


TANKS FOR THE
NEXT GENERATION



**ROTH MultiTank®
Certified Installers Handbook**





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1. INTRODUCTION

1.1 Roth MultiTank Certified Installer Program

The Roth MultiTank Certified Installer Program is designed to maximize your market share potential by providing certified installers with the security you deserve when installing our product. The program seeks to maximize your use of the Roth MultiTank for both new construction as well as replacement business by offering a warranty not only on the product, but on the costs of your labor should it be necessary to remove and replace a Roth MultiTank due to defects in materials or workmanship. You must be a certified installer to qualify for this additional labor warranty. This added value will allow you to quote the Roth MultiTank on any project whether it is for a homebuilder, homeowner, new construction or a replacement installation.

The Roth MultiTank Certified Installer Program offers you a unique marketing opportunity in the areas in which you do business. Certified Installers will be given preferential business lead opportunities that are generated from Roth's extensive internet, print and tradeshow marketing efforts. Certified Installers will be eligible to participate in certain promotions from time to time and will be permitted full access to the Roth Global Plastics website (marketing material, artwork, etc.)

The Roth MultiTank program is the only program of its kind in the onsite industry. With unprecedented warranty coverage on both the product and the replacement labor, the MultiTank program gives buyers tremendous value for their money, not to mention a tank that will last a lifetime.

1.2 Terms and Conditions (registration form located at the back of this manual)

Roth MultiTank Certified Installer Program

Roth Global Plastics is pleased to announce the launch of our new Roth MultiTank (RMT)...the only tank in the industry complete with both a product and replacement labor warranty; the only tank with a lifetime warranty against corrosion. The only tank you will ever need to carry.

In order to qualify for being a Roth MultiTank certified installer, you acknowledge the special terms and conditions of this agreement by signing the last sheets of this handbook.

1. In order for the tank warranty to be valid, the installing contractors must be certified under the Roth Global Plastics Certified Installer Program. The certified installer expressly agrees to adhere to the methods and practices described in this handbook when installing Roth tanks.

2. The installing contractor must fill out and submit the warranty card with each tank installed. Installers are recommended, but not required, to retain a copy of the warranty card for their records.

3. By submitting a form for certification after training, the installer expressly agrees to install the tanks exactly as instructed and only for their intended purpose.

4. Certified installers will submit all claims in writing to a Roth Authorized Distributor to be considered for reimbursement should it be determined that the tank requires replacement.

5. Certified installers agree to appropriately train/educate their crews, laborers and other staff members and are fully responsible for proper tank installation. The certification is not transferable or assignable. Certified installers are expressly prohibited from re-selling the tank to installers who are not certified.

6. Certified installers will have direct access to the factory for technical questions, supplemental installation instructions and other guidance as necessary to ensure a proper installation.

7. Failure to follow proper installation procedures will void any and all warranties, implied or written and will also result in immediate revocation of the installer's certification. This includes instructions related to the tank installation, riser system, riser sealing and all other instructions contained herein.

8. The warranty is limited to the replacement of the tank(s) in question of an equivalent model and up to \$2,500 per tank per installation providing the system failure is determined to be due to tank workmanship or materials only. Failure to properly design, apply or install the tank resulting in system failure does not constitute a valid warranty claim (e.g. failure to provide proper anti-buoyancy measures). Warranty on labor is valid for 5 years from the date of installation.



2. GENERAL

2.1 The Roth Advantage

Since 1947, Roth has been an industry leader for residential products related to environmental systems and solutions. Roth is a pioneer and world-leader in large part blow-mold design and manufacture with experience dating back nearly 40 years. Roth has over 1100 employees and 10 manufacturing facilities worldwide.

The Roth MultiTank was engineered to provide a permanent solution to all underground water and wastewater applications. Utilizing the world's largest blow-mold machine, Roth produces structurally sound, reliable parts that far exceed most system requirements.

Roth is also a true steward of the environment, not only manufacturing environmentally sound products that utilize recycled materials as a feedstock, but in utilizing a process where all scrap is fully recycled directly back into the process without ever leaving the plant and where no solid waste, air or wastewater are discharged into the environment. Roth is proud to produce a tank that will not only last forever, but one that minimizes the carbon footprint on the environment when compared to any other tank of any material of construction.

2.2 Roth Polyethylene Tanks

Unlike rotationally molded tanks Roth MultiTanks utilize a totally different resin that is structurally superior as both a raw material and a finished part. Utilizing high molecular weight, high density polyethylene resin (HMW-HDPE) Roth produces environmentally friendly products designed to last a lifetime. Consider the following features and benefits of a Roth MultiTank:

- The low-profile means less digging, smaller machines, maximum separation from shallow rock, high-water.
- Lightweight- allows installation without special equipment. Most tanks can be set by hand or with a mini-excavator.
- Multi-port inlet/outlet provides three piping options at each end of the tank allowing for convenient field piping, especially on replacements.
- Two – 24" diameter manways provide easy access for pumps, controls and service.
- Multi-purpose...cistern, septic, pump, dose or rainwater...you decide.
- Rugged construction allows for the use of native materials for backfill (no clay). Always follow the installation instructions on proper techniques.
- 60% - 70% heavier than other poly products - provides true structural integrity suitable for all applications, not just those where you can't set a concrete tank.
- **Absolutely no water** required for backfill, saves time, money and the hassle of dealing with water trucks.
- Threaded riser system allows for easy installation, no screws or assembly of small parts.
- 5-year warranty on replacement labor with a lifetime warranty against corrosion. The ONLY tank on the market backed up by a labor warranty.
- Roth tanks carry more state and third-party approvals than any other tank on the market.

The benefits of the Roth MultiTank are too numerous to list completely. This manual will help you make the most of the many advantages of the Roth MultiTank to your business and your customers!

2. GENERAL

2.3 Blow-mold manufacturing

The proprietary blow-mold manufacturing process used to make the Roth MultiTank consists of a 4-layer extrusion of high molecular weight, high density polyethylene (HMW-HDPE) at 400 degrees F in a vertical orientation. Roth's state of the art computer controlled machine precisely controls the wall thickness of the extrusion throughout the entire length of the parison to distribute the weight exactly where it is needed throughout the body of the tank resulting in unsurpassed structural integrity. The key to this structural integrity is the mold part-line that is formed at the very mid-wall of the tank making the tank sidewalls virtually immune to inward deformation due to compacted backfill.

