

May

2008

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By Gil Longwell

ON THE COVER: Mark Shepard (foreground) of Utilities Excavating, Inc., works with a crew on a jobsite. For more than 20 years, the business has installed a major share of the mounds and advanced treatment systems around overland Park, Kan. (Photography by Christopher J. Cummins)

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- Machine Matters: Greener maintenance practices

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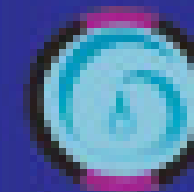


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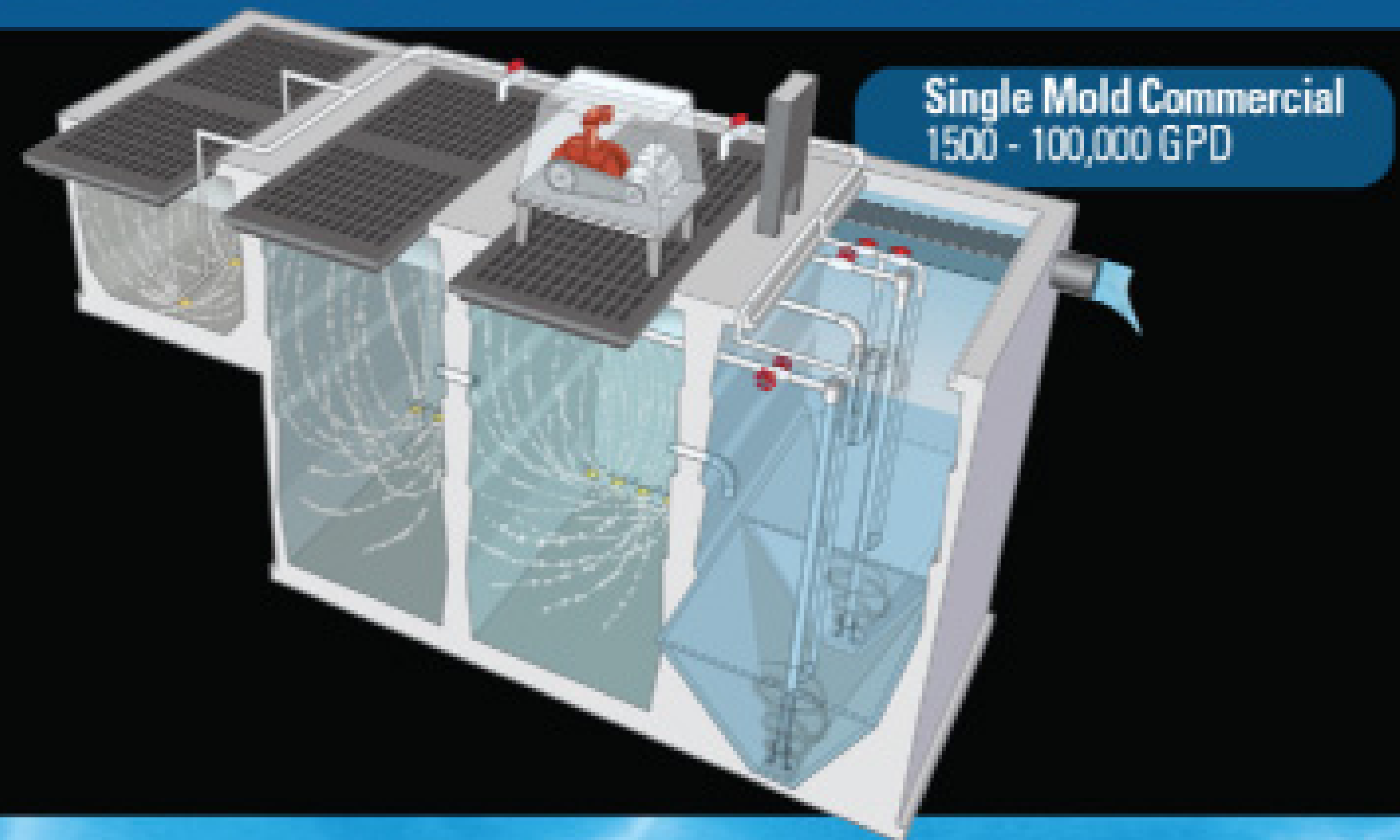
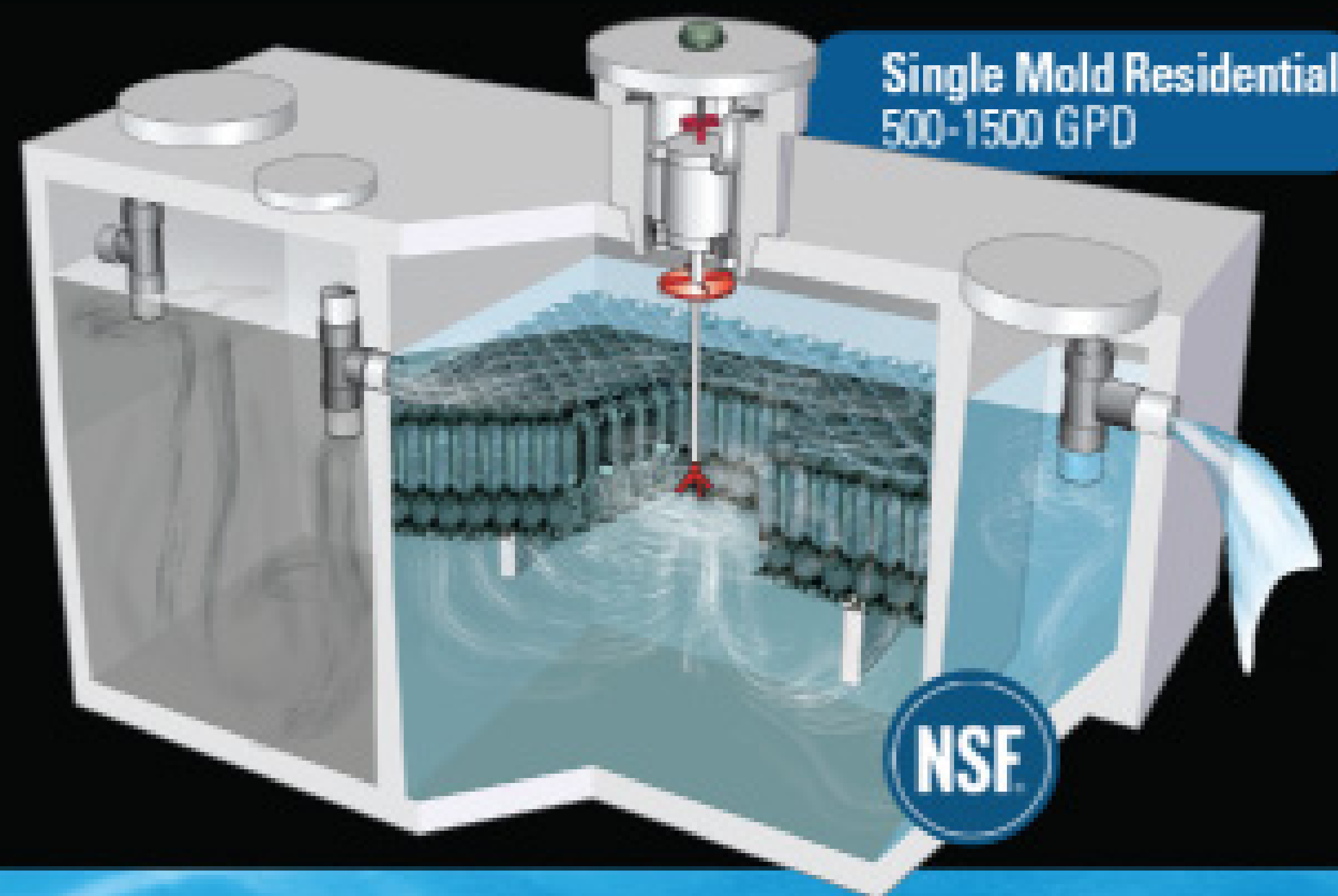
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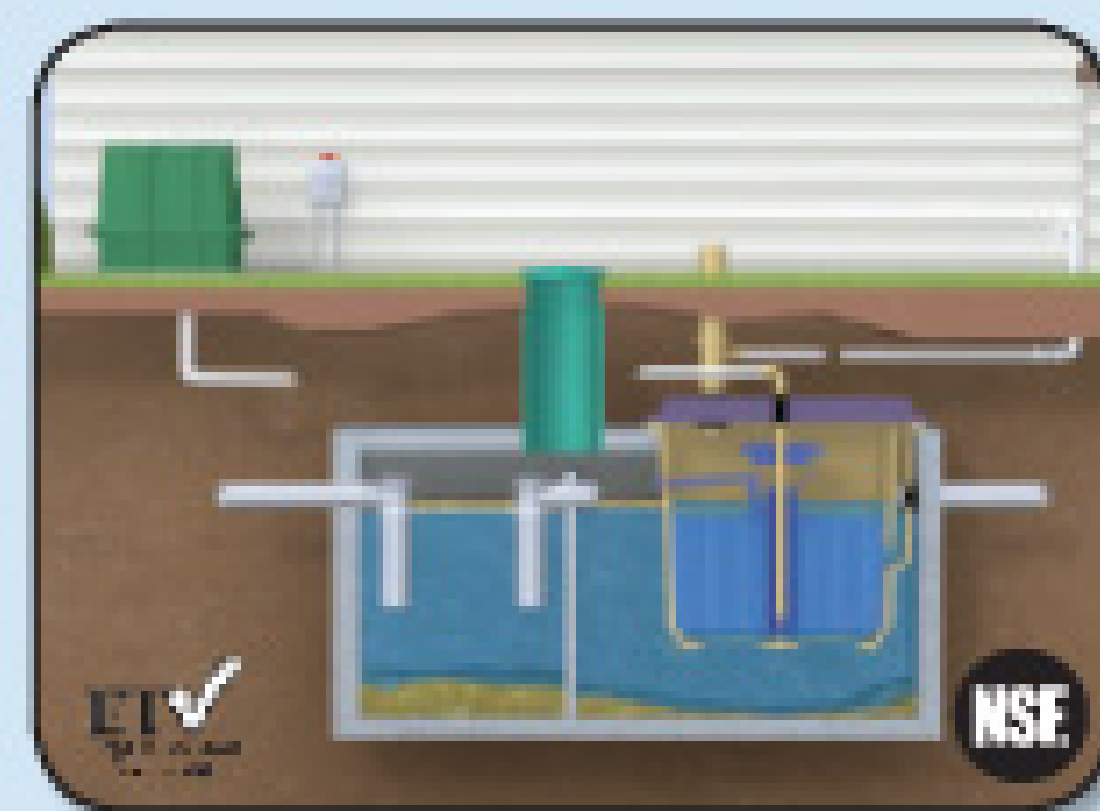
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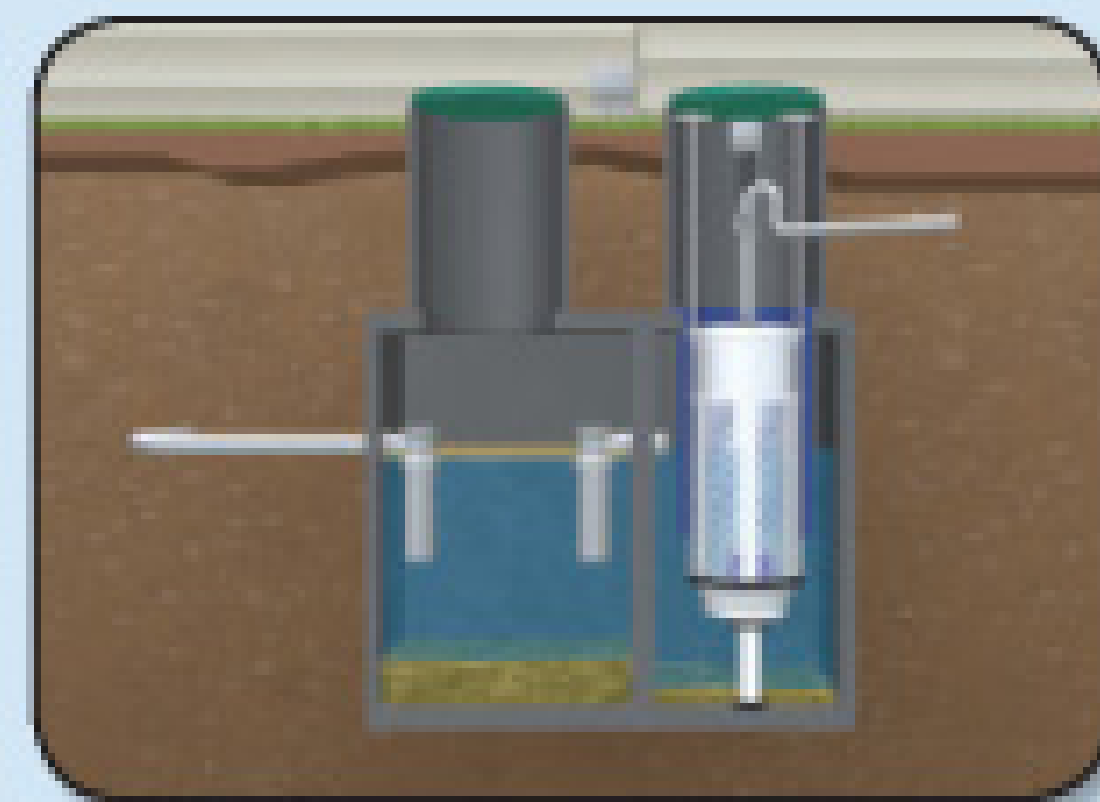
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Raise Your Hand

A trade magazine with a strong subscriber base can become a potent force to help industry members rise to challenges and make the most of opportunities

By Ted J. Rulseh

Quick answer: How long has *Onsite Installer* been in print? Believe it or not, we're halfway through our fifth year.

This issue, the annual Buyer's Guide, shows the full spectrum of products and services available to installation and design professionals. Until January 2004 when this magazine was launched, there was no such regular monthly resource exclusive to the onsite community.

When COLE Publishing started this magazine, we were surprised at how quickly the industry embraced it. Almost from the first month in which it hit the mailboxes, requests began coming from onsite associations for multiple copies, often hundreds at a time, to give to members and prospects, to hand out at annual conferences, to distribute to county or state regulators.

Growing up

We launched *Onsite Installer* at

a time when the industry was maturing — when the U.S. EPA had recognized decentralized systems as a permanent part of the nation's wastewater treatment infrastructure, when advanced treatment systems were becoming more common for use on lots previously considered ill suited to septic systems.

So, we have been able to follow (and help lead) the industry in a time of growth in business poten-

tial and prestige. We've tried to appeal to a wide range of practitioners. The monthly system profiles, describing challenging and usually advanced treatment system installations, appeal to experienced

installers, designers and engineers.

Contractor profiles (our cover stories) spotlight professionals whose exemplary work and sound business practices can provide inspiration to others. The "Basic Training" column, written by Jim Anderson and David Gustafson of the University of Minnesota onsite program, helps installers who are newer to the profession and acts as a refresher for more experienced hands.

In an important way, subscribers to a trade magazine become an industry community. The more members, and the more perspectives they share, the stronger that community becomes.

Looking ahead

Now, on publication of our fifth Buyer's Guide, it's appropriate to revisit a question we asked several months after our first issue: How can we serve you better? Underneath that big-picture question are several others:

- What are we doing well?
- What are we not doing that we should be?
- Are there any areas of the practice that we're neglecting?
- Do our articles speak directly to your interests as a professional?
- Do you have ideas for specific topics we should explore?

Please feel free anytime to drop me a note and let me know what you're thinking. We want *Onsite Installer* to be a welcome item in

your mailbox — a magazine that helps you in some way with every issue. In other words, a magazine that justifies in benefits the time you spend with it.

Stepping forward

Now it's my turn to ask something of you. Have you committed to being a regular reader of this magazine? We decided from the start to make *Onsite Installer* subscriptions free to qualified readers — those in some way involved in the industry as professionals.

All you have to do to subscribe is fill in and return the subscription form on the facing page or one of our business reply cards. You can also complete a form on the magazine web site (onsiteinstaller.com).

To date, we have been sending the magazine to many more professionals than have officially subscribed. If you have not subscribed already, now is a great time to do so. By committing to receive *Onsite Installer* every month, you're in effect saying: "I am a part of this industry. I support its growth and development. I am dedicated to my own growth as a professional."