Once the extrusion is complete and sealed off at each end, high pressure at 135 psig is introduced inside the parison and the entire extrusion begins to inflate like a large balloon. Simultaneous to this inflation, the water-cooled mold closes around the parison to shape the tank and provide its final form. Due to the forced cooling, parts are withdrawn from the mold in a relatively short period of time, usually between 8 and 14 minutes depending on the size of the tank.

Due to the process, each tank is proven to be watertight since the manufacture of each tank requires an airtight vessel in order to form the part.

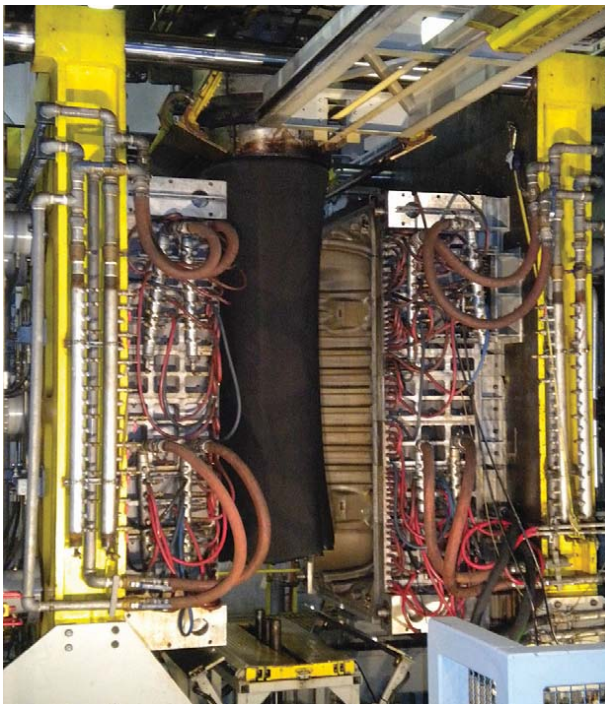


Photo 2.3.1 – Parison expansion during pre-blow process

Following the manufacturing process, each tank is weighed for gross (with scrap) and net (trimmed) weights and subjected to up to 12 ultrasonic thickness measurements, all of which are recorded. The tank is then fixtured in a post-mold fixture to pre-stress the tank in anticipation of the forces that it will see upon installation. The importance of this fixturing and the effects of soil compaction along the sidewalls will be discussed in great detail during the installation portion of the manual. It is important to note that the rib formed by the mold part-line produces exceptional material thickness and strength at the very mid-point of the sidewall thereby providing extraordinary resistance to sidewall forces encountered once placed in the excavation and backfilled.

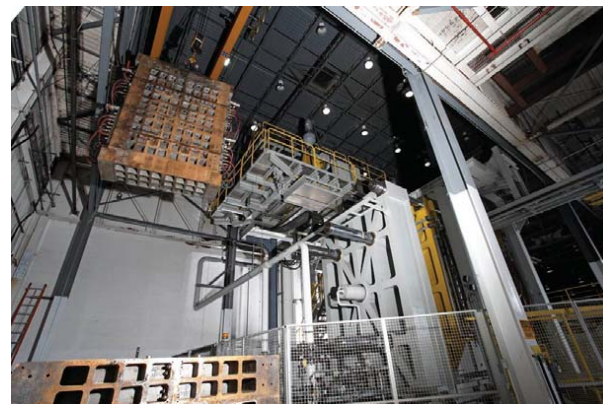


Photo 2.3.2– The largest blow molder in the world



Photo 2.3.3– The new material handling assembly

2. GENERAL

2.3 Blow-mold manufacturing (con't.)



Photo 2.3.4 – Post mold fixturing of Roth tanks

Note in particular that the post-mold fixturing “squeezes” the tank and arches the roof by attempting to push in the sidewalls. This is the exact same effect that should be achieved when placing compacted fill along the sidewalls. The fixture induces a shape and memory into the tank that makes it more receptive to receiving sidewall pressure during installation. It is this sidewall pressure that the tank relies on to achieve its maximum structural integrity.



3. BURIED STRUCTURE OVERVIEW

3.1 Rigid vs. Flexible Structures

The soil (backfill) interaction between a Roth tank is exactly opposite of that with rigid buried structures such as precast concrete tanks. When a precast tank is buried, the rigid walls are designed to not move in response to the pressures they experience. If the walls of the rigid structure move they will crack which may lead to premature failure of the vessel. In this situation, the soils exert active pressures on the walls of the rigid structure as they “act” upon the structure, attempting to deform the walls inward. The rigid concrete tank is passive in response to the soil force.

In flexible buried structures such as large diameter corrugated culvert pipe and the Roth tank the roles of the vessel and the backfilled material are reversed. In the case of a Roth tank, the vessel is backfilled and compacted according to the installation instruction which induces an arching effect in the roof of the tank, similar to the effect of the post-mold fixturing in Photograph 2.3.4. Once the tank has been properly backfilled and bedded with compacted fill now pushing against the sidewalls, the tank is ready to be covered. Upon experiencing the top loading forces (cover) the tank will attempt to transmit those forces through the arched walls of the tank and squat in response to the load. A properly installed tank will push against the compacted fill along the sidewalls to accommodate this movement. The compacted backfill now serves to restrain the tank in position by not allowing this movement to take place. In this case, the vessel is now “acting” on the soil and the soil becomes the passive participant in the process. At this point the tank is “locked” into position and excessive movement/ deformation is all but impossible.

3.2 Composite Structures

The phenomenon described above is, in reality, quite simple and is known as a composite structure. That is to say that the tank relies upon the installed condition to achieve its full structural integrity. The tank acts in concert with the soil to form a structure that, when properly installed, is actually stronger than the tank itself without the supporting soil structure. Other examples of composite structures would be the rebar used in concrete septic tanks, fiberglass filaments in fiberglass tanks and the plywood and roof truss system used in the construction of many wood frame structures.

3.3 Soil Compaction

The importance of the selection, proper placement and compaction of the tank bedding, haunch fill and sidewall (backfill) material cannot be overemphasized and is critical to the structural integrity and longevity of the tank.

In the simplest definition, soil compaction is simply mechanically increasing the density of the material being compacted to provide greater load bearing capacity. Compaction, in addition to the increased load bearing, provides stability, reduces swelling/shrinking and reduces the settling of the soils being placed.

Clays and other cohesive soil mixtures do not respond well to compaction and are difficult to work with. Clays and clay-like soils are not permitted for any portion of the installation (bedding, haunch support or sidewall backfill) and the use of such material will **void the warranty**.