So please complete the post-paid subscription card that comes with this issue and send it back. If you'd like, include a note with your thoughts on how *Onsite Installer* can deliver more value to you. Let's work together to build a community that helps each member meet the challenges and enjoy the opportunities the onsite industry brings. ■

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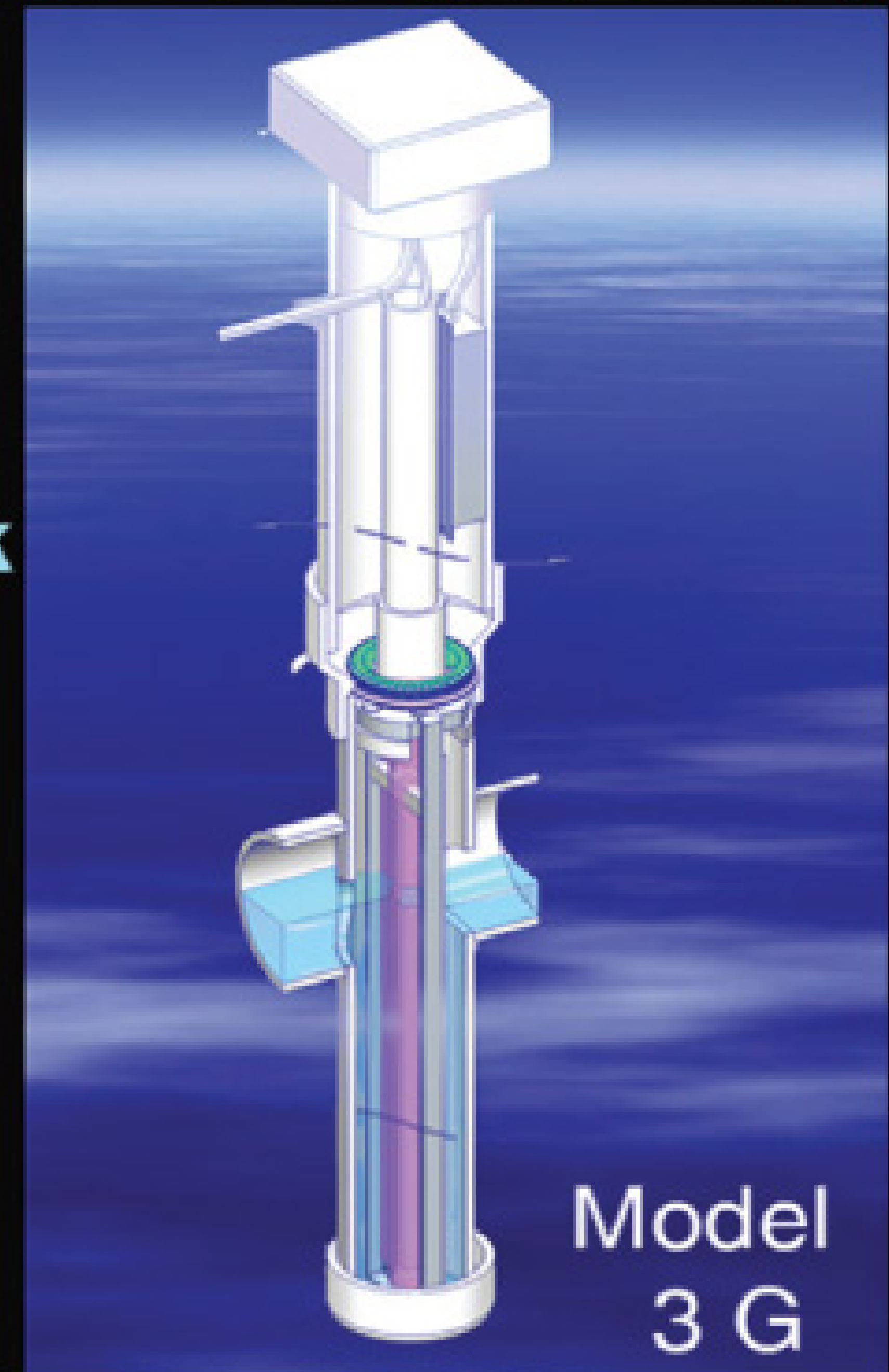
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Jim Anderson and David Gustafson are with the University of Minnesota's widely recognized onsite wastewater treatment education program. Anderson is Director of the university's Water Resources Center and Gustafson is the university's Extension Onsite Sewage Treatment Educator. Readers are welcome to submit questions or article suggestions to them at ander045@umn.edu.

Floodplain Basics

An understanding of the common terminology can help installers avoid costly mistakes and deliver long-lasting systems to homeowners

By Jim Anderson, Ph.D., and David Gustafson, P.E.

During the past year while conducting workshops in different parts of the country, we have run into questions about installing onsite treatment systems in floodplains.

When we talk about floodplains, it's apparent that many installers don't know floodplain terminology, don't know how to identify floodplains, and what a floodplain means for system installation.

Floodplains are normally dry or semi-dry areas to which water naturally flows as water levels rise. Floodplains are typically found near rivers, lakes and low-lying coastal plains, but many flood-prone lands are simply depressions where water naturally collects when it rains.

Identifying a property where water collects is an important aspect of installation. Routing water away from the system and making sure there are no additional water sources is a key to installation and a long-lasting system. Installing in areas toward which surface or subsurface water flows is a recipe for disaster.

Defining the term

Officially, a floodplain is the land adjoining lakes and rivers that is covered by the 100-year flood. This means a flood has a 1 percent chance of occurring in any given year (it is also called a regional flood).

Using sophisticated engineering

and meteorological techniques, it is possible to calculate the magnitude of such floods on rivers where long-term flood records have been kept. Various government agencies conduct these studies, and as they become available, state law usually requires local communities to adopt floodplain zoning ordinances.

The natural floodplain is an important part of our water system. It affects storm runoff, water quality, vegetative diversity, wildlife habitat, and the aesthetic qualities of our rivers and lakes. Any alteration of the floodplain should be carefully evaluated.

When buying or managing property on a river in a community that has adopted floodplain zoning, we need to consider these points: floodway location, flood fringe location, flood protection elevation, flood-proofing, and flood insurance.

Accurate floodplain maps are critical for installers who work on property in or next to floodplains. These maps determine whether a structure or onsite system is in a floodplain and whether the owner will need to purchase flood insurance.

Knowing the terms

Unfortunately, many of these maps are outdated or inaccurate. Installers should investigate thoroughly and take care not to make representations or determinations about floodplain property. It is wise to direct buyers and sellers to a



Installers need to understand floodplain terminology and how the presence of floodplains affects installation decisions.

local surveyor or the state Department of Natural Resources (DNR) for more information. Here are the important definitions that relate to floodplains

The floodway refers to land immediately adjoining the river channel that is the natural conduit for flood waters. The floodway must remain open to allow flood waters to pass. When the floodway is obstructed by buildings, structures, or debris, flood waters will be dammed up and will flood even greater areas upstream.

Large portions of the floodplain store and later release flood waters, which reduce river flood stages. Development of these areas can result in increased flooding. If the property lies within this mapped floodway, the owners will not be permitted to construct a dwelling

or other enclosed structure, place fill, or obstruct flood flows in any way.

Since this area must be left open to pass flood waters, only open space uses, such as farmland, residential yards or gardens, golf courses, parks, playgrounds, or parking areas are normally allowed in the floodway.

The flood fringe is the remainder of the floodplain lying outside the floodway. This area is generally covered by shallow, slow-moving flood waters. This is where an installer typically becomes involved in a floodplain. Development is normally allowed in the flood fringe provided residential buildings are placed on fill so that the lowest floor, including the basement, is above the 100-year flood level.

For onsite systems, generally the elevation of the infiltrative

surface needs to be one foot above the 100-year flood elevation. Usually, this elevation has been set by an engineer or surveyor for the residence being constructed, and the installer can obtain that information from them to establish the elevation of the system.

Flood protection elevation refers to an elevation one foot above the 100-year flood. The elevation of the lowest floor of a dwelling must be at or above the flood protection level. Local regulations vary and may require additional protections, such as requiring access road elevation to be within two feet of the flood protection elevation.

Floodproofing includes a variety of construction methods, such as watertight doors, windows, walls, and bulkheads that can be used to prevent flood waters from entering a structure. This method of flood protection is not a sure deterrent to flooding and is used only in very special circumstances where it may not be possible to

place a building or accessory structure on fill.

Typically, from an onsite system perspective, owners need to recognize that if flooding occurs, they will have to suspend use of the system during the flood. Before the system is used when waters sub-

merge, the National Flood Insurance Program (NFIP) provides flood insurance for structures and their contents in participating communities. In this program, federally insured or regulated institutions must require flood insurance on all new loans for structures in mapped floodplain areas recognized by the

If you are working in an area near a lake or stream that may be subject to flooding, but you are unsure, the soil can help indicate whether this may be a problem. Soils in floodplain areas periodically receive fresh deposits of sediment carried by the flood waters. Generally they lack the clear soil horizons because the horizons do not have time to develop before the next deposit comes along.

The soils will have distinctive layers of different materials deposited by successive flooding. If you see these characteristics, and if the property owner or developer has not investigated or has not had the flood elevation established, it is important to raise this concern. Have them investigate whether there is a problem, or do some investigating on your own. ■

Installers should investigate thoroughly and take care not to make representations or determinations about floodplain property. It is wise to direct buyers and sellers to a local surveyor or the state Department of Natural Resources (DNR) for more information.

side, it will need to be inspected for damage and the tank pumped to remove any sediment or solids that may have washed in during the flood. All parts of the system need to be evaluated.

Flood insurance is important for the owner of floodplain property. The National Flood Insurance

Agency (FEMA).

An installer can find out if a piece of property is located in the floodplain by checking with local building or zoning officials. Ask for the Flood Hazard Boundary Map or Flood Insurance Rate Map furnished by FEMA.

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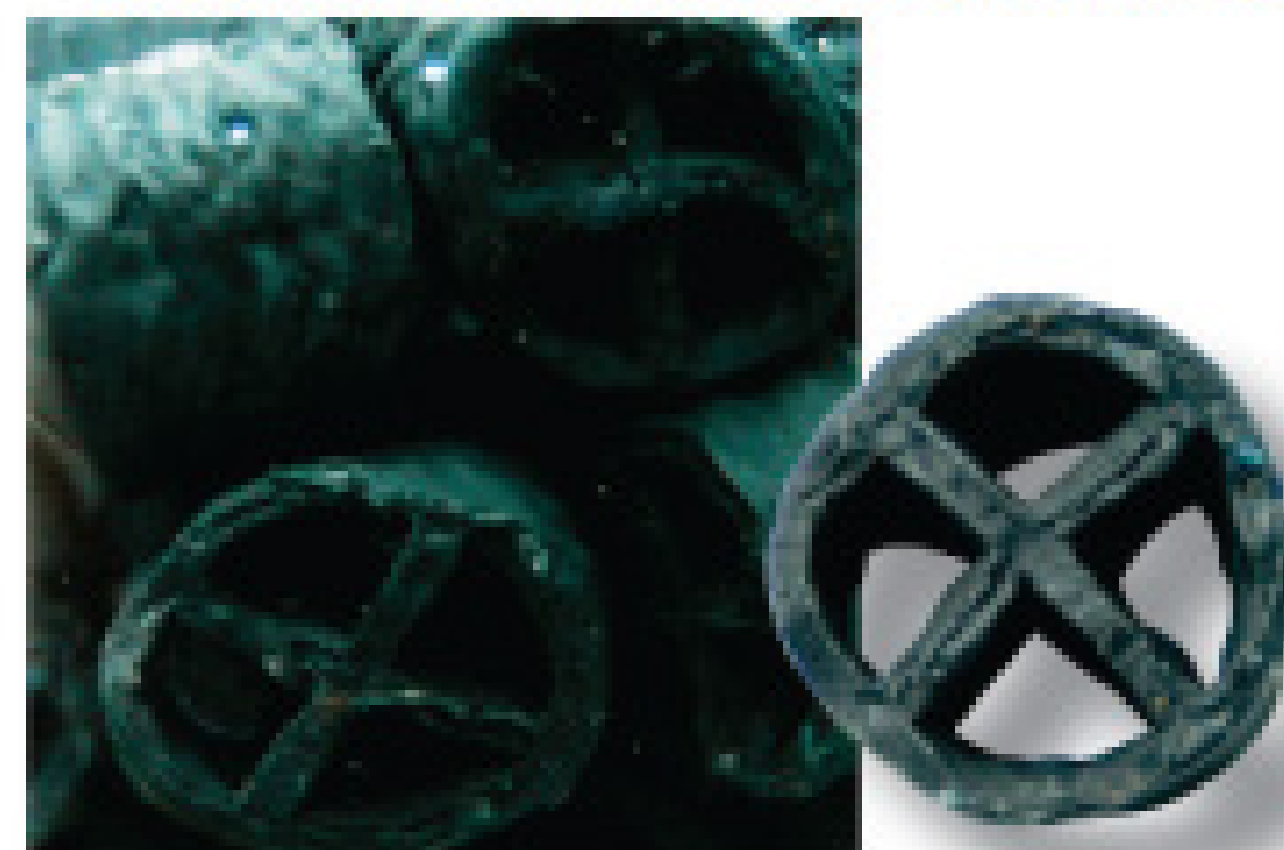
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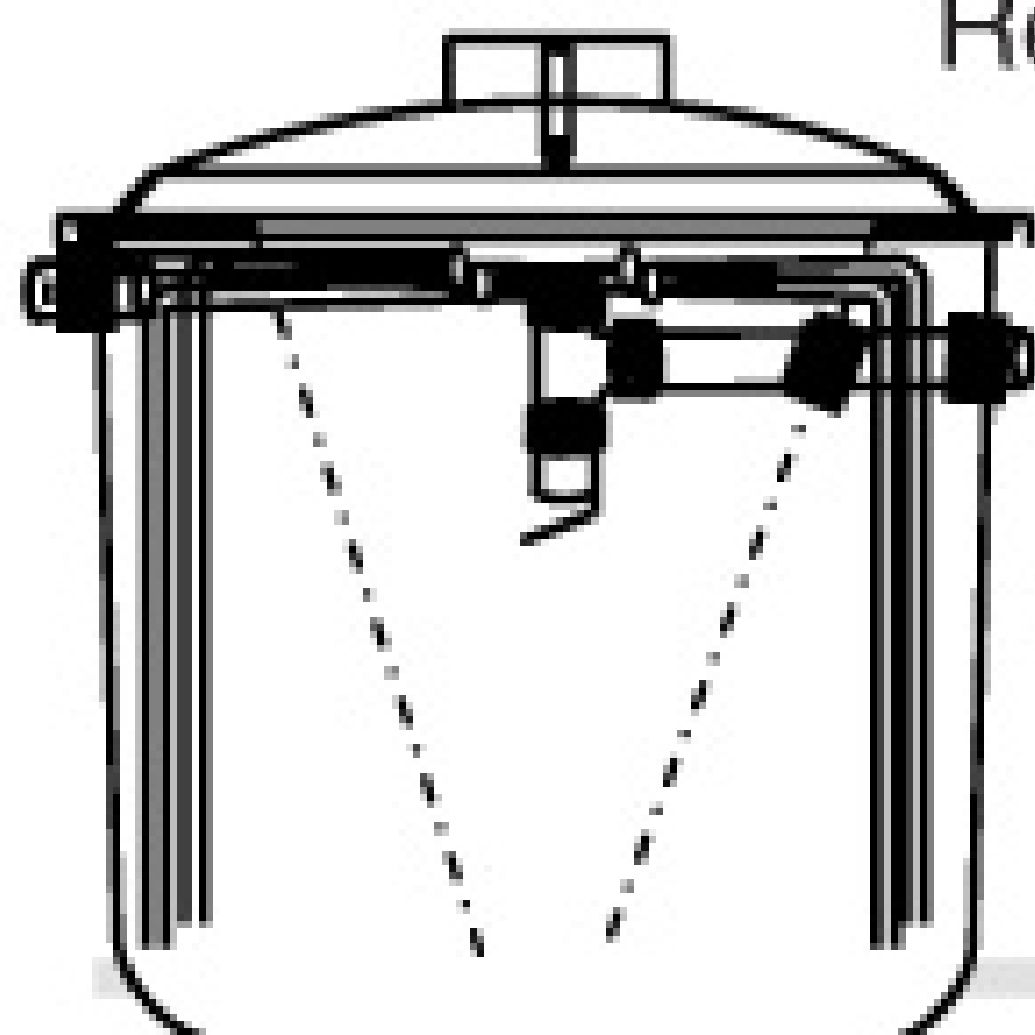
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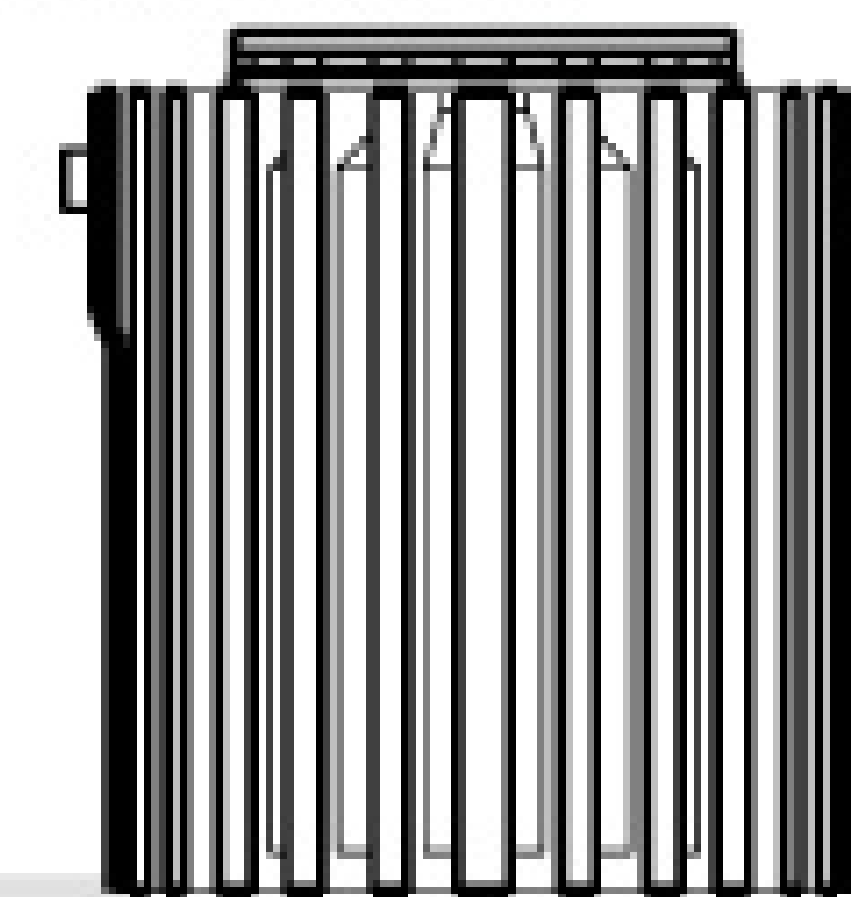


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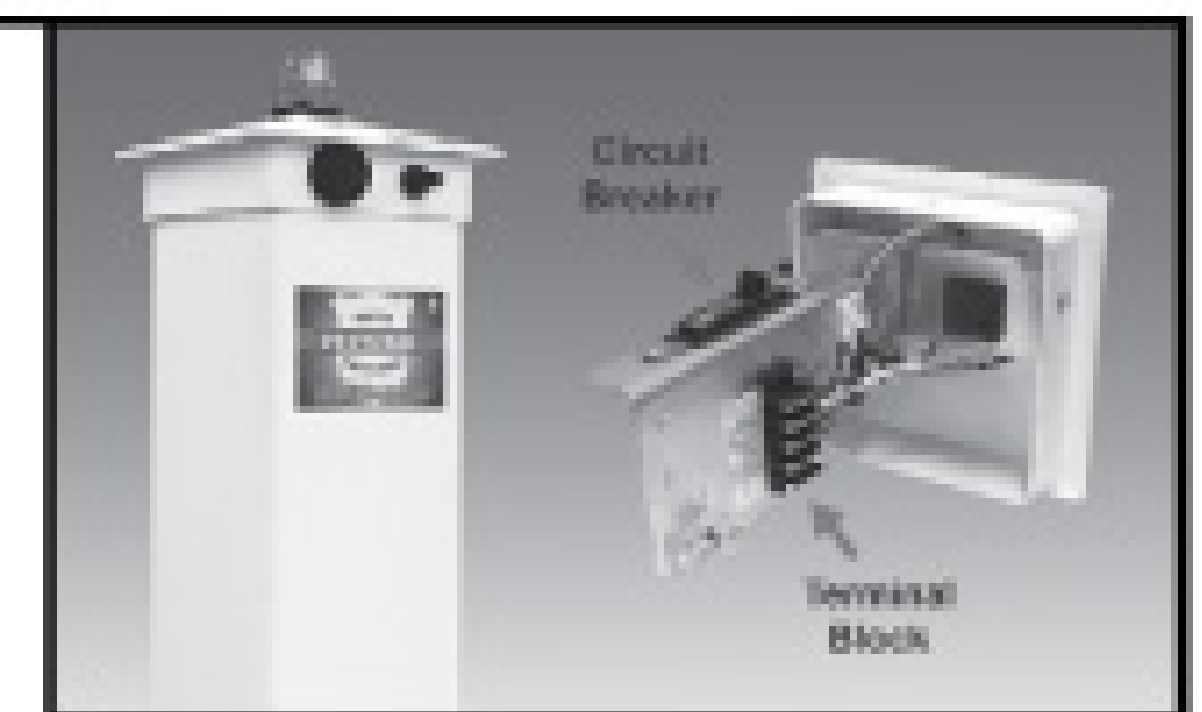


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41

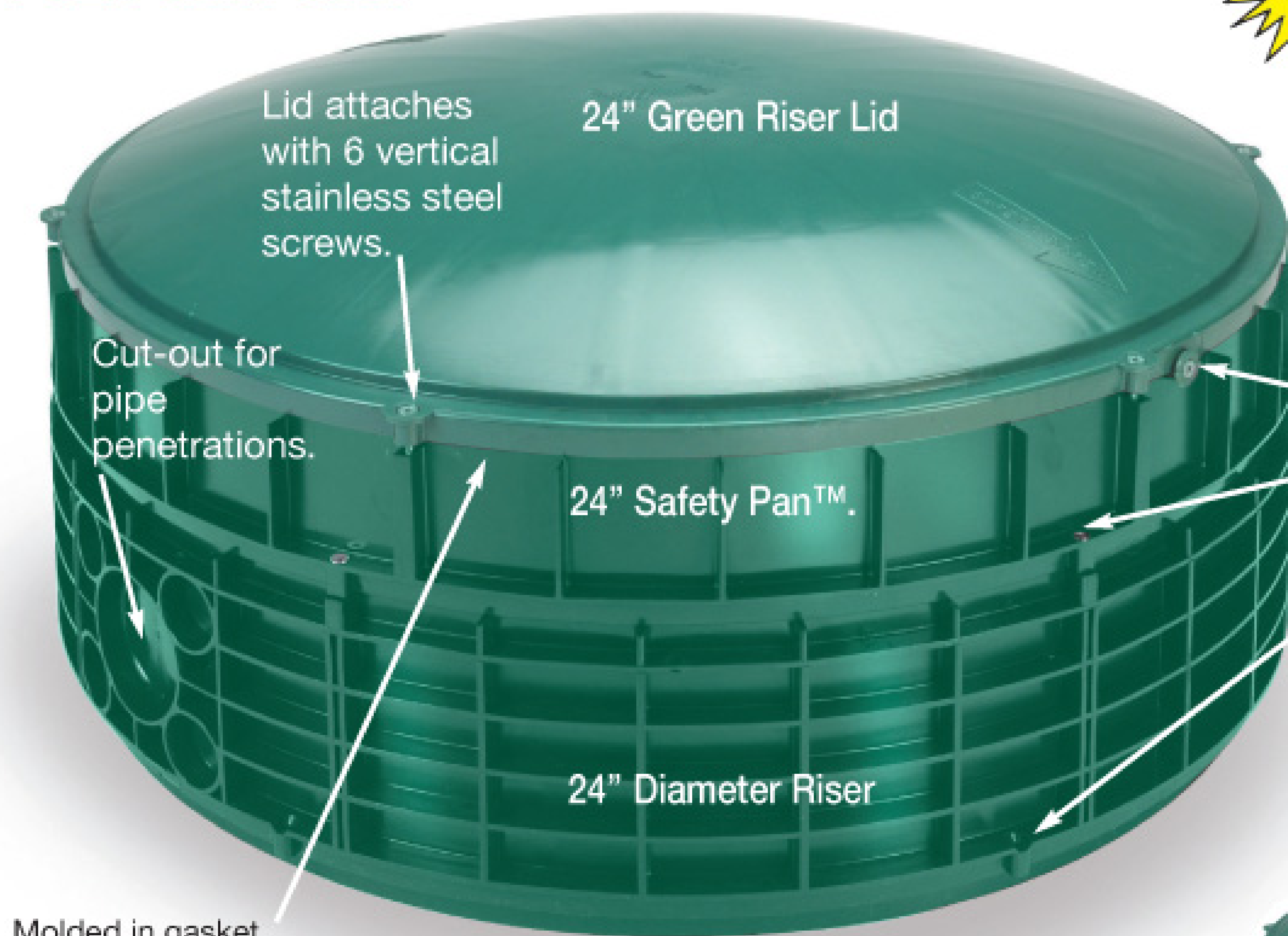


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Riser to Riser attachment with 6 vertical stainless steel screws.

Patent Numbers
5,617,679 &
5,852,901; other
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Concrete Lid w/handle

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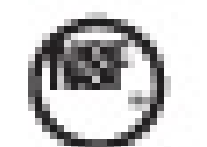
Tank Adapter Ring

For mounting riser flush to top of tank when casting-in is not an option.

Effluent Filters

Patent Numbers
6,319,403; D 431,629; other
pats. pending.

800 GPD
ANSI/NSF
Standard 46

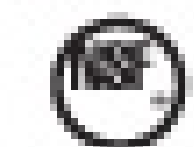


4" Sch. 40 &
SDR-35

EF-4
4" Filter



1500 GPD
ANSI/NSF
Standard 46



4" Sch. 40 &
SDR-35

244 ft. of
1/16" filtration
area.

EF-6
6" Filter



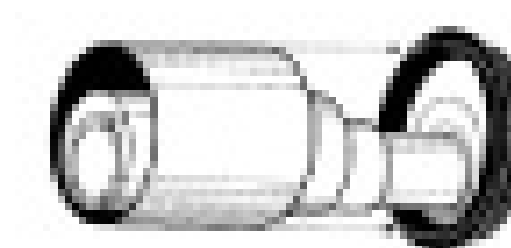
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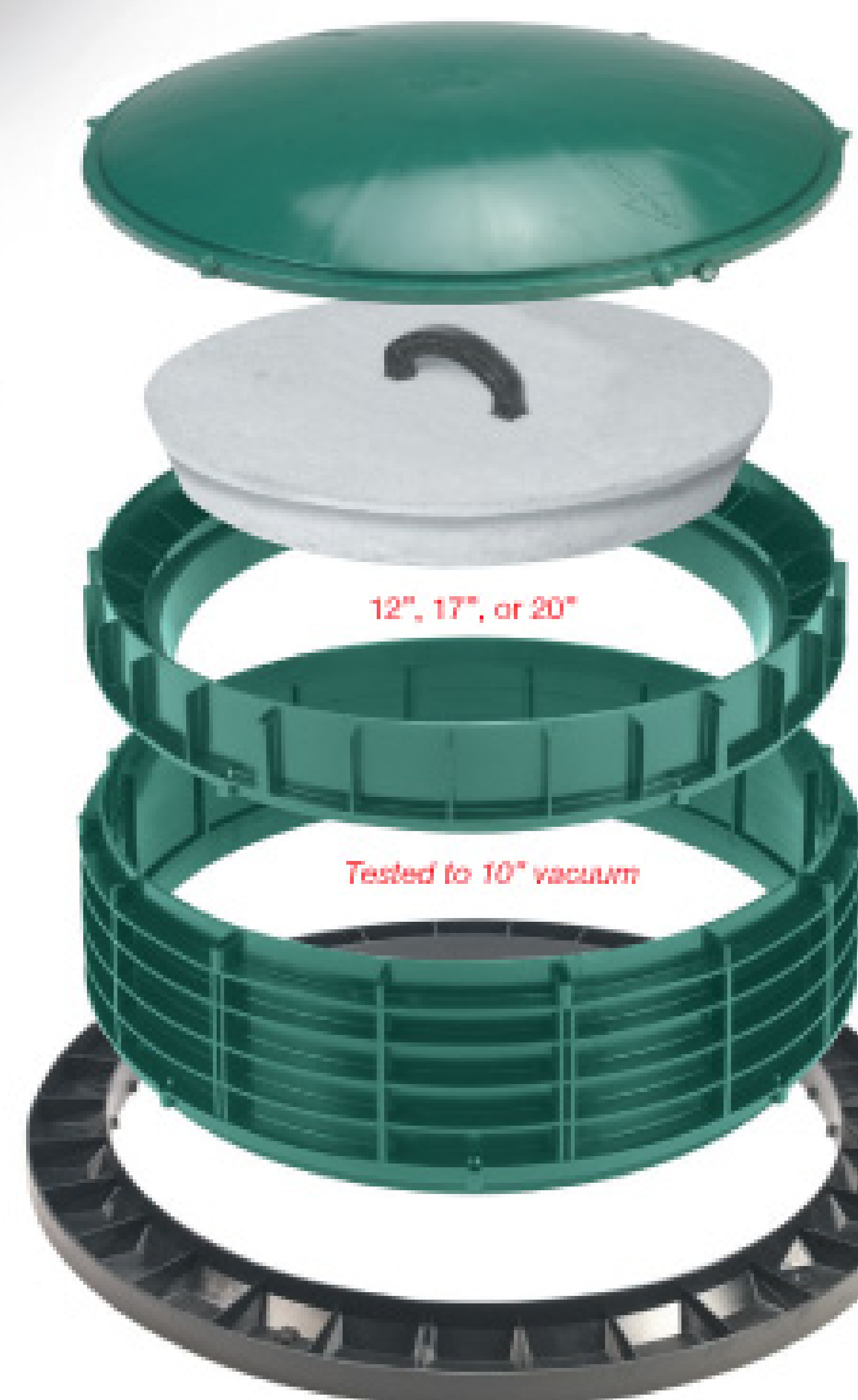


TS-4-RUBBER TANK SEAL
(will hold 10psi)
TS-4PRO TANK SEAL
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4,951,914,
5,624,123
& 5,711,536;



Tested to 10" vacuum

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"Rules and Regs" is a monthly feature in Onsite Installer. We welcome information about state or local regulations of potential broad interest to onsite contractors. Send ideas to editor@onsiteinstaller.com.

So Long to Cesspools?

Rhode Island proposes regulations requiring advanced nitrogen reduction systems and cesspool replacements in selected situations

By **Scottie Dayton**

New proposed onsite regulations will require people building or expanding homes in Rhode Island's Narrow River watersheds and South County salt ponds to use nitrogen-reducing advanced treatment systems. Replacements for failed systems on lots smaller than 20,000 square feet with potable wells face the same restriction.

The cesspool act, starting June 1, will require homeowners to replace all failed cesspools, cesspools used for commercial enterprises or multi-family dwellings, and cesspools within 200 feet of tidal water, public wells, or reservoirs. Of the estimated 50,000 cesspools in the state, about 3,000 must be replaced during the next five years. The law requires all cesspools to be replaced by 2013.

Typical nitrogen-reducing systems will cost around \$28,000, versus \$10,000 for conventional systems. For those who can't afford the upgrades, the Department of Environmental Management (DEM) will grant extensions up to five years, or until the properties are sold.

Darlene Gardner, president of Superior Septic Service Inc. in Saunterstown, notes that too few maintenance companies exist to service larger numbers of innovative systems. "Failing systems will be worse for the environment and give the technology a black eye," she says.

According to Gardner, the DEM held public hearings on the proposed rule, but "didn't leak much to the people and towns this ruling would affect." Gardner and other

pumping companies did their best to notify customers.

Oregon

The Department of Environmental Quality (DEQ) is proposing a 3-percent annual fee increase to address rising program costs, and a 5-percent one-time commercial permit fee increase to support 2.5 new positions in the water quality program. It also proposes increasing the onsite application surcharge from \$40 to \$60 to hire three additional staff members who will monitor compliance.

The 8-percent fee increase will affect some 500 machine shops, offices, retail stores, RV parks, mobile home parks, private camps, golf courses, churches, resorts, restaurants, gas stations, markets, taverns and small industrial operations. More than a million Oregonians rely on onsite systems. The DEQ estimates that 13,900 applications per year will be subject to the surcharge.

A proposed word change in the rule will allow certain structures to be located closer to onsite systems and enable the systems to fit previously impermissible areas. The proposed or modified rules become effective on June 19, 2008.

Minnesota

The Minnesota Pollution Control Agency (MPCA) approved an update after a year-long review process as part of its 10-year septic plan. Counties will have up to two years to pass ordinances incorporating all the changes, but some

must be implemented immediately. For example, contractors are allowed to install onsite systems without further soil verification if samples from two licensed contractors match the design plan. Eric Buitenwerf, administrator of the Environmental Services Office (ESO), says the change circumvents soil inspection by the organization during installation.

Counties could require ESO officials to take a second core sample before installation, but that would necessitate two trips to building sites and slow down the permitting process, unless extra staff was hired.

The MPCA now requires an eight-page management plan for each onsite system. Redundancy is likely, says Buitenwerf, as MPCA backed off on plan inspections for enforcement reasons. He worries that new design elements may make onsite systems so expensive that people will install old-time systems such as dry wells or cesspools. "Some county residents have abandoned proper septic systems altogether," he notes.

Kansas

Upgrading failing septic systems is one way that Kansas and Missouri will spend \$900,000 they are getting from the U.S. EPA to restore water quality in the Marais des Cygnes river basin. Local groups on both sides of the state line have undertaken water quality protection activities in the Marais des Cygnes Basin since 1983, according to a news release from

the Kansas Department of Health and Environment.

Other projects include planting vegetation along shorelines; establishing alternate watering facilities for livestock, installing porous concrete surfaces in parking lots, and creating patches of vegetation along city streets to filter contaminants. The basin encompasses 3,230 square miles in Kansas and 453 square miles in Missouri and has a population of more than 125,000.

Missouri

The Missouri Department of Health and Senior Services is amending regulations dealing with onsite wastewater systems. The changes are still in draft, and public comment is not being accepted until the proposals are published. The agency expects the changes to be effective in September or October of 2008.

Details of the draft changes are included on the department web site at www.dhss.mo.gov/Onsite/Regs.html. There could be a reduction in the number of continuing education requirements for inspectors and evaluators, although the licensing and documentation rules would become stricter.

Continuing education for installers, soil evaluators and percolation testers could also be reduced after the initial three-year registration period from 20 hours every three years to 12 hours for installers of advanced systems and soil evaluators, and to eight hours for basic system installers and percolation testers. ■



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Final Report:

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May 2008



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be installed wherever a home can be built, regardless of topography or soil type. The unit features a 2-hp submersible grinder pump with a shut-off head of 132 feet and a maximum flow of 35 gpm. **For more information:** 800/701-7894; www.littlegiantpump.com.