An excellent guide to soil compaction, compaction equipment, soil classifications and other very useful information was developed by Multiquip Inc., of Fresno California - a distributor of earth moving Equipment. This information may be found at www.multiquip.com/multiquip/pdfs/product-brochures/Soil-compaction-2004-handbook.pdf

4. INSTALLATION TRAINING MATERIAL

4.1 Installation Seminar

The following installation seminar is comprised of photos and instructions from test installations, actual field installations and factory-staged demonstrations and tests. It is intended to show a wide variety of techniques, materials, and installation guides and is not intended or presented as a single “ideal” installation as we recognize that each and every installation has its challenges and that no single site is likely ever ideal. The intent is to provide you with as broad of an overview as possible so that you may adopt local codes, materials, equipment and practices to achieve the desired results of a successful installation!

There are four basic thoughts to keep in mind when installing Roth tanks.

1. Empty
2. Bed
3. Haunch
4. Compact

By remembering these 4 key steps...**EMPTY, BED, HAUNCH, COMPACT**, you will be ensured a quality installation every time. Following are the basics:

- 1. EMPTY.** The tank should be empty throughout the entire installation process. Adding water is potentially detrimental to the installation as it will create internal pressure working against the compacted backfill described above.
- 2. BED.** Create a firm and uniform compacted bed for the belly of the tank to rest on. The compacted bed should prevent the belly from pushing down into the excavation after water is ultimately introduced to the tank. A compacted bed will eliminate or minimize settlement which can distort piping connections.
- 3. HAUNCH.** Due to the curved shape of the tank, the haunches of the tank need to have fill worked under them to cradle the tank. The haunches are defined as the curved area of the tank where the vertical sidewall transitions into the horizontal belly of the tank. Since it is nearly impossible to compact this material under the haunches, the use of pea gravel, crushed stone or other material that is compacted when placed is required. Care must be taken to work the material under the tank and between the ribs.

4. COMPACT. Now that the tank is completely “cradled” on the compacted bed and the haunches, backfilling can begin up the sidewalls. Adding materials in 6”-12” lifts (layers) and compacting with a jumping jack, plate tamper or hand tamper is required to provide the sidewall restraint necessary to “lock” the tank into position. Native material may be used providing it is compactable and free of clay. **NO CLAY IS PERMITTED FOR BACKFILL!**

It should also be noted that the instructions for installing Roth tanks are virtually identical to the instructions published in the Best Practices Manual of the National Precast Concrete Association.

In addition to the installation instructions inside every tank that leaves the factory, the following sticker is placed on the inlet end of every tank as a helpful reminder.

IMPORTANT!
FAILURE TO INSTALL TANK PROPERLY WILL VOID THE WARRANTY

- * **DO NOT FILL TANK WITH WATER BEFORE BACKFILL**
- * **BED TANK ON COMPACTED BASE**
- * **SUPPORT HAUNCH WITH GRANULAR MATERIAL (SAND, GRAVEL, PEA STONE OR SIMILAR)**
- * **COMPACT BACKFILL IN 6" LIFTS**
- * **DO NOT BACKFILL WITH ANY CLAY**
CALL FACTORY AT 866.943.7256 WITH QUESTIONS

4. INSTALLATION TRAINING MATERIAL



Photo 4.1.1-Drilling of inlet and outlet holes

Drill the inlet and outlet holes utilizing a standard 5" hole saw. The inlet and outlet ends have been pre-offset at the factory to provide the required amount of fall between the inlet and outlet inverts. All tanks have two pilot hole dimples located at each end of the tank and one hole on each side providing the option for three inlet locations (End, Right Side, Left Side) and the same for the outlet locations. The "A" dimples will provide a 40" liquid level (suitable for most States and Provinces) and the "B" dimples will provide a 42" liquid level.

For most States and Provinces, you will center the pilot bit on the "A" dimples **at each end of the tank**. **DO NOT USE DIFFERENT COMBINATIONS OF "A" and "B" dimples.** This will result in an improperly configured tank that may not allow proper flow through the tank.

Tanks for **Florida, and Oregon** are all **PREDRILLED AT THE FACTORY.**

Tanks for **Arizona, Illinois and Nebraska** should be drilled at the "B" dimple pilot holes.

ALL OTHER STATES AND PROVINCES SHOULD USE THE "A" DIMPLES.

DO NOT ATTEMPT TO CUT THE HOLES WITH ANYTHING OTHER THAN A HOLE SAW! YOU WILL NOT ACHIEVE A WATERTIGHT SEAL ON THE PIPING!

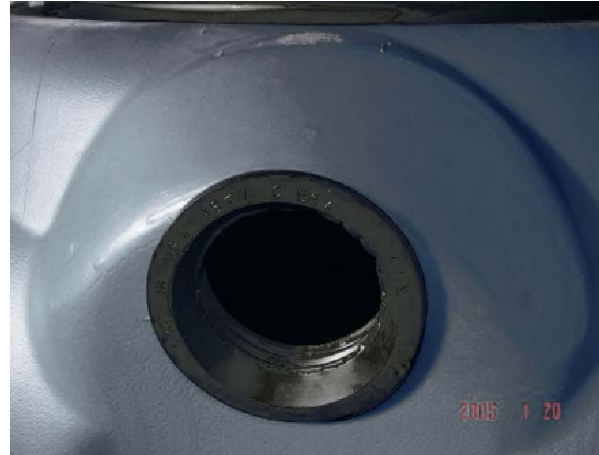


Photo 4.1.2-Tank with rubber grommet

All tanks are provided with two rubber grommets for the inlet and outlet connections. Insert each grommet fully into the 5" hole so that the flange on the grommet is flush with the surface of the tank. Pipe lubricant will be necessary to stab in the pipe from the outside. It is also advantageous to bevel the end of the pipe and to angle the pipe to the side when stabbing it through the grommet. Attempting to push the pipe straight in through the grommet may cause the grommet to disengage from the tank wall.



Photo 4.1.3-Bedding being spread and compacted

Bedding, in this case, manufactured sand or stone dust is added and spread about the bottom of the excavation to create a uniform bed. Other material such as sand, crushed gravel, or other similar material may be used to bed the tank providing it is uniformly spread and compacted.

4. INSTALLATION TRAINING MATERIAL



Photo 4.1.4-Bedding material prepared for setting the tank

The bedding material has been added to the desired elevation, raked and compacted in preparation for setting the tank. Creating a firm compacted bed for the belly of the tank to bear upon is critical in minimizing tank deformation. Over-digging and/or using soft native material for the bedding will cause the tank to push in and deform.

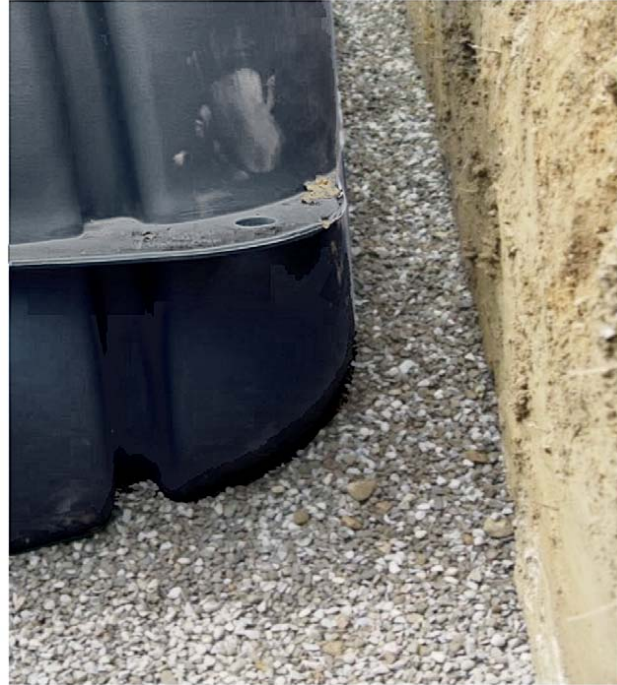


Photo 4.1.5-Support of the haunch

The tank is set in the excavation on the bedding and more material is added to support the haunch of the tank. Note in photo 4.1.5 how it is necessary for the material to flow under the curved portion of the tank as well as into the ribs to provide haunch support.



Photo 4.1.6-Spreading & compacting of backfill material

The backfill material is spread evenly and compacted around the entire tank. Care must be given to see that the material is worked into the corrugations and under the haunch to provide uniform support. Adding large quantities of material along the sides of the tank may cause bridging of the material between the tank and the excavation causing voids. Take care to eliminate any void space and provide continuous support.

4. INSTALLATION TRAINING MATERIAL



Photo 4.1.7-Proper support for vessel

Note that this free-flowing material clearly fills all voids, including the ribs (corrugations) and provides uniform support to the vessel, locking it into position thereby preventing future movement (deformation) of the vessel. **Compaction must follow each lift of backfilling to provide proper restraint of the tank movement.**



Photo 4.1.8-Example of mechanical compaction

Mechanical compaction equipment such as vibratory plate tampers (shown above), jumping jacks or hand tamps may be used to provide compaction to the backfill material. The tank will not be compromised or hurt by mechanical compaction of the material. In certain situations, the installing contractor may perform a "bucket press" on the native material to provide compaction as the fill is brought up around the tank.



Photo 4.1.9-Uniform level distribution of material

Note the uniform and level distribution of compacted material around this tank. Additional backfill material should be added in 6" layers (lifts) uniformly around the vessel.



Photo 4.1.10-Example of backfilling material

Native material may be used as backfill, HOWEVER care must be taken to properly place and work the material into a compacted composition. Many installers find that it is easier to simply bring in all imported material for backfilling. Note the relatively free flowing native material above and the absence of clay, rocks and other unfavorable material.

4. INSTALLATION TRAINING MATERIAL



Photo 4.1.11-Example of evenly and uniform backfilling with native material

In photo 4.1.11, one can clearly see the native material added evenly and uniformly around the tank. This particular backfill was compacted using a simple hand tamp. This material was taken from the excavated fill shown above. Note the compaction of the soil and the absence of clay, rock and debris that could damage the tank.

Failure to properly follow these installation instructions will result in excessive sidewall expansion and tank roof squat. Symptoms of these conditions are lids that are out of level and/or risers that lean toward one another. The tank will not catastrophically fail, however it may cause trouble/interference with the piping system and replacement of the lids. In most cases, the tank can be excavated and properly reinstalled.



Photo 4.1.12-Example of complete backfill

Once backfilling is complete to the top of the tank as shown in photo 4.1.12, no further compaction of the material is required. While the native material above indicates a small presence of clay, the material is generally a sandy clay loam indicating a greater presence of sand than clay. Note how the material is generally free flowing and does not indicate the adhesion properties associated with soils comprised predominantly of clay.

4. INSTALLATION TRAINING MATERIAL



Photo 4.1.13-Example of soil with heavy clay

The soils in photo 4.1.13 exhibit properties of heavy clay as evidenced by the plasticity. These soils are completely unacceptable for backfill material. Note in particular the gray material in the lower right hand corner of the photo.



Photo 4.1.14-Example of final grading

Final grading should encourage water to drain away from the tank. Grading equipment may be run near, but not over the buried vessel.



Photo 4.1.15-Example of careful and uniform backfill of piping system

Gravel, and other similar material, should always be used when backfill around and under piping systems. It is also important to backfill carefully and uniformly around the riser systems to prevent distortion of the riser into an out of round shape.

4. INSTALLATION TRAINING MATERIAL



Photo 4.1.16-Pipe located inside the edge of the manway

Insert piping from the outside of the tank utilizing pipe lube or similar lubricant on both the grommet and the pipe to facilitate passage through the grommet. Cut pipe to length such that T-baffles are located just inside the edge of the manway as shown in photo 4.1.16. Do not over-insert piping into the middle of the manway.

4.2 Sealing Riser Joints

The threaded riser system offered by Roth Global Plastics provides a mechanical system of attachment and will not be watertight without taking additional steps to seal the various joints in the system. There are a number of products and measures that may be taken to prevent infiltration depending on the application of the tank and expected exposure to high groundwater or surface water penetration.

While every installation requires a watertight system, some installations are more sensitive than others to incidental infiltration. The most critical applications for ensuring absolute watertightness are:

- Cisterns
- Holding tanks
- STEP applications
- Mound systems
- Time dosed systems
- Other engineered systems or advance treatment units

Roth Global Plastics tanks are all inherently watertight from **exfiltration** due to our manufacturing process. You can be assured that the waste stream will not leak into the groundwater system when using Roth tanks.

A number of sealants are available from Roth depending on the application and expectation of the riser joints being exposed to potential sources of infiltration:

Basic sealing system – Use of closed cell foam gaskets at all joints for use in arid climates or to prevent infiltration due to the occasional exposure to groundwater.