Zoeller Offers Progressing Cavity Grinder Pump

The E810 progressing cavity grinder pump from Zoeller Pump Co. adapts to existing progressing cavity grinder pump systems and has a quick-disconnect coupling. It features finned class 30 cast-iron construction to reduce heat, corrosion-resistant powder coated epoxy finish, stainless-steel hydraulic pump rotor, upper and lower ball bearing construction and a carbon/ceramic mechanical seal. **For more information:** 800/928-7867; www.zoeller.com.



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Gradall Introduces XL 4300 III Excavator

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Simple Solutions Launches New Wolverine Filter

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to remove hydrogen sulfide, methane and mercaptans from septic, sewer and plumbing vents. It also has received Uniform Plumbing Certification (UPC) from the International Association of Plumbing and Mechanical Officials (IAPMO). **For more information:** 866/667-8465; www.stopsepticodor.com.

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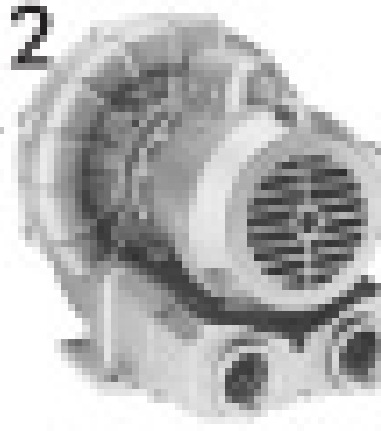
EL 60 \$255
EL 80 \$300

0523

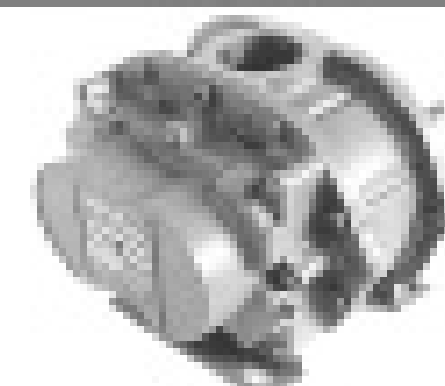


Rotary Vane
Compressor
\$310

Regenair 
R3105-12
Blower
\$410



Sutorbilt & Roots
Blowers



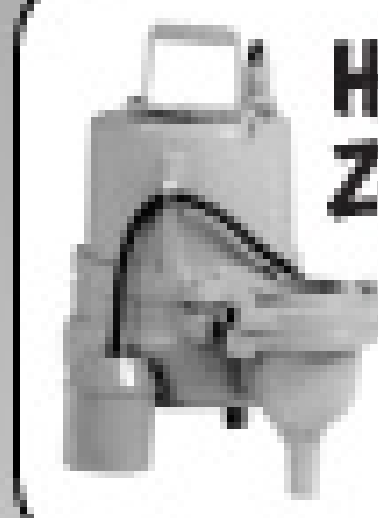
DC-STAINLESS
Washdown Pump



Moro M3
176 cfm



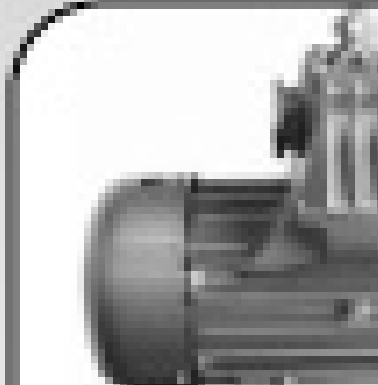
Hydromatic, Zoeller, ABS, Liberty & Myers
Pumps



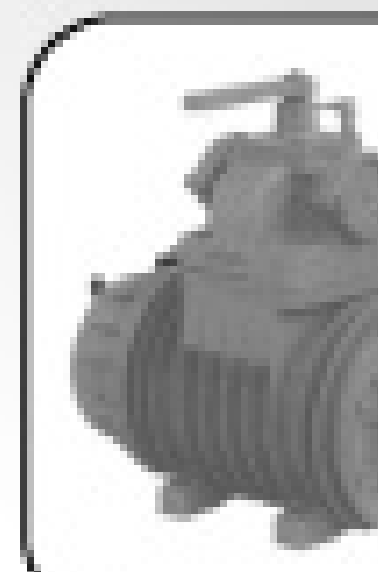
SDS 
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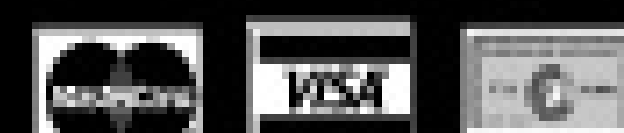
The Flagg-Air 340 does not carry the NSF seal. Check local and state regulations for approval in your area.



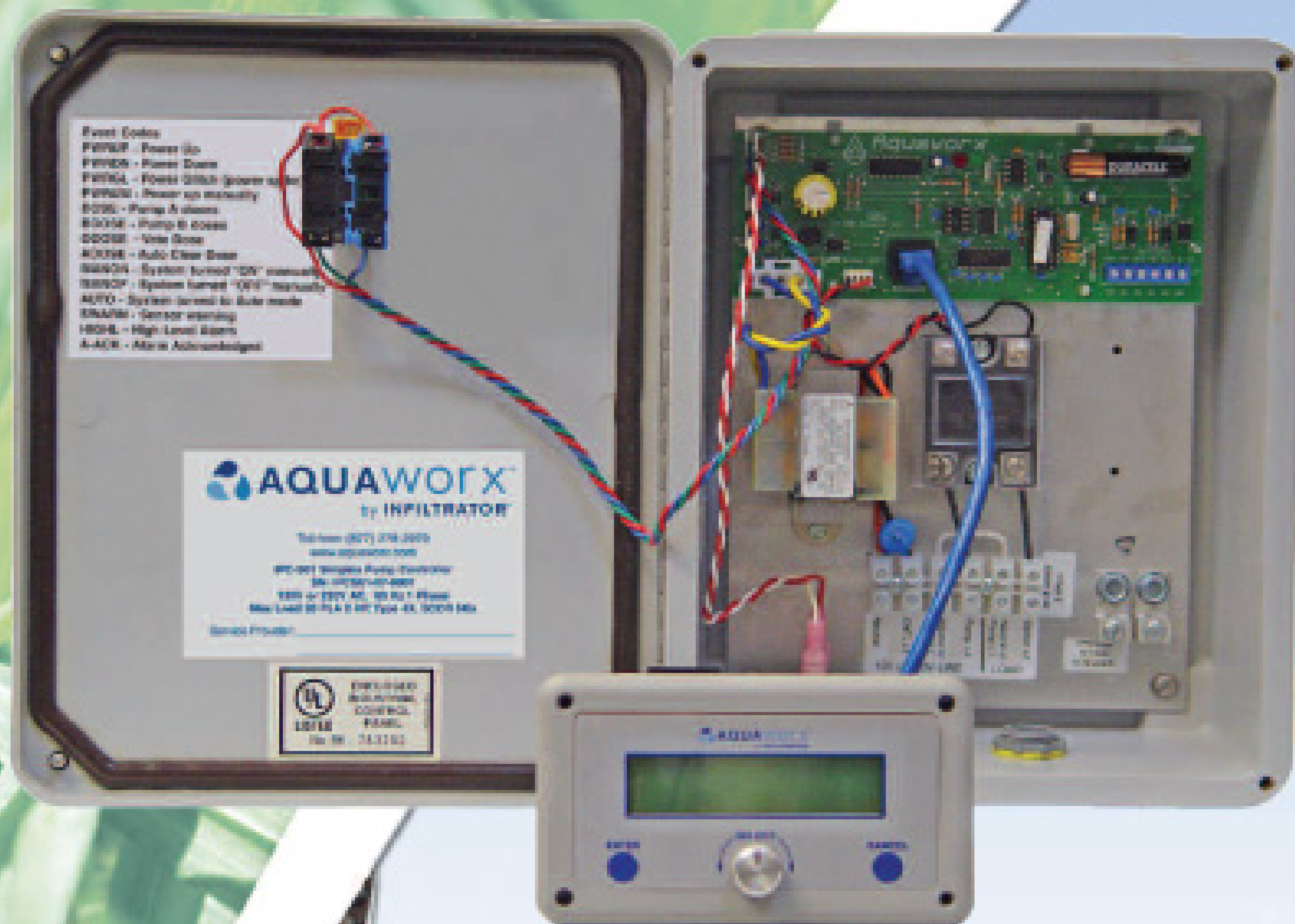
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Not Written in Stone

State-to-state differences in rules for septic systems indicate that some flexibility may be in order to suit challenging situations

By Zan Ewing, R.E.H.S.

A septic system contractor friend told me about his experience installing an uncomplicated, standard gravity system in a county in Oregon. The installation went well, and when finished he called in for the pre-cover inspection.

Upon inspection, the regulator informed him that the distance between two of the drainfield lines, in two points, had only 7 1/2 feet of undisturbed soil between them rather than the 8 feet required by the Department of Environmental Quality rules. The four drainfield lines installed had an overall 30-foot width between the outside lines, centerline to centerline, meeting code, but those two pesky short segments were a bit too close. The remedy, the inspector said, was to replace the entire drainfield with one that met the rules.

Well, obviously a bit of a discussion ensued, and the negotiation ended with the installer adding a 100-foot line as penance for his transgression. Would the functioning of this system be negatively affected by his oversight? I seriously doubt it. Would it have been a better solution for the regulator to put a short note on the inspection report pointing out the problem, advising him to pay a bit more attention to this in the future? Probably.

No magic in it

Many people new to the onsite industry seem to think Moses came

down off the mountain holding stone tables etched with the DEQ onsite rules. It also seems to be the notion of many that these standards have mystical significance and that, if they are not met, the system flat won't work.

Don't get me wrong — rules are absolutely necessary for a program to work. But we need to understand a bit about which deviations from the rules will truly negatively affect the functioning of an onsite system, and about cases where a deviation can actually make a better installation. We need to be able to put the onsite rules in some sort of perspective and occasionally think out of the box.

With this in mind, and being a curious fellow, I did an online search of several other states' onsite rules. I was wondering just how much significant variation there is. It is interesting to see what differences there are state to state. I was more interested in system construction standards than in the siting criteria of systems, so I focused on that.

One set of rules I downloaded was from Washington, our northern neighbor. Washington has climate and geography similar to Oregon's, and its rules were written by knowledgeable industry professionals just like ours. Many rules differ from Oregon's — some less restrictive, others more.

Rules that differ

To illustrate some of the differ-

ences, we can look at the table of required setbacks. These are not just esoteric points, as these differences can make a parcel developable, or not.

An example of the differences is with property line setback requirements. Oregon requires 10 feet minimum from the edge of the drainfield to the property line, but the septic tank and distribution network can be as close as five feet.

Washington's standard setback is five feet for all portions of the septic system, but the local health officer may allow a reduction to as little as two feet if the property line is upslope from the disposal trench. This reduction can also be made with the building foundation setback, again if it is up-gradient. Before Oregon's 1995 rule changes, a 10-foot property line setback was required from all portions of the system. That was relaxed to five feet for all components except the drainfield.

Another example is that Washington requires a 30-foot setback from a disposal trench to a down-slope groundwater interceptor, building foundation drain, or drainage ditch. Oregon requires a 50-foot setback. That is a significant difference. Why do things seem to work in Washington with a 30-foot setback but not in Oregon? Do they just know less than we do?

Minnesota rules require a 20-foot setback from a building to a drainfield trench where Oregon requires 10 feet. Where do these

Many people new to the onsite industry seem to think Moses came down off the mountain holding stone tables etched with the DEQ onsite rules. It also seems to be the notion of many that these standards have mystical significance and that, if they are not met, the system flat won't work.

numbers come from? How come 10 feet works here but not in Minnesota? Washington and Colorado (and possibly many others) require a two-compartment septic tank, where Oregon requires only one. Are they right and we wrong?

Colorado requires a minimum of six feet of undisturbed soil between the drainfield trenches where Oregon requires eight feet. Will six feet not work here? I don't know. I could go on and on. My point is that rules are necessary guidelines, but we must realize that many of these are more "common sense" numbers and that we should not necessarily read more into it than that.

Help for small lots

With the forgoing illustrations in mind, drainfield repair on a small lot provides an example of where strictly following the Oregon code might negatively affect system installation and performance. Many

old lots don't have enough space to install a reasonable amount of drainfield unless a little fudging is allowed.

Some places we might fudge could be with the property line or foundation setbacks. Washington evidently has found that a 5-foot (or less) property line setback doesn't create a problem, so maybe in some cases, such as these difficult repairs, strict compliance could be overlooked.

Another place we could fudge might be on the spacing of the drainfield lines. If Colorado and others have had success with less than our 10-foot-on-center spacing requirement, maybe by relaxing this we could get in an additional line or two. If our goal is to get enough additional drainfield trench installed to avoid a public health threat and build a functioning system, occasionally we need to be able to think creatively and use the experience of others, especially with difficult situations.

Knowing that other states have had good experience with some of these different standards and regularly use them, we may feel confident in relaxing some rules when necessity arises.

A consequence of rules that are burdensome or impractical is found in the January 2008 issue of the *Onsite Installer* magazine. An article cited two states where grassroots efforts have overridden state guidelines. According to the article, after homeowner complaints, several counties in Texas passed local rules overriding the state rules.

The major issues resulted from

the requirements of three-times-per-year inspection of existing systems, inspection costs, maintenance fees, and reporting requirements, and from claims that service companies were doing shoddy work.

Impact of variations

In Ohio, a group created a bill that suspended the state's current onsite rules until July 2009. This group is rewriting legislation to mandate sophisticated and costly onsite systems. Advocates are seeking new rules to protect the environment without causing severe financial burden to property owners. This group cited more than 1,000 cases where onsite rules were causing economic hardships to landowners. In some cases, the group said, the new systems cost more than the homes being served.

The moral of this story is that we need to better understand the importance of various code requirements and the relative impact of occasional variations. What is taboo in Oregon may be within the standard code in other states, and vice versa. With these code differences, one would have to conclude that the jury is still out as to what is absolutely right and wrong.

Zan Ewing is a registered environmental health specialist with 34 years of experience in the onsite industry as a regulator, consultant, and installation contractor. He is past-president and current vice president of the Oregon Onsite Wastewater Association. He can be reached at ewingzan@aol.com or 503/364-1052. ■

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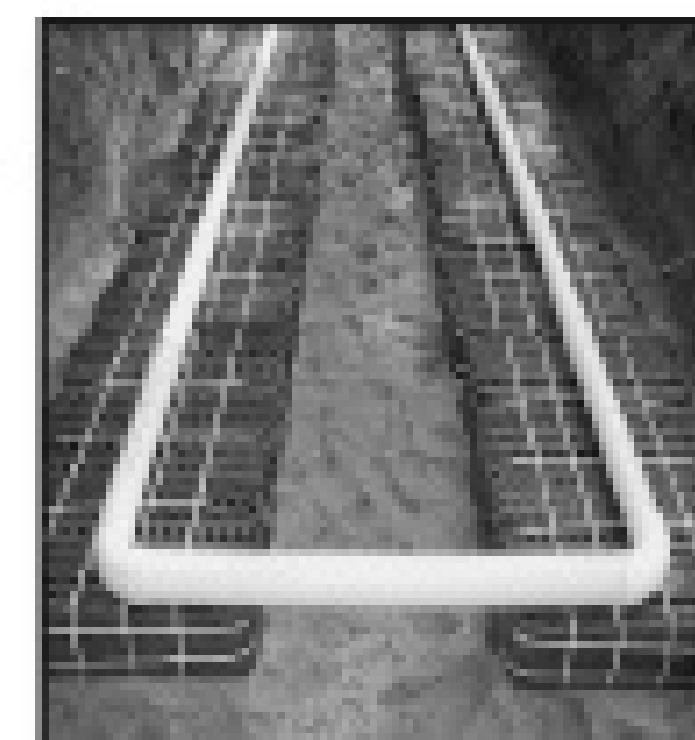
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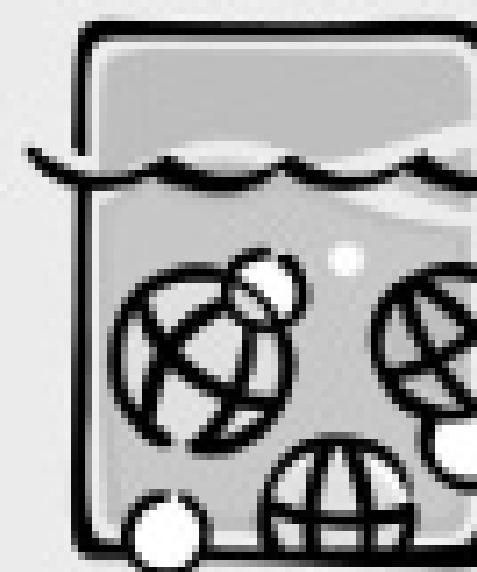
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Short-Tail Excavators

Don't let their abbreviated looks fool you. These nimble machines fit jobs in tight spaces with performance that can rival conventional-style excavators.

By Greg Northcutt

Ever since they were introduced in North America a decade or so ago, bobtail excavators have been gaining popularity. The reason is simple: A shorter tail swing lets them work in areas where standard excavators with prominent counterweights can't.

Available in compact up to mid-size machines, this design minimizes the amount of counterweight and, in some cases, the front corners of the cab that protrude beyond the tracks when swinging the upper structure. And there is little if any loss of power digging performance or lifting capacity, manufacturers say.

Case describes its CX225 minimum-radius excavator as having "the performance of a 20-metric-ton machine with the work envelope of a 7-metric-ton, standard-configured machine."

A shorter tail swing makes it easier to place spoil in confined areas and reduces the chance of striking a wall, tree or other object when rotating. That can pay off when installing septic systems in cramped residential yards.

Comparing swings

You get an idea of how an excavator with a smaller work envelope might fit your operations by comparing three Caterpillar midsize excavators. The 21.5-metric ton 320D L has a standard tail swing

radius of 9 feet. The tail swing of the 23.7-metric 320D LRR has been reduced so that the back end of the machine doesn't extend beyond the length of the tracks. This reduced radius tail swing of 6 feet, 7 inches is 2 feet, 5 inches less than the standard design.

The compact radius of the 24-metric-ton 321D LCR model is designed to rotate with little if any of its counterweight extending beyond its tracks. It has a 5-foot, 6-inch tail swing radius, 3 feet, 6 inches shorter than the 320D L.

"The additional 5,000 pounds of counterweight on the compact radius 321D LCR and 6,000 pounds on the reduced-radius 320D LRR gives these machines better over-the-front lift and far superior over-the-side stability when compared with more traditional machine designs," reports John Walker, manager of Caterpillar's hydraulic excavators for the heavy construction market.

Performance features

To further minimize its working envelope, while maximizing performance, the boom tower of the compact-radius 321D LCR is positioned farther back in the upper frame compared to the standard 320D L. "The design difference of the compact-radius model reduces the front swing radius, when the boom is pulled to the full up posi-



The Bobcat 435 zero-house-swing excavator has a shorter swing radius than a zero-tail-swing model.

tion for superior operation in confined spaces," Walker notes.

It also greatly improves the lift capabilities of the machine in close. This model demonstrates a 21-percent advantage in lifting capacity in key areas over the front compared with the standard model. The longer stroke of the boom cylinders reduces the front swing radius when the boom is pulled up and improves lift and stability for easier, safer and more productive operation in limited spaces.

"You can place a dump truck or trailer right next to the tracks of the 321D LCR and load it," Walker says. "With a more traditional



The Cat 320D LRR reduced-radius excavator illustrates a tail-swing radius that is shorter than a conventional machine but longer than a compact-radius excavator.

design, with the boom tower and boom cylinders positioned farther out over the swing bearing, trucks may need to be positioned 10 to 15

feet away from the center line of the excavator to simply get the stick and bucket in the right position to load a hauler.”

With its counterweight positioned closer to the center line, the compact-radius excavator requires less swing torque, especially with heavy payloads in the bucket. The result is quicker starts and stops and faster cycle times.

The reduced-radius 320D LRR, with its slightly cantilevered tail and heavier counterweight, can demonstrate as much as a 10 percent over-the-side lift advantage over the compact-radius 321D LCR at ground level and above points on the lift charts and a 20 percent over-the-side advantage over the

corners of the house remain within the width of the machine.

In many applications, zero-house-swing models provide more freedom of placement than a conventional design. Consider, the midsize conventional tail-swing Bobcat 331 and the similar size zero-house-swing model 430.

“The 331 can slue only to the point where the tail begins to encroach on an object, which is no more than about 90 degrees,” says Tom Connor, excavator product specialist. “However, the 430 can slue as much as 320 degrees in either direction without restriction for many more spoil-placement choices.”

Ironically, Connor notes, the



The Ditch Witch XT1600 rubber-track excavator-tool carrier combines attachment versatility with zero-radius turning.

320D L at similar locations.

“If you’re loading trucks with larger buckets or using heavier attachments and couplers, the reduced radius machine offers better static stability,” Walker says.

Compact choices

Among compact excavators with a shorter radius tail swing are those made by Bobcat. For its 3.5- to 5-ton machines, the company offers conventional tail-swing models, in which the tail of the upper structure extends beyond the tracks when rotating; and zero-house-swing models, in which both the rear end and the right and left front

conventional tail-swing design can be a plus when site access space is limited. Typically, as engineers compress the upper structure to reduce tail swing, they also expand the width of the undercarriage to accommodate the various components. As a result, a Bobcat zero-house-swing excavator is about 10 inches wider than similar-sized conventional models. “For contractors facing tight access on jobsites that extra width isn’t a viable option,” Connor says.

It’s worth looking into these machines if you work in settings constrained by buildings, trees, and other site obstacles. And in the onsite industry, who doesn’t?

Greg Northcutt is a freelance writer based in Port Orchard, Wash. He can be reached by e-mailing this publication at editor@onsiteinstaller.com. ■

Another Option

For digging and loading in compact spaces, and doing a whole lot of other jobs in tight quarters, the Ditch Witch rubber-track excavator-tool carrier can be an effective choice. It combines the attachment versatility and zero-radius turning on a compact track loader with the digging capabilities of a compact excavator.

A dual-pivot excavator system allows the boom to swing independently of the upper structure. This provides up to 260 degrees of sweep for offset digging next to structures and lets operators dig multiple trenches without moving the unit.

Two joysticks and infinitely variable pilot controls operate the ground drive, excavator, lift arms and attachments. The operator’s seat swivels to the front and rear, depending on the component being used.

The 9,500-pound XT1600 model, with its 59-hp diesel engine, offers digging capabilities and breakout force similar to a 3.5-metric-ton compact excavator and a similar hydraulic flow to a skid-steer loader of similar weight, the company says.

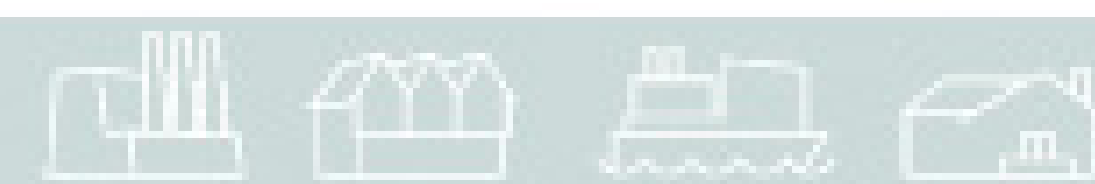
An equalizer track system with pivoting rollers keeps more of the track on the surface for a smoother ride and for more stability on the jobsite and when loading and unloading the machine. This model can be used with 24 Ditch Witch attachments and most full-size skid-steer attachments.

The digging and breakout performance of the 24.5-hp., 3,980-lb. XT850 is similar to a 1.5-metric-ton compact excavator. Hydraulic flow is similar to that of skid-steer loaders of the same weight. This model can be used with more than 70 Ditch Witch compact utility attachments.



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H & M Vacuum Pumps & Equip.

East Coast to West Coast
800-533-5858 Fax: 800-778-9548
sales@hmvacuumump.com
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Jet, Inc.

750 Alpha Dr.
Cleveland OH 44143
440-461-2000 Fax: 440-442-9008
tlydic@jetincorp.com
www.jetincorp.com
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Septic Services, Inc.

PO Box 632
Union MO 63084
800-536-5564 Fax: 636-583-6432
septic@fidnet.com
www.septicserv.com
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Tuf-Tite, Inc.

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Lake Zurich IL 60047
847-550-1011 Fax: 847-550-8004
sales@tuf-tite.com
www.tuf-tite.com
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Webtrol

8417 New Hampshire Ave.
St. Louis MO 63123
314-631-9200 Fax: 314-631-1804
help@webtrol.com
www.webtrol.com

Wieser Concrete Products, Inc.

W3716 US Hwy. 10
Maiden Rock WI 54750
800-325-8456 Fax: 715-647-5181
wieserpc@wieserconcrete.com
www.wieserconcrete.com
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Alarms & Controls

Alderon Industries, Inc.

PO Box 827
Hawley MN 56549
218-483-3034 Fax: 218-483-3036
info@alderonind.com
www.alderonind.com
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Aquaworx by Infiltrator

6 Business Park Rd.
Old Saybrook CT 06475
877-278-2979 Fax: 860-577-7001
info@aquaworx.com
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Delta Environmental Products, Inc.

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225-665-6162 Fax: 225-664-9467
terri.moran@pentairwater.com
www.deltaenvironmental.com
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GfG Instrumentation, Inc.

1194 Oak Valley Dr. Ste. 20
Ann Arbor MI 48108
800-959-0329 Fax: 734-769-1888
info@gfg-inc.com
www.gfg-inc.com



Liberty Pumps

7000 Apple Tree Ave.
Bergen NY 14416
800-543-2550 Fax: 585-494-1839
lpfaff@libertypumps.com
www.libertypumps.com

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Sutherlin OR 97479
541-459-4449 Fax: 541-459-2884
swerner@orenco.com
www.orenco.com
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patrick@polylok.com
www.polylok.com
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PumpDragon.com

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jworden@clearH2Oolutions.com
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Quanics, Inc.

PO Box 1520
Crestwood KY 40014
877-782-6427 Fax: 502-992-8249
dbanks@quanics.net
www.quanics.net



Septic Products, Inc.

1378 Twp. Rd. 743
Ashland OH 44805
419-282-5933 Fax: 419-282-5943
sales@septicproducts.com
www.septicproducts.com
Ad on page 51

Septic Services, Inc.

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Union MO 63084
800-536-5564 Fax: 636-583-6432
septic@fidnet.com
www.septicserv.com
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602 E. Union St.
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262-567-8908 Fax: 262-567-9532
septronics@charterinternet.com
www.septronicsinc.com
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SIM/TECH FILTERS, Inc.

1455 Lexamar Dr.
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888-999-3290 Fax: 231-582-7324
sales@gag-simtech.com
www.simtechfilter.com

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888-342-5753 Fax: 218-847-4617
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www.sjerhombus.com
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randychelette@sbcglobal.net
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help@webtrol.com
www.webtrol.com

Zoeller Pump Company

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800-928-7867 Fax: 502-774-3624
info@zoeller.com
www.zoeller.com
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Bacteria & Chemicals

Alita Industries, Inc.

13311 Brooks Dr. Ste. B
Baldwin Park CA 91706
626-962-2116 Fax: 626-962-2177
info@alita.com
www.alita.com
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PO Box 31057
Clarksville TN 37040
888-352-7226 Fax: 888-368-1904
info@arcan.com
www.arcan.com
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Jet, Inc.
750 Alpha Dr.
Cleveland OH 44143
440-461-2000 Fax: 440-442-9008
tlydic@jetincorp.com
www.jetincorp.com
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Webtrol

8417 New Hampshire Ave.
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help@webtrol.com
www.webtrol.com

Decorative Rock

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218 Hwy. 16
Rio WI 53960
920-992-6535 Fax: 920-992-6533
rbailey@dekorraproducts.com
www.dekorraproducts.com
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PO Box 1090
Fallbrook CA 92088
760-731-0745 Fax: 760-731-2405
jscruver@aol.com
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Drainfield Components

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Old Saybrook CT 06475
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info@aquaworx.com
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BrenLin Company, Inc.

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Herman MN 56248
888-606-1998 Fax: 320-677-3001
brenlin@frontiernet.net
www.seal-r.com
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BS Design Corp.

20 Wilshire Dr
Sharon MA 02067
866-968-9668 Fax: 781-793-0611
info@bsdesigncorp.com
www.bsdesigncorp.com
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DekoRRa Products

218 Hwy. 16
Rio WI 53960
920-992-6535 Fax: 920-992-6533
rbailey@dekorraproducts.com
www.dekorraproducts.com
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Eljen Corporation

10 N. Main Street, Ste 216
West Hartford CT 06107
860-232-0077 Fax: 860-232-0167
info@eljen.com
www.eljen.com
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FlowUSA, Inc.

PO Box 12452
Kansas City MO 64116
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sales@flowusa.com
www.flowusa.com
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GeoFlow, Inc.

506 Tamal Plaza
Corte Madera CA 94925
415-927-6000 Fax: 415-927-0120
krf@geoflow.com
www.geoflow.com
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info@infiltratorsystems.com
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swerner@orencos.com
www.orencos.com
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877-765-9565 Fax: 203-284-8514
patrick@polylok.com
www.polylok.com
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Presby Environmental, Inc.

143 Airport Road
Whitefield NH 03598
800-473-5298 Fax: 603-837-3826
info@presbyeco.com
www.presbyenvironmental.com
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Quanics, Inc.

PO Box 1520
Crestwood KY 40014
877-782-6427 Fax: 502-992-8249
dbanks@quanics.net
www.quanics.net



Ring Industrial Group

30 Industrial Park
Oakland TN 38060
901-465-6333 Fax: 866-279-9203
info@ringindustrial.com
www.ringindustrial.com
Ad on page 14

Septic Heater

41296 310th Street SE
Gully MN 56646
888-417-3784
info@septicheater.com
www.septicheater.com

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Boyer City MI 49712
888-999-3290 Fax: 231-582-7324
sales@gag-simtech.com
www.simtechfilter.com

SludgeHammer Group Ltd.

336 S. Division Rd
Petoskey MI 49770
231-348-5866 Fax: 720-834-3102
twiegman@sludgehammer.net
www.sludgehammer.net
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randychelette@sbcglobal.net
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Excavation Equipment

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www.flowusa.com
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400 Production Court
Elizabethtown KY 42701
270-737-1447 Fax: 270-737-0419
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www.ihices.com
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39 Sandia Mountain Trail
Edgewood NM 87015
800-963-6746 Fax: 801-454-4410
odorhog@gmail.com
www.odorhog.com
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Bio-Microbics, Inc.

8450 Cole Pkwy.
Shawnee KS 66227
913-422-0707 Fax: 913-422-0808
sales@biomicrobics.com
www.biomicrobics.com
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BS Design Corp.

20 Wilshire Dr
Sharon MA 02067
866-968-9668 Fax: 781-793-0611
info@bsdesigncorp.com
www.bsdesigncorp.com
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FlowUSA, Inc.

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www.hmvacuumpump.com
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pio@lombardoassociates.com
www.lombardoassociates.com

Orenco Systems, Inc.

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Sutherlin OR 97479
541-459-4449 Fax: 541-459-2884
swerner@orencosystems.com
www.orencosystems.com
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www.polylok.com
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PumpDragon.com

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317-774-0300 Fax: 317-221-0067
jworden@clearH2O.com
www.pumpdragon.com
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Septic Products, Inc.

1378 Twp. Rd. 743
Ashland OH 44805
419-282-5933 Fax: 419-282-5943
sales@septicproducts.com
www.septicproducts.com
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Septic Services, Inc.

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Union MO 63084
800-536-5564 Fax: 636-583-6432
septic@fidnet.com
www.septicserv.com
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SIM/TECH FILTERS, Inc.

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888-999-3290 Fax: 231-582-7324
sales@gag-simtech.com
www.simtechfilter.com

Simple Solutions Distributing, LLC

6 Jacobs Road
West Milford NJ 07480
973-846-7817 Fax: 973-858-0219
simplesolution1@optonline.net
www.stopsepticodor.com
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Tuf-Tite, Inc.

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Lake Zurich IL 60047
847-550-1011 Fax: 847-550-8004
sales@tuf-tite.com
www.tuf-tite.com
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Webtrol

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St. Louis MO 63123
314-631-9200 Fax: 314-631-1804
help@webtrol.com
www.webtrol.com

Wieser Concrete Products, Inc.

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Maiden Rock WI 54750
800-325-8456 Fax: 715-647-5181
wieserpc@wieserconcrete.com
www.wieserconcrete.com
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Zoeller Pump Company

3649 Cane Run Rd.
Louisville KY 40211
800-928-7867 Fax: 502-774-3624
info@zoeller.com
www.zoeller.com
Ad on page 9

Gas Detection

GfG Instrumentation, Inc.

1194 Oak Valley Dr. Ste. 20
Ann Arbor MI 48108
800-959-0329 Fax: 734-769-1888
info@gfg-inc.com
www.gfg-inc.com

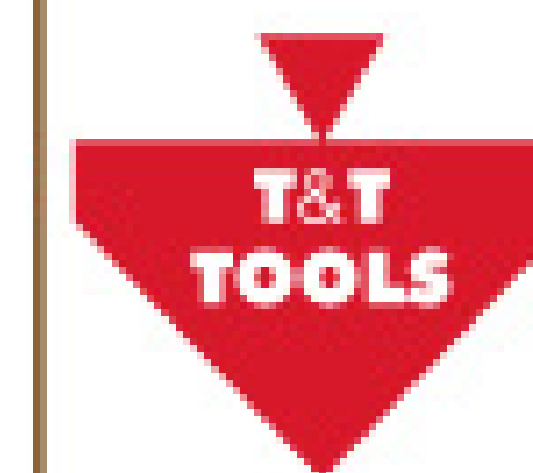
Hand Tools

Clements Associates, Inc.

1992 Hunter Ave.
Newton IA 50208
641-792-8285 Fax: 641-792-1361
jmcsoil@jmcsoil.com
www.jmcsoil.com
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Southern Manufacturing

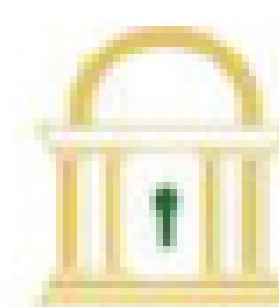
PO Box 790
Groves TX 77619
800-992-4501 Fax: 409-962-4544
randychelette@sbcglobal.net
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T & T Tools, Inc.