Advanced sealing system – Use of the closed cell foam gaskets at all joints followed by a covering of sealant (ADH100) or butyl mastic is recommended (the closed cell foam gaskets act as a backer where the joints may be non-uniform). When using the ADH100, curing time must be allowed between applications. Approximately two tubes of ADH100 will adequately “caulk” the riser to tank joint and two-three riser to riser joints.

Critical sealing system - Use of foam gaskets and ADH100 followed by a protective cap of butyl mastic applied with a heat gun to ensure full contact with the mating surfaces and providing protection to the sealants underneath. The ADH100 should be fully cured before applying the mastic (10-24 hours).

4. INSTALLATION TRAINING MATERIAL



Photo 4.1.17-Applying the foam gasket

Apply foam gasket uniformly around the edge of the manway. Once the gasket is applied, thread riser section in as tightly as possible.



Photo 4.1.18-Riser and tank joints completely threaded in and gasketed

In the photo 4.1.18, the riser and tank joints are now completely threaded in and gasketed. ADH100 may now be "caulked" over the joints to provide sealing and adhesion of the parts.

When applying butyl mastic over the joints, the butyl is best applied when warm or with the use of an electric heat gun to encourage the butyl to form freely around the joints. Butyl mastic wrap (4" wide) is used over the riser to riser joints and butyl mastic cord (3/4" square) is packed into the riser to tank joint.

All surfaces should be clean, dry and free of oils to ensure proper adhesion and sealing of the materials no matter what system is used.

In all systems, it is critical that the risers be backfilled carefully so as to maintain roundness. Uneven loading on the risers during backfilling conditions can cause joint separation thereby inviting leaks into the system.

4.3 Anti-buoyancy Solutions

Buoyancy of any buried structure is dependent on four factors, only one of which can be determined by the manufacturer of the vessel, namely:

- Weight of buried vessel
- Minimum weight of liquid in vessel
- Amount of cover
- Level of groundwater relative to vessel

Aside from the weight of the vessel, all other factors are site specific criteria that cannot be calculated by the factory. In fact, one can only assume that the tank is completely empty, that the tank has no cover over top of it and that it is completely submerged. The combination of these three factors actually all occurring at once is not impossible, but it is rather improbable.

Aside from considering the worst case scenario, all anti-buoyancy calculations and countermeasures should be considered a site specific requirement that the system engineer should account for.

While great concern is exhibited over the nearly irrational fear that "all poly tanks will float", the fact of the matter is that concrete tanks will become buoyant under the right set of site specific circumstances as well. **In general, most Roth tanks will be resistant to flotation under worst-case conditions with about 30" of cover.**



4. INSTALLATION TRAINING MATERIAL

It is highly recommended that all tanks be filled with water immediately after installation or immediately after pumping for existing tanks.

Roth tanks can be “anchored” by pouring a concrete apron around the midpoint of the tank using the excavation as a form. This detail is shown below.

Details Provided by APPIAN Consulting Engineers – www.applanengineers.com

12/06/2005 – 10:07:05 AM

RESTRAINING COLLAR FOR HIGH GROUNDWATER

TOP

GENERAL NOTE:

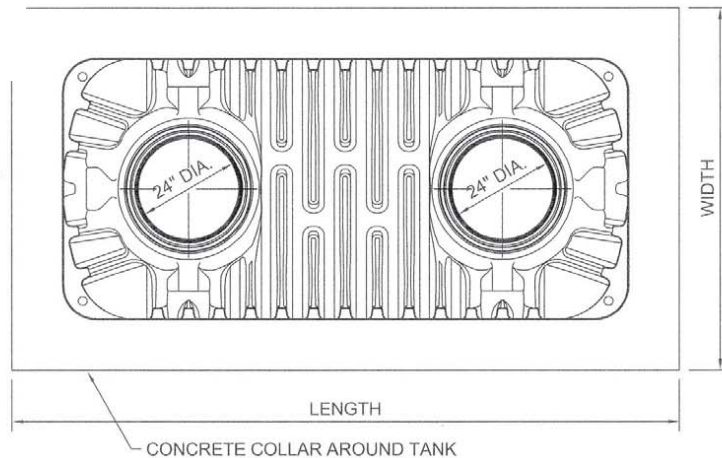
1. THE BUOYANCY RESTRAINING COLLAR DESIGN IS BASED ON BUOYANCE CALCULATIONS AVAILABLE ON REQUEST FROM ROTH

CONCRETE NOTES:

1. PROVIDE CONCRETE TO OBTAIN THE MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS.
2. CONCRETE MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH ACI-318-99 (BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE) AND ACI-301-LATEST EDITION (SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS).

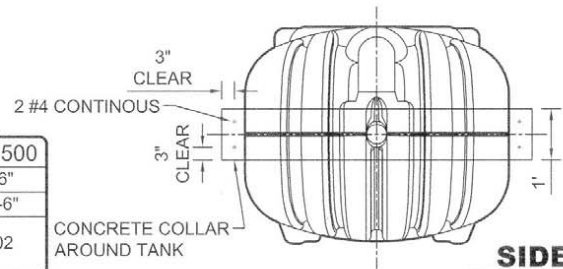
REINFORCING STEEL:

1. ALL REINFORCING STEEL SHALL BE BILLET STEEL CONFORMING TO STANDARDS OF ASTM A615, GRADE 60.



CONCRETE COLLAR SPECS

TANK MODEL	ST-500	ST-750	ST-1060	ST-1250	ST-1500
WIDTH (FEET)	7'-0"	7'-0"	7'-6"	7'-6"	7'-6"
LENGTH (FEET)	7'-0"	10'-6"	12'-0"	14'-0"	16'-6"
FACTOR-OF-SAFETY AGAINST FLOATING	2.96	2.15	2.09	2.10	2.02



DWG SCALE: 1:1
PLOT SCALE: 1:2
SHEET #: 1 OF 1

Roth MultiTank Buoyancy Restraining System

4. INSTALLATION TRAINING MATERIAL

4.4 Deep Burial Instructions (where allowed by local Code)

Where allowed by State and Local Codes, Roth tanks may be buried with up to 72" of cover. Deep burial applications involve the use of two internal pipe supports of Schedule 40, 4" PVC (supplied by others).

The supports are located inside the edge of each manway and span from floor to roof of tank as shown in the attached photos.

It should be emphasized that the use of the pipe supports places even more emphasis on proper installation so as to avoid point loading of forces generated due to the cover over the tank on the pipe to tank interface alone.

PROPER INSTALLATION PRACTICE MUST BE ADHERED TO. USE OF THE PIPE SUPPORTS TO CUT CORNERS WILL VOID THE WARRANTY AND MAY CAUSE SEVERE DAMAGE TO THE TANK!



Photo 4.1.19-Pipe Supports

The pipe supports are added after the bedding is complete and the tank has been set in the hole. The supports can be added after some backfilling is complete, but should always be added no later than when the backfill reaches the mold part-line (rib at midpoint of tank). Pipe supports are required for any installation with more than 36" of cover, but may be added to any installation with less cover at the installer's discretion.

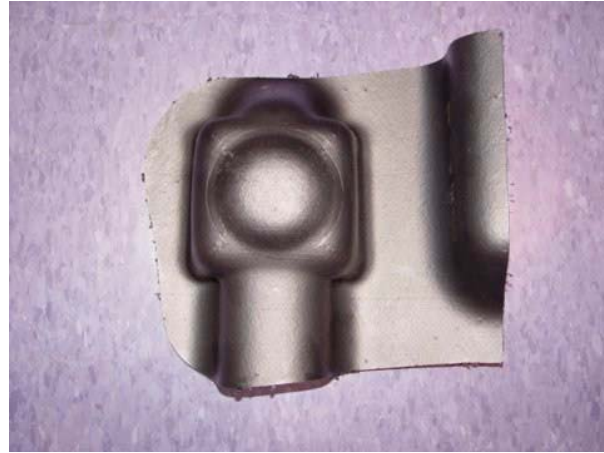


Photo 4.1.20-Pipe Support Tenons

Four pipe tenons are located in every tank from 900 G and larger. Two tenons are located in the 750 G tank. The 300 and 500 G tanks do not have tenons and do not require pipe supports for deep burial.

The tenons are located just inside the manways and are opposed to one another on the floor and roof of the tank.

The Schedule 40, 4" PVC pipe should be cut approximately 43 1/2". Due to the internal dimensions of every tank varying slightly during the manufacturing process each end should be measured. Depending on the amount of compaction and the state of the backfill, the tank may be slightly "taller" due to the squeezing effects of the fill.

A properly fitted pipe support should be slightly loose after installation, but not so loose that it is easily dislodged. The installation of the support is accomplished by fitting the upper end of the pipe over the roof tenon and then sliding the lower end of the pipe over the floor tenon with a pry bar, shovel or other device in a "shoehorn" type manner.

After installing the pipe supports, continue with normal installation procedures.



5. SPECIAL CONSIDERATIONS FOR CISTERNS

5.1 General

The Roth MultiTank is an NSF 61 certified and listed product which means that not only is the resin used an FDA compliant resin listed by NSF, but that the finished product itself is tested periodically by NSF to ensure that there are no contaminants harmful to human health and safety that would be introduced to the water stored in the vessel.

The NSF listing and testing, however does not provide any protection against contamination introduced to the vessel during handling, storage, transport, installation or the water source that ultimately fills the vessel. All vessels used for potable water storage should be thoroughly cleaned and disinfected prior to initial use.

5.2 Grading and Drainage

All underground cisterns should be installed exactly as septic tanks. If the cistern is being used for potable water, special care should be taken during installation to properly seal the piping penetrations and risers if used.

Grading and drainage site considerations can have a huge impact on the operation and performance of your system. Every system is designed based on the expected flow from the residence and precautions should be taken to encourage surface water and groundwater away from the tank and drainfield.

5.3 System Care and Maintenance

All cistern systems should be provided with appropriate downstream filtration and disinfection equipment. If the cistern is being used to collect rainwater for drinking purposes, it should be provided with upstream filtration to separate any organic material from entering the vessel.

For more information and technical guidance on the use of your Roth MultiTank as a cistern, we recommend that you review the information summarized in the article “Well A Syst”, a project developed for Colorado by the Colorado Department of Public Health and Environment, Water Quality Control Division, found at <http://www.colorado.gov/cs/>.



6. FREQUENTLY ASKED QUESTIONS

6.1 Frequently Asked Questions

Q: Can I use a ROTH tank as a pump tank?

A: All ROTH tanks are structurally suited to be partially or completely pumped dry. You must check with the State, County and perhaps even municipality where the tank is being installed as the regulations on pump tanks are very inconsistent or, in some cases do not exist. ROTH is the only poly tank manufacturer that allows the use of their tank for pump applications without restrictions. When using tanks as a pump tank, special consideration must be given to anti-buoyancy measures as liquid (which serves as ballast) is removed from the tank.

Q: What is the maximum temperature that the tank can withstand?

A: 140 degrees F is the maximum temperature of influent in the vessel.

Q: Will the tank fade or be structurally compromised by prolonged sunlight exposure?

A: No. ROTH uses resins that contain a UV inhibitor which is the maximum available on the market.

Q: Can ROTH tanks be used as a grease trap?

A: Yes. The basic principles of a grease trap operation are identical to those of a septic, which is that solids will collect at the bottom while fats, oils and greases (FOG) rise and accumulate at the top with a clarified effluent between the two layers. Ask the factory for directions on how to apply the tank as a grease trap. You must also check with local code officials on inlet sizes, compartment wall design, traffic rating, and other considerations in order to ensure code and regulatory compliance.

Q: Does ROTH use the same resin as rotationally molded tanks?

A: No. ROTH utilizes a high molecular weight, high density polyethylene (HMW-HDPE) that has superior structural characteristics to the resins used in rotationally molded tanks.

Q: I have a fork cut in my tank. Can this be repaired?

A: If the fork cut is above the liquid level, it may be sealed with a 2-part epoxy kit (sold separately). Other methods for repairing larger holes are to hire a local plastic fabricator who is familiar with welding HDPE to patch the hole by thermally welding at your yard.
IMPORTANT: Check with your local regulators to ensure repairs are acceptable.

Q: Does ROTH use scrap to make their tanks?

A: Our tanks are made with a blend of virgin resin, internally generated scrap and select, high grade scrap that we purchase on the secondary market. All scrap material purchased from outside sources is industrial based scrap (no consumer scrap that individual households recycle) and is sampled and laboratory tested for compliance to our specifications.

Non-compliant scrap is rejected and returned. ROTH considers itself a steward of the environment both in the products that we produce, the materials we use to produce them and the process by which they are produced. ROTH proudly occupies a large portion of a former Brownfield facility that was formerly and EPA Superfund site. We are even more proud of the fact that our process is the most environmentally sound in the world; we have no air, water or solid waste discharge as a result of our process.