PO Box 531
Spring Lake MI 49456
800-521-6893 Fax: 800-521-3260
sales@tandttools.com
www.tandttools.com
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Leasing & Financing



Capital Partners, LLC

101 N. Main Ave. Ste. 215
Sioux Falls SD 57104
866-769-2345 Fax: 605-271-7133
jim@yourcapitalpartner.com
www.yourcapitalpartner.com

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Manholes/Wetwells



Containment Solutions, Inc.

5150 Jefferson Chemical Rd.
Conroe TX 77301-6834
936-756-7731 Fax: 936-756-7743
dheiman@csiproductions.com
www.containmentsolutions.com
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Nutrient Removal

Lombardo Associates, Inc.

49 Edge Hill Road
Newton MA 02467
617-964-2924 Fax: 617-332-5477
pio@lombardoassociates.com
www.lombardoassociates.com

Onsite Septic Systems

Advanced Drainage Systems

4640 Trueman Blvd.
Hilliard OH 43026
800-821-6710 Fax: 614-658-0204
info@ads-pipe.com
www.ads-pipe.com

Aqua Test, Inc.

PO Box 1116
Black Diamond WA 98010
800-221-3159 Fax: 425-413-9431
aquatestinc@yahoo.com
www.aquatestinc.com
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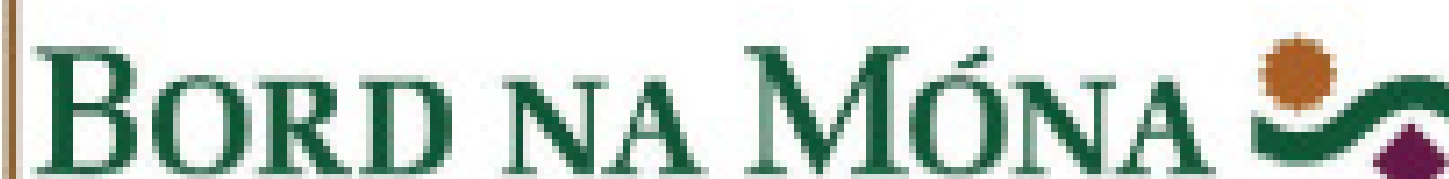
Aquaworx by Infiltrator

6 Business Park Rd.
Old Saybrook CT 06475
877-278-2979 Fax: 860-577-7001
info@aquaworx.com
www.aquaworx.com
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Bio-Microbics, Inc.

8450 Cole Pkwy.
Shawnee KS 66227
913-422-0707 Fax: 913-422-0808
sales@biomicrobics.com
www.biomicrobics.com
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ENVIRONMENTAL PRODUCTS U.S. INC.

Bord Na Mona

4106 Bernau Avenue
Greensboro NC 27407
336-547-9338 Fax: 336-547-8559
slaterra@bnm-us.com
www.bnm-us.com
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BrenLin Company, Inc.

13999 County Road 11
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888-606-1998 Fax: 320-677-3001
brenlin@frontiernet.net
www.seal-r.com
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BS Design Corp.

20 Wilshire Dr
Sharon MA 02067
866-968-9668 Fax: 781-793-0611
info@bsdesigncorp.com
www.bsdesigncorp.com
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DekoRRa Products

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rbailey@dekorraproducts.com
www.dekorraproducts.com
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Denham Springs LA 70726
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terri.moran@pentairwater.com
www.deltaenvironmental.com
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Eljen Corporation

10 N. Main Street, Ste 216
West Hartford CT 06107
860-232-0077 Fax: 860-232-0167
info@eljen.com
www.eljen.com
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Fergus Power Products

24978 225th St.
Fergus Falls MN 56537
218-736-6772 Fax: 218-736-7115
fpproducts@prtcl.com
www.ferguspowerpumps.com
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877-356-9872 Fax: 800-784-9504
sales@flowusa.com
www.flowusa.com
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Corte Madera CA 94925
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krf@geoflow.com
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H & M Vacuum Pumps & Equip.

East Coast to West Coast
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Hancor, Inc.

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888-367-7473 Fax: 888-329-7473
drainage@hancor.com
www.hancor.com

Hoot Systems, Inc.

2885 Hwy. 14 E.
Lake Charles LA 70607
888-878-4668 Fax: 254-299-0822
ron@hootsystems.com
www.hootsystems.com
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6 Business Park Rd.
Old Saybrook CT 06475
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info@infiltratorsystems.com
www.infiltratorsystems.com
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750 Alpha Dr.
Cleveland OH 44143
440-461-2000 Fax: 440-442-9008
tlydic@jetincorp.com
www.jetincorp.com
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pio@lombardoassociates.com
www.lombardoassociates.com

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swerner@orencos.com
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inforequest@ringindustrial.com
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www.septronicsinc.com
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973-846-7817 Fax: 973-858-0219
simplesolution1@optonline.net
www.stopsepticodor.com
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SludgeHammer Group Ltd.

336 S. Division Rd
Petoskey MI 49770
231-348-5866 Fax: 720-834-3102
twiegman@sludgehammer.net
www.sludgehammer.net
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Snyder Industries

PO Box 4583
Lincoln NE 68504
402-467-5221 Fax: 402-465-1229
clintz@snydernet.com
www.snydernet.com
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Southern Manufacturing

PO Box 790
Groves TX 77619
800-992-4501 Fax: 409-962-4544
randychelette@sbcglobal.net
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1200 Flex Court
Lake Zurich IL 60047
847-550-1011 Fax: 847-550-8004
sales@tuf-tite.com
www.tuf-tite.com
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Waterloo Biofilter Systems, Inc.

PO Box 400
Rockwood ON N0B 2K0
519-856-0757 Fax: 519-856-0759
info@waterloo-biofilter.com
www.waterloo-biofilter.com
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Webtrol

8417 New Hampshire Ave.
St. Louis MO 63123
314-631-9200 Fax: 314-631-1804
help@webtrol.com
www.webtrol.com

Wieser Concrete Products, Inc.

W3716 US Hwy. 10
Maiden Rock WI 54750
800-325-8456 Fax: 715-647-5181
wiesercp@wieserconcrete.com
www.wieserconcrete.com
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Zoeller Pump Company

3649 Cane Run Rd.
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www.zoeller.com
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www.flowusa.com
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Pressure Washers

H & M Vacuum Pumps & Equip.

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sales@hmvacuumump.com
www.hmvacuumump.com
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PO Box 632
Union MO 63084
800-536-5564 Fax: 636-583-6432
septic@fidnet.com
www.septicserv.com
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Water Cannon, Inc.

4044 W Lake Mary Blvd.
Lake Mary FL 32746
800-333-9274 Fax: 888-928-9274
richard@watercannon.com
www.watercannon.com
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Pump Control Panels

SJE-Rhombus Controls®

22650 County Highway 6
Detroit Lakes MN 56502
888-342-5753 Fax: 218-847-4617
sje@sjerhombus.com
www.sjerhombus.com
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PO Box 790
Groves TX 77619
800-992-4501 Fax: 409-962-4544
randychelette@sbcglobal.net
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Pumps-Aeration

Alita Industries, Inc.

13311 Brooks Dr. Ste. B
Baldwin Park CA 91706
626-962-2116 Fax: 626-962-2177
info@alita.com
www.alita.com
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Bio-Microbics, Inc.

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Shawnee KS 66227
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www.biomicrobics.com
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Sharon MA 02067
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www.bsdesigncorp.com
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Denham Springs LA 70726
225-665-6162 Fax: 225-664-9467
terri.moran@pentairwater.com
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419-755-1011 Fax: 419-755-1251
grsales@gormanrupp.com
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To a Tee

Installers debate the pros and cons of inlet tees on septic tanks and discuss solutions to homeowner's sewage odor problems

Question:

I would like some feedback on the subject of an inlet tee being installed inside the septic tank. Alabama just started making us put them in, and I wanted to see if anyone had any problems with it.

Answers:

➔ In my opinion, a primary trash tank/compartment should have an inlet baffle as well as an outlet baffle. The same is true for a secondary trash tank/compartment — you need them. Otherwise, the solids and FOG will not accumulate in the tank sufficiently.

The inlet baffle greatly reduces the turbulence caused by liquids rushing into the tank and keeps the floating debris from backing up in the sewer pipe. The outlet baffle helps keep most of the floaters from leaving the tank and should pick up water from the clear zone to pass on to the next stage.

Here in Texas, we are supposed to use the baffle length into the water from the flow line to one-third to one-half the flow line depth. At least that's what I do. I have seen no problems in septic lifetime with this approach.

➔ Inlet tees on a tank seem to work fine. We have used them for some time. They also make a great retrofit for tanks with broken inlet baffles. We have seen some concrete tanks with a full baffle across

the width of the tank on the inlet in a low-flow situation become so thick that the sewage would not flow. With a tee, it seems to drop on down.

Occasionally one will hang some toilet paper, but that is often a result of not enough drop out of the inlet. Just make sure that you have an inspection port over the tee, because you can then clear it if it should become clogged. The main thing is to introduce the sewage in a manner that doesn't disturb or stir the scum layer on top of the tank.

Question:

I have a question about septic odor. Over the years, some homeowners have complained of a smell outside their new homes shortly after they move in. These are homes where I installed the system. Some are gravity systems, some flood dose. Most of the homes were plumbed by the same plumbing company.

I have wondered for a long time if this plumber is doing something wrong — I don't recall having the smell issue when other plumbers do the work. They do return when called by the homeowner but never find anything wrong. They always blame me.

The cure for the smell almost every time has been to remove the outlet tee or baffle and install a 90-degree elbow in its place.

Can anyone explain why this causes the smell to go away?

Answers:

➔ I would want to be clear about the placement of what you describe as the outlet tee. To me, that is on the outlet side of the tank. If that is the case, then I would be reluctant to place a 90-degree elbow on this unless it had a vent drilled into it.

If you do that, though, the gas problem is likely to remain. If you use a 90 with no vent and the fall from the tank to the distribution box or dose tank is sufficient, the 90 becomes a siphon and will drain the tank to the bottom of the drop pipe. This is likely to pull more solids into the absorption area because of the surge.

Often the gas odor outside the home is just a result of vents being too low on a steep roof line or vents setting next to an outside wall that extends above the roof line. Again, the installer is not at fault, but can earn credibility for diagnosing the problem. We have had success with charcoal vent filters as well.

➔ As the 90-degree elbow discharges below water, the septic is prevented from venting out the house stack. The septic tank likely then vents out the drainfield in gravity systems and likely via man-holes in pressure systems. It sounds like there is a P-trap missing between the house sewer and septic tank.

➔ The smell goes away because if the outlet of the pipe is underwater, gas from the septic tank collecting in the air space above the liquid cannot get into the pipe. This may create a new problem because gas in the septic tank now has nowhere to go. So it will probably start to stink up the yard. As for diagnosis, here are a few possibilities:

If the roof vent is too far from the fixture it is intended to serve, the P-trap will siphon dry. The roof vent is not just a vent to allow odor out. It also is a siphon break. So if the vent is too far from the P-trap, or if the diameter of the vent pipe is too small, the water in the P-trap will be whisked away.

If a home sits unoccupied for a while, the water in the P-traps can evaporate. In floor drains there are common locations where plumbers omit traps. I have no idea why. One section of vent, because it is installed vertically, can pull away from another if they are not connected correctly.

➔ I can't believe a P-trap underground in the line outside of the house. If it was up here in Alaska, it would freeze, which is just one more reason to not have one. I can't in my wildest imagination figure out why anyone would put a trap in the line between the foundation cleanout and tank.

Do they vent the tank through the pumping risers? It's got to be vented somehow, to somewhere.

I've had a few of those with odor inside empty P-traps, but they're usually with a rarely-used shower or hidden floor drain in the basement or a washing machine dump in a spare room that never gets used.

➔ I install all piping from two feet outside the house to the tank and beyond. I use Schedule 40 pipe with all fittings primed and glued. All pipe is bedded in stone, with extra care in the overdig of the basement. We install a cleanout on every home. There are no P-traps. The tanks that I used were concrete. They came with a plastic baffle on each end. These baffles were plastic (about 12 inches square, extending down 12 inches below the invert), bolted to the sides of the tank.

The odor usually was very noticeable and occurred almost immediately. Of course, most homeowner complaints came during the warm months. Plumbing vents through the roofs were changed on several of the homes. This did not

help. Here in Indiana, we are required to leave the risers on the tanks extending to the surface.

Several homeowners were sure that this was where the smell was coming from and covered the risers with plastic to seal them. This did not help. I am still not sure why the smell stopped when a 90-degree elbow was installed on the outlet end of the tank. We tried a 90-degree elbow on the inlet end of several tanks (against our better judgment). Only once did this help. ■

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Mark Shepard, shown working with a crew on a home site, owns Utilities Excavating Inc., based in Overland Park, Kan. (Photography by Christopher J. Cummins)

A Sense of Communities

Mark Shepard builds and repairs advanced onsite systems while trying to be of service to his employees, his profession, and his hometown and county

By Gil Longwell

Utilities Excavating Inc., Overland Park, Kan.

OWNERS: Mark and Jeanne Shepard

YEARS IN BUSINESS: 22

EMPLOYEES: 5

ANNUAL REVENUE: \$750,000

SPECIALTIES: Emerging technologies

AFFILIATIONS: NOWRA, Kansas Small Flows Association

WEB SITE: www.wedoseptics.com



Mark Shepard is firmly connected to the communities where he lives and works. Shepard, who owns Utilities Excavating Inc. in Overland Park, Kan., believes being part of a community brings opportunity and responsibility.

For more than 20 years, his business has been rooted in this rapidly developing area about 12 miles southwest of Kansas City and five miles west of the Missouri state line. He has worked in many communities.

First a homebuilder, he got into excavating and utility installation when he saw that “the only excavator in the area was gouging holes in the soil and my bottom line.” He bought a backhoe to cut costs and was instantly in demand to work for other builders.

That led to an occasional pipe repair project, which he describes as “more personally rewarding than installing a new sewer line in a new

subdivision.” By 1996, Shepard had moved into the onsite industry. “I took on a few system installations,” he says. “I liked the idea of working on virgin territory — of going into a bean field and installing a system that worked with nature.” With every change of focus, he found opportunity and reward.

Today, Shepard and his company install a major share of the mounds and advanced treatment systems around Johnson County. The business includes about 75 percent new systems, 10 percent system repairs, and 15 percent utility installation and repair.

Along the way, he finds ways to help his profession and help people in need in and around Overland Park.

Employee community

Shepard is an integral part of his three-person crew. Every day, he works side by side with Kelly

“When there are people in need and you have the ability to help, you simply do it. It’s the right thing to do.”

— Mark Shepard

Eshleman, an area resident for 15 years. Jim Kinerk, Shepard’s brother-in-law, has been with the company for about three years. “We’re so small, we don’t have job titles,” says Shepard. Eshleman and Kinerk are also good friends. “They get along both on and off the job,” Shepard says.

In the office, Mary Ann Siscoe is the part-time office manager who works with Shepard’s wife and company president, Jeanne. Shepard expects to add an equipment operator this year and free himself up for more sales, design and customer contact.

A small crew size has not kept Utilities Excavating from having a large impact in the onsite industry in Johnson County. In 2007, county regulators issued 166 permits for major repairs or new systems. Shepard and his crew were on nearly 25 percent of those jobsites, where they installed 25 new systems and handled 15 major repairs.

When mound systems were introduced locally, Utilities Excavating was right there. Shepard and his crew installed the first mound system permitted by the county, and they still install a large share of new mounds there. Shepard also installed the county's first aerobic unit from Bio-Microbics Inc. — a MicroFAST 0.9 system.

"We have also installed a good

number of 750 gpd Model DF75-FF systems from Delta Environmental Products," he says.

As a board member in the Kansas Small Flows Association, Shepard attends annual training events and serves that diverse community as well. He describes KSFA installer training as "state specific."

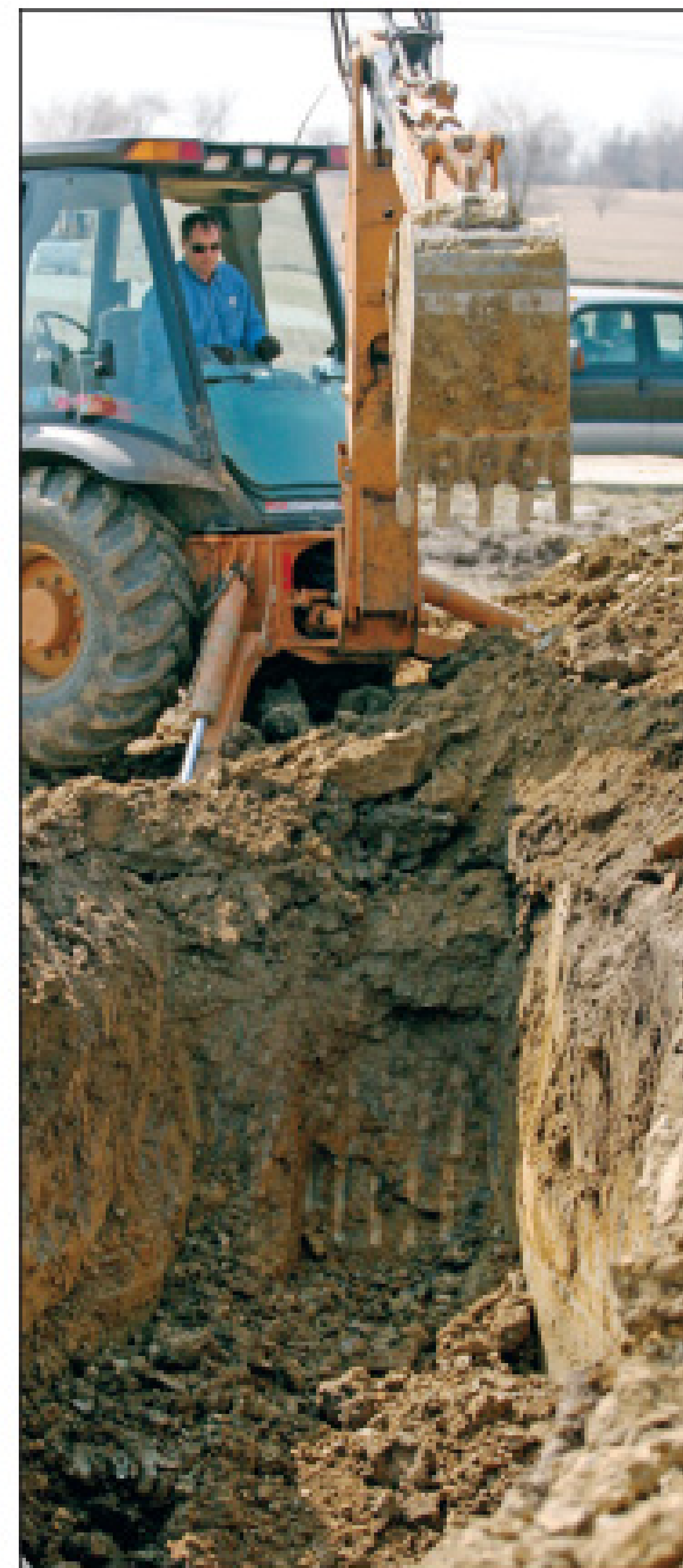
"Training is definitely needed, and most installers prefer participatory sessions rather than lectures," he says. Big training events at state and national venues provide unlimited opportunities for one-on-one conversations and small group discussion forums, formal and informal.

Diverse and growing skills

Shepard installs a variety of



Shepard and his crews take meticulous care to install quality systems that promote healthy communities.

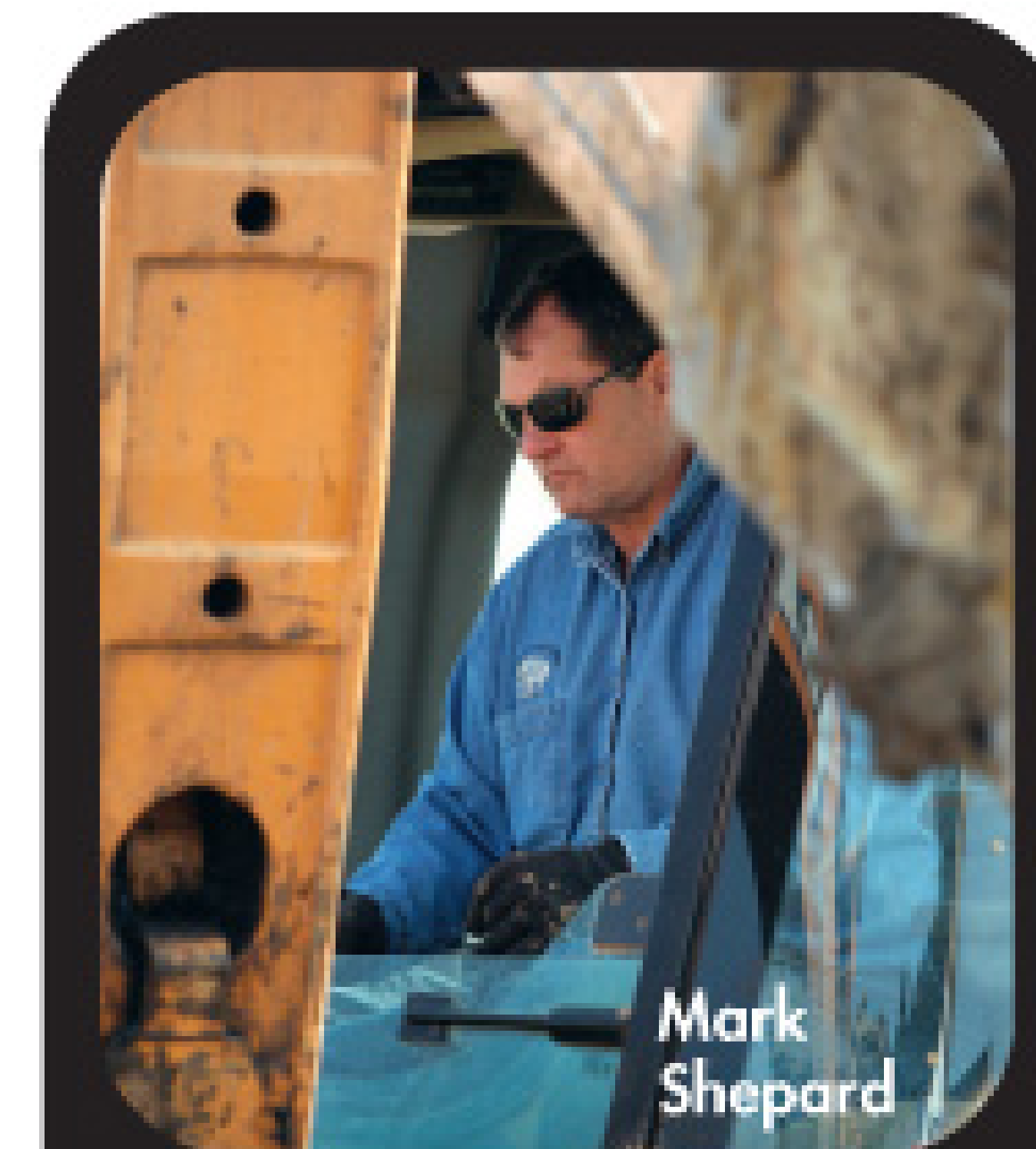


Mark Shepard at the controls of one of his company's excavators on a residential jobsite.

systems in his service area, which covers about an 80-mile-radius from Overland Park. Last year, in his home county alone, he installed 13 conventional gravity subsurface systems, six of which included a lift pump that moved the effluent uphill from the treatment tank before gravity finally took over.

The company also installed four mounds, four drip systems, and one sand filter. Crews installed 15 replacement treatment tanks and three holding tanks for commercial installations. The workload took Shepard to several other jurisdictions. "While the basic work remains the same, local regulations sometimes require handling different activities differently," he says.

Utilities Excavating is always looking for emerging technologies. Working on systems where the absorption area was in distress, he has found success installing Pirana bacteria generators from Pirana System and White Knight septic tank inoculation systems from



Preferences Vary

In Kansas, each county has the obligation to implement state-created rules. Counties also can make changes that make the state's regulations stricter.

Some call these changes more protective for the environment; others suggest that the motivations are merely to be different or to be in control. County-by-county differences challenge the installer community.

"The reason for the differences is not important, nor should we judge the county provisions as good or bad," says Mark Shepard, owner of Utilities Excavating Inc. He sees it as his job to recognize a jurisdiction's requirements and work to satisfy them.

"The installer must remember which jurisdiction he is working in and which local regulations apply, then do his best in that context in that community."

Knight Treatment Systems.

In northeastern Kansas, where public sewer systems are often nearby, "The trend is to 'repair' failing systems by connecting the building sewer to the public sewer," Shepard says. "If the public pipe is within 200 feet, we have no choice but to connect."

About three years ago, Utilities Excavating expanded its services to include comprehensive onsite system management and maintenance. For pressure distribution systems, the standard service

includes inspection and lateral cleaning every six months. Any problems found are resolved, and the homeowner has the comfort of knowing his system is being kept up to specifications. The company has about 100 systems under contract — including some installed by others.

Simple is best

Supporting his crew is a modest roster of well-oiled and well-tended machines. When he got into excavating, Shepard developed a preference for wobble-stick controls. To help his transition from one generation of machine to the next, he specifies that control system on new equipment.

Besides his 2006 Takeuchi TL130 skid loader, his 2006 Case 580 Super M backhoe has wobble-stick control. "It is faster to use and eliminates confusion when moving from one piece of equipment to the other," he says.

To move the equipment from job to job, a 2003 Ford F-350 pickup with dual rear wheels and a 1992 Ford 9000 chassis with a 22-foot box stand ready. Shepard calls the 1992 his "warehouse on wheels," as it hauls all tools and parts to each jobsite. To avoid the cost of a dump truck, he has all aggregate materials delivered to the site.

When not working hard on installations and repairs, Shepard gives freely of his own and his employees' time to help the community. "When there are people in need and you have the ability to help, you simply do it," he says. "It's the right thing to do."

Using his carpentry skills, Shepard showed up at a Habitat for Humanity worksite one day to help with finish carpentry. After watching a well-meaning volunteer try desperately to create a pleasant-looking final grade as he struggled with the controls on a donated wheel-loader, Shepard could not hold back. He left the jobsite and returned an hour later with his machine.

Later that day he bought a load of topsoil and donated it. "I did not do this to embarrass or diminish the other volunteer," he says. "I did it to help him out and to make the final job look right."



"Regulators from several jurisdictions were encouraged to come visit, watch a professional installation, get their questions answered and grow professionally in what I called a 'familiarization session.' Everyone benefited from this job."

— Mark Shepard

Lending a hand

When he encountered a landowner who needed help replacing an onsite system, Shepard coordinated the donation of the materials, and his crew installed an aerated treatment tank that discharged to a gravity absorption area.

"All of the materials and all of our labor were donated to the KSFA," Shepard explains. Because the owner had the resources to make reduced installment payments, "We arranged for him to send his payments to KSFA."

Mark Shepard's approach to leading his company involves learning, participating, leading, giving. The pattern has served him well.

Taking things a step further, Shepard opened the site to regulators from several jurisdictions. "We encouraged them to come visit, watch a professional installation, get their questions answered and grow professionally in what I called a 'familiarization session,'" Shepard says. "Everyone benefited from this job."

That summarizes Shepard's approach: Learning, participating, leading, giving. The pattern has served him well, creating work opportunities, providing personal and business rewards, and making each community a better place. "It is not about giving back," Shepard says. "It is about giving." ■

MORE INFO:

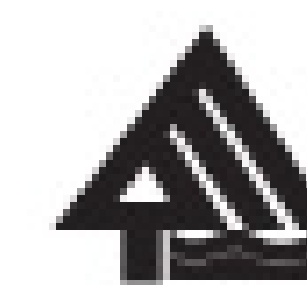
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 Regulator/Government (G)
 Supplier/Distributor/Sales (D) of:

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 Other _____

Please answer the following questions about your company:

1. Do you provide a service(s) other than one related to the onsite industry? (If so, check all that apply.)
 Plumbing (P) Septic Service (S) Excavation & Grading (Q) Portable Restroom Rentals (T)
 Other (please specify) _____

2. How many systems do you design and/or install per calendar year?
 0-10 11-20 21-30 31-40 41-50 More than 50

3. What is your annual budget for purchasing the equipment you use to do installs?
 \$0-10K \$11K-20K \$21K-30K \$31K - 50K \$51K-100K More than \$100K

4. How many vehicles do you currently have in service (including trucks, vans, dump trucks, vacuum trucks, etc.)?
 1-5 6-10 11-15 16-20 20 or more

5. How many pieces of excavation equipment do you have in service (including loaders, backhoes, excavators, etc.)?
 0 1-3 4-5 6-7 8-9 10 or more

School Days

A treatment system based on a trickling filter enables an elementary school to expand in an environmentally sensitive area in Ontario

By **Scottie Dayton**

The 45-year-old onsite system at Belfountain Elementary School in the hamlet of Belfountain, Ontario, kept backing up, and weekly pump-outs made no difference. A steady rise in enrollment was overtaxing the 2,000-gallon septic tank and clay-tile drainfield.

Anthony Acchione, owner of Allto Construction in Orangeville, was the district's turnkey contractor and onsite installer. He discussed treatment options with senior project engineer John Hibberd, P.E., of HEI Group, Toronto.

The system had to meet specific criteria. Control panels or monitoring devices could not be inside the school, and outside components had to be childproof. The system had to keep pace with further expansions and satisfy all environmental conditions.



"Doing anything in this area requires special permission and approval from three environmental governing bodies," says Acchione.

Subcontractors for Allto Construction lay rebar before pouring eight inches of concrete to form the platform for the 40-foot biofilter container. The concrete took 14 days to cure. (Photos courtesy Chris Jowett, Waterloo Biofilter Systems Inc.)

"Our first challenge was getting them." The second challenge was completing the project before classes began that autumn.

Hibberd's solution has five tanks, an absorbent trickling filter in an above-ground container, a drip disposal drainfield, and an 8-foot-high wire mesh security fence. Much to the students' dismay, Acchione met his deadline.

Site conditions

Soils are sandy gravel with a percolation rate of 6 minutes per inch and no water table. The 7-foot-deep top layer has boulders up to 24 inches, followed by coarse sand. Situated on top of a hill, the property lies within the Niagara Escarpment and is near the Oak Ridges Moraine, which contains the

headwaters of 65 river systems, and the Credit Valley Watershed.

System components

The school has 200 students and no kitchen. Hibberd sized the system at 2,575 gpd to handle future expansion. Its major components are:

- 6,000-gallon, two-compartment, concrete septic tank. All tanks made by Newmarket Pre-cast Concrete Products Ltd., Uxbridge, Ontario.
- 2,000-gallon pump tank with two 1-hp effluent pumps. All pumps from Franklin Electric, Winnipeg, Manitoba.
- 6,000-gallon, two-compartment settling tank.
- Effluent filter, part of the package from Waterloo Bio-

System Profile

Location:	Belfountain, Ontario
Facility served:	Belfountain Elementary School
Engineer:	John Hibberd, HEI Group, Toronto, Ontario
Installer:	Anthony Acchione, Allto Construction, Orangeville, Ontario
Site conditions:	Sandy gravel with a percolation rate of 6 minutes per inch and no water table.
Type of system:	SC-20 absorbent trickling filter, Waterloo Biofilter Systems Inc., Rockwood, Ontario
Hydraulic capacity:	2,575 gpd

"The biofilter handles 2,575 gallons per day, but the container can handle twice as much if the school decides to expand. Even the septic tanks are situated where it is easy and cost effective to put in another set when the time arrives."

— Anthony Acchione

filter Systems Inc., Rockwood, Ontario.

- 5,000-gallon, two-compartment balancing tank with two 1-hp effluent pumps.
- Customized SC-20 Waterloo biofilter wastewater treatment system.
- 2,000-gallon pump chamber with two 1/2-hp effluent pumps.
- Remote-control panel from IDT Systems, Cambridge, Ontario.

Patti Moss from Allto Construction performs a ball test to make sure that the pipes leaving the building have no sags or obstructions.



- 6,800 feet of 3-inch perforated PVC low-pressure pipe from Royal Group, Woodbridge, Ontario.

System operation

Sewage from the existing school and addition exits through 6-inch SDR-28 PVC pipe, passes through individual manholes, flows to the septic tank, then enters the pump tank. Dual alternating pumps in the tank send 100 gallons every 30 minutes through a 2-inch polyethylene pipe to the settling tank. "This tank lengthens the retention time to intercept solids more efficiently before they reach the balancing tank," says Acchione.

Dual alternating pumps in the balancing tank cycle every 30 minutes, pumping 100 gallons up 12 feet to the top of the biofilter. The foam filter media occupies half of the 40-foot shipping container and is separated from the operations room by a wall.

Effluent enters a manifold with three nozzles that spray in a circular pattern over 3-inch-square foam cubes. As the liquid trickles down,

microorganisms in the media consume the organic components. Two low-amperage 4-inch air fans constantly circulate air through the foam pile to ensure aerobic conditions.

A 3-inch-high longitudinal partition on the floor divides the biofilter in half lengthwise. The clear, odorless liquid on one side drains into a collection line that recirculates it to the settling tank; the other 50 percent gravity-flows to the drainfield pump chamber. The drainfield has two zones, each receiving 300 gallons on demand from its dedicated alternating pumps. Water flows through a distribution box and into eight 80-foot-long laterals.

"The biofilter handles 2,575 gallons per day, but the container can handle twice as much if the school decides to expand," says Acchione. "Even the septic tanks are situated where it is easy and cost effective to put in another set when the time arrives."

Installation

"Installing the systems at the two other schools taught us the most efficient way to work," says Acchione. "We built the platform for the 40-foot container first." After stripping the topsoil, his crew cut and filled the area to level it, then built a 6-inch-thick bed of gravel with fines. A wood frame went on top of the gravel, followed by rebar covered with 8 inches of poured cement, which required 14 days to cure.

The base of the two, 6,000-gallon tanks was set 30 feet deep to match the elevation of the piping exiting the school. "That's a major excavation, and the coarse sand beneath the boulder layer collapsed when disturbed," says Acchione. Unable to maintain a 3-to-1 slope

Electrical and communication conduits are shown installed before the container was set on the concrete pad.

The biofilter occupies half of the 40-foot shipping container and is separated from the operations room by a wall.



on one side without undermining the abutting parking lot, Acchione brought in a trench box to protect the men in the hole.

Excavated boulders were trucked to his yard, crushed, and reused. A 120-ton crane set the tanks. Most were backfilled with three feet of sand, but the deep burials required six feet of coverage.

Acchione performed a ball test for the building department and engineer onsite to assure them that the pipes leaving the building had no sags or obstructions. "We drop a tennis ball into the 6-inch pipe from inside the school," he says. "If it arrives in the septic tank, everything is good." It was.