Q: Why are ROTH tanks different colors on the inside and outside, but all the other poly tanks are the same color throughout?

A: ROTH's process utilizes a 4-layer co-extrusion process that allows us to color each individual layer a different color. The original ROTH brand tanks were blue on the outside and the other three layers black. Black is used to homogenize the color of the innermost three layers when we are consuming scrap material. The new Roth MultiTanks are black on the outer 3 layers with a virgin (white, non-colored) resin on the inner lining or wetted surface.

Q: How should I store my ROTH tanks?

A: We recommend storing the tanks upside down to minimize the natural sagging that can occur if they are stored on their feet. As HDPE is a pliable material, the tanks will have a tendency to sag slightly over time. While this does not have any impact on the structural integrity of the tank, storing the tanks upside down will prevent this. The tanks should not be stacked any more than 3 layers high.

Q: What third-party certifications does ROTH hold and what do they mean?

A: ROTH is third-party certified by IAPMO (International Association of Plumbing and Mechanical Officials) which allows us to mark our vessels with the UPC symbol (Universal Plumbing Code) and by CSA (Canadian Standards Organization). All Roth MultiTanks are NSF 61 listed for potable water service.



6. FREQUENTLY ASKED QUESTIONS

6.1 Frequently Asked Questions (cont.)

Q: My local inspector told me that I needed to have an NSF 40 certification on the tank to install it. Is an NSF certification required for septic tanks?

A: No. This is a frequent point of confusion. NSF 40 is the prevailing standard for advanced treatment units (usually aerobic). NSF 40 is a complicated and extraordinarily expensive certification to achieve and usually takes up to 24 months to complete. We are not aware of any septage jurisdictions that require an NSF 40 for conventional septic tanks.

Q: Can I use the tank as a potable water cistern?

A: Yes. Approximately 40 states have adopted NSF 61 as their default regulation for potable water cisterns. The RMT series of tanks manufactured by Roth Global Plastics are NSF 61 certified for use in potable systems. All blue ROTH tanks may be used for non-septic applications other than potable such as water storage, chemical feed, agricultural, rainwater, graywater recycling and other similar applications.

Q: I was told that all poly tanks float because they are so light. Is this true and should I be concerned about using a ROTH tank?

A: All tanks, including concrete tanks will become buoyant when exposed to high enough groundwater without adequate soil coverage or anchoring. Buoyancy is a very simple calculation that is basically a mass versus volume relationship. Consider an empty one gallon plastic milk jug. Since the volume is one gallon and the mass contained is about 8.2 pounds (the weight of most water per gallon) the buoyant force is simply 8.2 pounds if you ignore the weight of the container. Said differently, it would take 8.2 pounds of force to push and hold that jug under water. Buoyancy is also a linear force, so if the tank is half-full, the force necessary to counteract the effects of buoyancy is half. Buoyancy is easily overcome by one or more of the following:

1. Making sure the vessel is full at all times, especially during times of seasonal high groundwater.
2. Installing the vessel with adequate cover to overcome the buoyant forces (about 30" of cover for all ROTH tanks).
3. Installing the vessel with an anchoring system specifically designed by a licensed engineer for the intended application.

Q: Can ROTH tanks be used above ground or on a trailer for water delivery?

A: While our tanks are designed for buried applications, they are overwhelmingly strong and resilient. We recommend that a tank be bedded in about 6" of pea gravel should it be utilized in an aboveground installation. The pea gravel can be retained in place by constructing a simple sand-box slightly larger than the footprint of the tank. The pea gravel provides the necessary haunch support. No other special care should be required. The same haunch support would be required if they were to be used on a trailer.

Q: Are the tanks suitable for use with chlorine or other chemicals?

A: HDPE is one of the most chemically resistant materials in the world. Dilute solutions of most chemicals should not present any problems at all. For concentrated chemical solutions, please contact the factory. Most hazardous materials and wastes are transported and stored in HDPE drums, tanks, and other vessels.

Q: What is the difference between one compartment and two compartment tanks?

A: The use of single compartment versus double compartment tanks is purely driven by regulations. Most regulations clearly identify what applications require a single versus double compartment product.

Q: I want to install a pump in the second compartment. Is the compartment wall watertight?

A: No. The compartment wall is not watertight, nor is it intended to be. The compartment wall acts as a sludge baffle, allowing a buildup of sludge on the inlet side of the wall. This allows for more highly clarified effluent to develop in the effluent compartment. If your application (and local regulations) requires the ability to pump effluent while maintaining the liquid level of the influent, you need to install two tanks in series.



6. FREQUENTLY ASKED QUESTIONS

6.1 Frequently Asked Questions (cont.)

Q: I know that precast concrete tanks must conform to ASTM 1223. Do ROTH tanks conform to the same standard.

A: No. The ASTM 1223 specification is very specific to precast concrete tanks. In fact, there exists no comparable ASTM specification for polyethylene tanks. The closest specifications that are recognized or acknowledged by many States are the IAPMO and CSA standards, both of which ROTH is third-party certified. The specific standards are listed below:

- 1) IAPMO/ANSI Z1000-2007 Prefabricated Septic Tanks
- 2) CSA B66-06 Septic and Sewage Holding Tanks for Plumbing Systems

Q: I noticed that there is a horizontal rib that goes all the way around the tank. Is this a seam?

A: No. The rib you are referring to is known as the mold part-line. This rib is formed when the two halves of the mold close and “pinch” the hot polyethylene. The tank is completely seamless and the rib that you mention is part of what gives ROTH tanks their extraordinary strength and material thickness at the very midpoint of the sidewall.

Q: I am getting ready to drill my tank before installation. Where do I drill?

A: All ROTH tanks (with the exception of tanks being installed in FL, AZ, NE and IL) should be drilled at the “A” dimples with a standard 5” hole saw. The dimples are pre-offset at the factory and will provide a 43” invert at the inlet and a 40” invert at the outlet. Tanks being installed in Florida and Oregon are pre-drilled at the factory. Tanks in AZ, NE and IL should be drilled at the “B” dimples with a 5” hole saw and will result in inlet and outlet inverts of 44” and 42” respectively.

Q: Are ROTH tanks traffic rated?

A: No. Although ROTH tanks are the strongest poly tank on the market, they are not rated for any vehicular traffic. ROTH tanks are suitable for residential installations only and can easily withstand lawnmowers and normal wear and tear.

Q: What is the maximum burial depth?