The drainfield's percolation rate was too rapid, so Acchione imported septic sand with a percolation rate of 25 minutes to cover its 40-by-170-foot-long footprint. A 3-foot-deep sand bed lies atop a 3-foot-deep stone bed. After laying the dispersal pipe, the crew covered it with six inches of sand for insulation. Test samples of tertiary effluent reaching the drainfield contain less than 10 mg/L BOD and TSS.

Arriving on a tilt-and-load truck, the pre-engineered, insulated, waterproofed shipping container was lowered onto its pad by a crane. Because it was used as an operations room with front and side access doors, eyewash station, fire extinguisher, space heater, and a chair and table, Ontario's Building Code considered the container to be a building.

The entire onsite system is controlled from this locked operations room. Subcontractors built an 8-foot-high wire-mesh security fence





Access risers for deep-buried tanks are shown just after installation.

around the access risers, 5C-20 container, and electrical junction boxes to keep out the children

Maintenance

Waterloo Biofilter Systems will service the system under contract for two years, after which the school board may hire any licensed service provider. Monthly inspections cover pumping of the septic tanks as needed, checking of the effluent pumps, control panels, and Auto-Dialer Alerts, rinsing of the spray nozzles and effluent filters, and examination the drainfield.

"These systems don't require much maintenance," says Acchione. "The control panel monitors everything. If something goes wrong, it automatically dials 10 people who jump on the Internet to see

what's happening." Despite a very tight schedule, the system was fully operational when school started in September. Acchione is working with the school board to upgrade two more school onsite systems this year. ■

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- 230 **IDT Systems Inc.**
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- 236 **Newmarket Precast Concrete Products**
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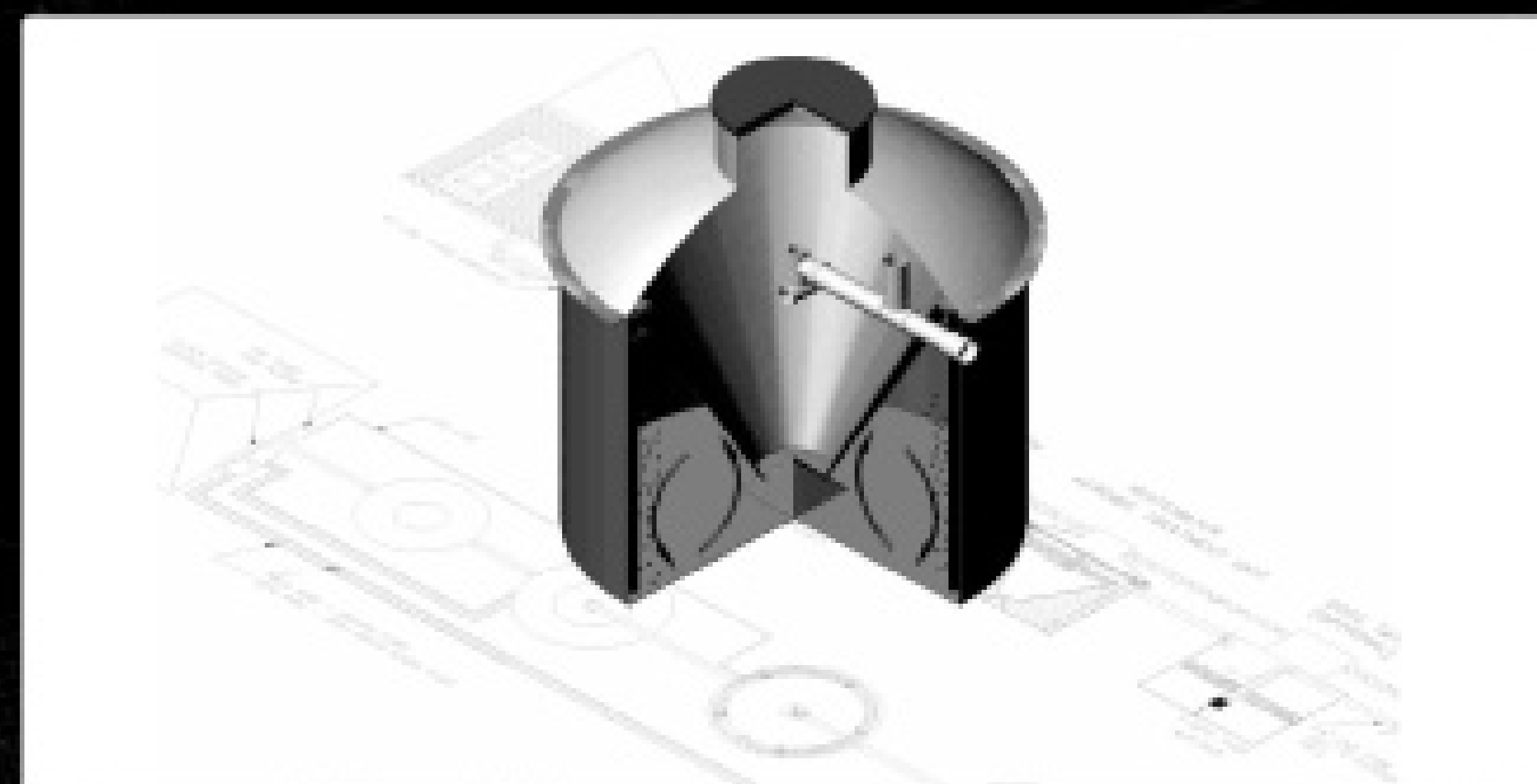
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Roth Receives Federal Cross of Merit

Manfred Roth, owner of the Roth Group, including Roth Global Plastics, makers of the FRALO line of products, was presented the Federal Cross of Merit by Prime Minister Roland Koch on behalf of the Federal Republic of Germany for his honorary work and social commitment. Roth is a past president of the Chamber of Commerce of Dillenburg, served as commercial judge in Marburg and supports The Philipps-University in Marburg, where he serves on the board. He also supports cultural organizations and donated the under-floor heating systems for the renovation of the Frauenkirche in Dresden. Roth took over the family's small handcraft business after his father's illness in 1961, and became the sole shareholder of Roth Industries upon his father's death in 1969. Today the company operates worldwide and has more than 1,100 employees.



Prime Minister Roland Koch, Manfred Roth and wife Helen Roth.



Darren Simmie (right), sales manager for Orenco Systems Inc., leads Stephen Steele of Milan Supply, Jared Willey of Wastewater Technologies Inc. and Bob Johnson of Atlantic Solutions in a panel discussion at a January workshop in Sacramento, Calif.

Orenco Holds AdvanTex Dealer Workshops

Orenco Systems Inc. conducted two-day workshops for its authorized AdvanTex dealer network in Atlanta, Ga., Sacramento, Calif., and Sutherlin, Ore. The workshops trained dealers on the company's new technology for tracking system service. All members of the AdvanTex program are required to attend periodic training.

Zoeller Hosts Open House

Zoeller Pump Co. held an open house for contractors, installers, distributors, regulators and vendors in connection with the 2008 Pumper & Cleaner Environmental Expo in Louisville. The group toured Zoeller's Louisville facility and viewed various product demonstrations. ■



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Association Changes Name

At its annual convention, the Wisconsin Onsite Wastewater Recycling Association voted to change its name to the Wisconsin Onsite Water Recycling Association. The change reflects opportunities members will have to expand their businesses by offering stormwater management system installation to municipalities.

Four scholarship recipients were announced. Grayson Bulter won the \$2,000 Robert Lindner Memorial Scholarship. He intends to major in engineering mechanics or engineering physics this fall. Brittany Rynes, who plans to study nursing, won the \$1,500 Gretchen McQuestion Scholarship. Melanie Meier received \$1,500 toward her business major, and Terran Thompson received \$1,000 to study surgical nursing and anesthesiology. WOWRA has awarded \$94,000 in scholarships over the past 17 years.

Recycled Glass in Onsite Systems

Representatives from the Pennsylvania Recycling Markets Center (RMC) briefed attendees at the Pennsylvania Association of Sewage Enforcement Officers conference about its efforts to reduce barriers to the use of manufactured recycled glass sand in onsite systems. The Department of Environmental Protection approved the product in 2003.

About 25,000 onsite systems are installed annually in Pennsylvania. According to RMS, if half are elevated mounds requiring 80 to 150 tons of material each, then the result is a green builders demand of 1 to 2 million tons, which manufactured recycled glass sand could fill. Call the RMC at 717/948-6660 or visit www.parmc.org.

CALENDAR OF EVENTS

May 12-15

California Onsite Wastewater Association Conference and Exposition, DoubleTree Hotel, Sacra-

mento, Calif. Call 707/579-4882 or visit www.cowa.org.

June 29-July 2

American Society of Agriculture and Biological Engineers International Meeting, Providence, R.I. Call Sharon McKnight at 269/428-6333 or visit www.asabe.org.

Aug. 22-23

Wisconsin Liquid Waste Carriers Association Summer Convention, Radisson Paper Valley Hotel, Appleton. Call 608/255-2770 or visit www.wlwca.com.

Sept. 10-11

National Association of Wastewater Transporters Inc. Septage/Grease Trap Waste Treatment Symposium, Holiday Inn at Six Flags Union, Mo. Call 800/236-6298 or visit www.nawt.org.

Oct. 14-15

Delaware Onsite Wastewater Recycling Association Conference and Exhibition, Dover Downs Hotel and Casino, Dover. Call 302/739-9331 or visit www.dowra.org.

Oct. 23-26

Ontario Association of Sewage Industry Services Conference and Exposition, Best Western Conference Centre, Orillia. Call Don Kelloway at 877/202-0082 or visit www.oasisontario.on.ca.

Jan 30-31, 2009

Wisconsin Liquid Waste Carriers Association and Wisconsin Onsite Water Recycling Association Joint Convention, Marriott West Hotel, Madison. Call 608/255-2770 or visit www.wowra.com.

TRAINING & EDUCATION

Alternative Treatment Class and Tour

The New York Onsite Wastewater Treatment Training Network Inc. is offering a special certified course, Alternative Onsite Waste-

water Treatment Technologies, May 28-29, at the New York State Fairgrounds in Syracuse. Included are a factory tour of Roth Global Plastics and a full day visiting the Skaneateles Lake Demonstration Project. Attendees will learn about the design, construction, and maintenance procedures for:

- Fusion series treatment systems
 - Aerocell foam cubes
 - Packed bed/suspended growth systems
 - Textile/peat filter/bottomless sand filters
 - Drip irrigation systems
 - Shallow pressure-dosed trenches
 - Microbial inoculators/generator
- Call 800/963-3544 or visit www.wastewater.delhi.edu.

National Association of Wastewater Transporters

NAWT has scheduled sessions in the following locations:

- June 5 – Inspector Training and Certification, Flagstaff, Ariz. Call Kitt Farrell-Poe at 928/782-3836; kittfp@ag.arizona.edu.
- July 17-18 – Operation and Maintenance Training, northern California. Call 707/579-4882; www.cowa.org.
- Aug. 6-7 – Operation and Maintenance Training, central California. Call 707/579-4882; www.cowa.org.
- Aug. 26-27 – Inspector Training and Certification, Tucson, Ariz. Call Kitt Farrell-Poe at 928/782-3836; kittfp@ag.arizona.edu.

Alabama

Licensing classes are the joint effort of the Alabama Onsite Wastewater Association (AOWA) and University of West Alabama (UWA). Courses are at UWA's Livingston campus unless stated otherwise:

- May 1-2 – Pumpers
 - May 7-9 – Advanced Installer Level 2
 - June 11-13 – Basic Installer
 - June 26-27 – Continuing Education, Dothan
- Call Allen Tartt 205/652-3803 or visit www.aowatc.uwa.edu.

California

Certification courses are sponsored by the California Onsite

Wastewater Association and National Association of Wastewater Transporters. Check the COWA web site for locations.

- June 12 – Soils
 - July 17-18 – Operation and Maintenance, Part 1
- Call Cliff Trammel at 707/579-4882 or visit www.cowa.org.

Florida

Courses are at the Florida Onsite Wastewater Association's Training Center in Polk City unless stated otherwise.

- May 6 – Smart Business Practices ... Portable Restroom Industry
 - May 20-21 – O&M Service Provider Program I, II, III, Miami
 - June 10 – Management of Decentralized Systems, Jacksonville
 - June 11 – Management of Decentralized Systems, Daytona Beach
 - June 16-17 – Master III-Basic Florida Soils
 - June 18-19 – Master I-System Design and Function
 - June 19-20 – Master II-System Materials and Regulation Requirement
- Contact FOWA at 407/830-4381 or www.fowaonsite.com.

Iowa

The Iowa Onsite Wastewater Training Center has the following courses:

- June 19 – Basic Soils, location to be announced
- Aug. 21 – At-Grade and Mounts, Ankeny

Call Annette Adams at 800/362-2127, ext. 6464 or e-mail Dennis Hayworth at dahayworth@dmacc.edu.

Michigan

The Michigan Onsite Wastewater Training and Education Center at MSU Tollgate Center in Novi is offering these courses:

- May 6-7 – Soils Training
 - Aug. 12-13 – Existing Systems Evaluator Training
- Contact Barb DeLong at 517/355-4720 or visit www.egr.msu.edu/age, then Extension & Outreach.

Minnesota

The University of Minnesota Extension has these hands-on

workshops:

- May 1-2 – Installing, White Bear Lake
- May 5-7 – Pumping and Maintaining, Mankato
- May 5-9 – Pumper/Maintaining and Service Provider Combo, Mankato
- May 6-9 – Service Provider, Mankato
- May 29-30 – Soils, Brainerd
- June 2-4 – Designing Onsite Systems, Mankato
- June 5-6 – Soils, Mankato
- June 10-11 – Soils, Sartell
- June 12-13 – Inspecting Onsite Systems, Waseco
- June 20 – Soils-Continuing Education, Sartell
- June 26 – Soils-Continuing Education, North Branch

Call 800/322-8642 (612/625-9797) or visit www.extension.umn.edu.

Missouri

The Department of Health and Senior Services is offering the following training professional CEU courses:

- May 6 – Troubleshooting, Grandview
- May 7 – Hydraulics, Grandview
- May 20-21 – Operation and Maintenance, Camdenton
- May 27 – Troubleshooting, Maryville
- May 28 – Hydraulics, Maryville
- June 17-18 – Operation and Maintenance, Hannibal
- June 24-25 – Operation and Maintenance, St. Louis

Call 573/526-6095 or visit www.dhss.mo.gov/Onsite

New York

The New York Onsite Wastewater Treatment Training Network Inc. is offering certified courses at the New York State Fairgrounds in Syracuse:

- May 7 – Inspection of Existing Residential Wastewater Treatment Systems
- May 28-29 – Alternative Onsite Wastewater Treatment Technologies

Call 800/963-3544 or visit www.wastewater.delhi.edu.

North Carolina

North Carolina Soils and On-Site Wastewater Training Academy is offering the following courses:

- May 6 – Principles of Gravity

- System Design, Boone
 - May 7 – On-Site Systems Layouts, Boone
 - May 13 – Principles of Gravity System Design, Elizabeth City
 - May 14 – On-Site Systems Layouts, Elizabeth City
 - May 15 – Pump System Design, Elizabeth City
 - May 20 – Introduction to Decentralized Wastewater, Fletcher
 - May 21-22 – Onsite Wastewater System Inspector, Fletcher
 - June 10-12 – Subsurface Wastewater Operator Training, Fletcher
 - June 25 – Soil Survey in the 21st Century, Raleigh
 - June 26 – Installation of Pump Systems, New Bern
 - June 27 – Installation of Advanced Systems, New Bern
- Call Joni Tanner at 919/515-1678 or visit www.soil.ncsu.edu/training.

Pennsylvania

The Pennsylvania Septage Management Association offers the following training:

- July 16-17 – Advanced Onlot Wastewater Treatment System Inspection, Chester County
- July 16-17 – Basic Onlot Wastewater Treatment System Inspection, Bordentown

New Jersey Septage Management Association members qualify for PSMA member tuition fees. Call Jackie at 610/350-0590 or visit <http://psma.net>.

Rhode Island

The University of Rhode Island's Onsite Wastewater Training Center offers these professional development workshops at its Kingston campus:

- May 8 – Innovative and Alternative Technology Overview
 - May 14 – Hands-On Component Installation
 - May 29 – Innovative and Alternative Systems Field Tour
 - June 4-5 – Innovative and Alternative Systems Operation and Maintenance
 - June 18 – Soils Basics for the Onsite Wastewater Contractor (contact Mark Stolt)
 - June 25 – Bottomless Sand Filter Design and Installation
- Call Holly Meehan at 401/874-

5950 or Mark Stolt, when directed, at 401/874-2915 or visit www.uri.edu/ce/wq.

Texas

The Texas Onsite Wastewater Association is offering a Basic Maintenance Provider course, May 8-9, in the Beaumont area. Call 888/398-7188 or visit www.txowa.org.

Washington

The Washington On-Site Sewage Association and Washington State Department of Health in coopera-

tion with Washington State University are offering these certification courses at the training center in Puyallup unless stated otherwise:

- May 6-7 – Combined Basics of Onsite Sewage
- May 14-15 – Installation Basics, Part 2
- May 20 – Mounds/Sand Filters
- May 22 – Maintenance Basics, Bremerton

Call John Thomas at 253/770-6594 or visit www.wossa.org. ■



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