A: The RMT is certified by IAPMO to both CSA B66-05 and IAPMO/ANSI Z1000-2007 standards for prefabricated septic tanks. Maximum burial depth as specified by these standards is one meter and 36 inches respectively. While many states limit the burial depth of septic tanks to 36 inches, the RMT has been successfully installed at depths to 48 inches and in some cases as deep as 72 inches. Please contact the factory for special deep burial instructions and recommendations, 1-866-943-7256.

Q: Are the risers watertight once they are threaded together?

A: The riser joints between the tank and riser and from riser section to riser section are water tight only after applying our riser gasket (sold separately) and a sealant (sold separately) to the joints per installation instructions. For water tight installation recommendations and tips, please call our factory at 1-866-943-7256.





7. ROTH MULTITANK CERTIFIED INSTALLER PROGRAM

7.1 Terms and Conditions

Roth Global Plastics is pleased to announce the launch of our new Roth MultiTank (RMT)...the only tank in the industry complete with both a product and replacement labor warranty; the only tank with a lifetime warranty against corrosion. The only tank you will ever need to carry.

In order to qualify for being a Roth MultiTank certified installer, you acknowledge the special terms and conditions of this agreement by signing below.

1. In order for the tank warranty to be valid, the installing contractors must be certified under the Roth Global Plastics Factory Certification Program. The certified installer expressly agrees to adhere to the methods and practices described in this handbook when installing Roth tanks.
2. The installing contractor must fill out and submit the warranty card with each tank installed. Installers are recommended, but not required, to retain a copy of the warranty card for their records.
3. By submitting a form for certification after training, the installer expressly agrees to install the tanks exactly as instructed and only for their intended purpose.
4. Certified installers will submit all claims in writing to a Roth Factory Authorized Distributor to be considered for reimbursement should it be determined that the tank requires replacement.
5. Certified installers agree to appropriately train/educate their crews, laborers and other staff members and are fully responsible for proper tank installation. The certification is not transferable or assignable. Certified installers are expressly prohibited from re-selling the tank to installers who are not certified.
6. Certified installers will have direct access to the factory for technical questions, supplemental installation instructions and other guidance as necessary to ensure a proper installation.
7. Failure to follow proper installation procedures will void any and all warranties, implied or written and will also result in immediate revocation of the installer's certification.
8. The warranty is limited to the replacement of the tank(s) in question of an equivalent model and up to \$2,500 per tank per installation providing the system failure is determined to be due to tank workmanship or materials only. Failure to properly design, apply or install the tank resulting in system failure does not constitute a valid warranty claim (e.g. failure to provide proper anti-buoyancy measures). Warranty on labor is valid for 5 years from the date of installation.

Company: _____

Address: _____

Contact: _____

Signature: _____





7. ROTH MULTITANK CERTIFIED INSTALLER PROGRAM

7.2 Registration Form

RMT Certified Installer Registration Form

(to be filled out AFTER certification training)

Name: _____ Date: _____

Business: _____ Instructor: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____

Email address: _____

Website: _____

Business Profile (check all that apply):

- | | |
|---------------------------------------------|-------------------------------------------------|
| <input type="checkbox"/> Design/Engineering | <input type="checkbox"/> Advanced Treatment |
| <input type="checkbox"/> Pumping | <input type="checkbox"/> Service |
| <input type="checkbox"/> Installation | <input type="checkbox"/> Other (please specify) |

Other Information:

Approximate number of installations per year _____

Do you work in multiple states? (if so, please specify) _____

Certified Installer Acknowledgement

By virtue of the signature below, the above named party agrees to the terms and conditions of the Roth MultiTank Certified Installer Program and acknowledges that they have received the necessary training and training aids to properly install the Roth MultiTank and agrees to do so without exception.

Acknowledged by:(print name) _____

Signature: _____

Roth Certified Installer Trainer Signature: _____

FACTORY USE ONLY BELOW LINE – FACTORY USE ONLY BELOW LINE

Date received: _____ Received by: _____

RMT Certified Installer Number Assigned: _____





7. ROTH MULTITANK CERTIFIED INSTALLER PROGRAM

7.3 Warranty Claim Form

RMT WARRANTY CLAIM FORM

TANK MODEL #(s):

HOMEOWNER: _____

ADDRESS: _____

COUNTY: _____

PHONE: _____

CONTRACTOR:
(PERFORMING REPAIR/REPLACEMENT) _____

ORIGINAL INSTALLING CONTRACTOR: _____
(IF DIFFERENT)

DESCRIPTION OF FAILURE/JOB:

DATE REQUESTED: _____

ROTH APPROVAL: _____





ROTH MultiTank® PRODUCT DETAILS

MODEL (MultiTank)	DESIGN CAPACITY US Gallons (Liters)	TOTAL CAPACITY US Gallons (Liters)	ACTUAL CAPACITY US Gallons (Liters) 40"/42" Liquid level	HEIGHT Inches (mm)	WIDTH Inches (mm)	LENGTH Inches (mm)	WEIGHT Pounds (kilogram)
RMT-300 (single layer)	300 (1136)	325 (1230)	273 (1033)/284 (1075)	54 (1372)	45 (1143)	50 (1270)	120 (54.43)
RMT-500	500 (1893)	535 (2025)	452 (1710)/474 (1794)	51 (1295)	62 (1575)	60 (1524)	225 (102.06)
RMT-750	750 (2840)	1000 (3785)	853 (3229)/898 (3399)	51 (1295)	62 (1575)	103 (2616)	360 (163.29)
RMT-900	900 (3407)	1161 (4394)	990 (3747)/1028 (3891)	51 (1295)	62 (1575)	118 (2997)	450 (204.12)
RMT-1000E	1000 (3785)	1161 (4394)	990 (3747)/1028 (3891)	51 (1295)	62 (1575)	118 (2997)	450 (204.12)
RMT-1060	1060 (4012)	1337 (5061)	1177 (4455)/1227 (4645)	51 (1295)	62 (1575)	133 (3378)	520 (235.87)
RMT-1250	1250 (4730)	1469 (5560)	1259 (4766)/1319 (4992)	51 (1295)	62 (1575)	148 (3759)	560 (254.01)
RMT-1500	1500 (5678)	1771 (6703)	1540 (5830)/1601 (6060)	51 (1295)	62 (1575)	177 (4496)	640 (290.30)

Call 1.866-943-7256 or visit www.roth-america.com for additional information and product lines.



Roth, a family-owned business established in Germany 60 years ago, now operates in 29 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

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