

December

2008

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By Gil Langwell

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- Basic Training: Providing proper cover for onsite systems

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What Did the Past Year Teach You?

Before letting 2008 slip into oblivion, it can be worthwhile to look back and reflect on the year's events and any lessons they may carry

By Ted J. Rulseh

“Yesterday it was my birthday.
I hung one more year on the line.
I should be depressed, my life's a mess,
but I'm having a good time.”

Paul Simon

I tend to think of that song by Paul Simon, “Have a Good Time,” around birthdays and around year's end. So we're all about to hang one more on the line. But what does that mean?

I'm not a big one for New Year's resolutions, but I do believe in going back over the year just passed, not for nostalgia but for the same reason it would pay to go immediately back over notes from a lecture when I was in college, or still pays to review right away the notes from a business meeting.

Timely reminders are good for the memory banks. What we don't revisit we quickly forget. It's better not to forget things that can teach us worthwhile lessons. (That's why certain books are worth re-reading at various stages of life — one such book for me is Dale Carnegie's *How to Win Friends and Influence People*.)

Making it a tradition

For a number of years my wife and kids and I

made it a ritual on or around New Year's Eve to glance back over the year. My wife would pull out the diary she kept, and we would touch on the notable events — the highlights and the low-lights. It was mostly a pleasant way to revisit and remember our blessings.

I've done something similar to that on a few occasions with my business life. It's not difficult. You just take your planner or whatever you use to record appointments and page on through, front

You just take your planner or whatever you use to record appointments and page on through, front to back or back to front. Odds are you'll encounter reminders of things you did that helped make you successful, and mistakes you wish you could take back.

to back or back to front. Odds are you'll encounter reminders of things you did that helped make you successful, and mistakes you wish you could take back. Such items come in all shapes and kinds.

Let's see. Here's a time where I had a nasty flare-up with a colleague. It was so out of character for both of us that on reflection I decided just to erase it from memory as if it never even happened — in much the same way, when compiling statistics, you throw out the one or two figures that simply don't make sense. In the words

of a Spanish-speaking acquaintance, *No pasó nada. That didn't happen.* It was a good decision.

Here's a Friday where I had planned a fishing trip, but later put a big X through the calendar square because I thought I was “too busy.” I should have taken the long weekend: I was a burnout case in the office that Friday. With the break I would have come back refreshed on Monday. Lesson: When you need some free time, take it.

A lot to learn

How about your calendar? What can it teach you? Growth and wisdom are not just the sum of momentous events. More often they're the slow accumulation of small lessons, the kind that we'll forget if we're not careful, and as they say, when we forget the past, we're doomed to repeat it.

A look back can restore to memory those smaller teachable moments and help us make the learning part of who we are. So, one day before this month expires, consider taking a little quiet time to reflect. Find a comfortable spot, at home or at the office. Grab a coffee. Shut the door. Page through the year, whether on paper or digitally.

Have a notepad with you. Maybe you'll recall a promotion idea you wanted to share with your team but never did. Or a great bit of language you used to close a sale, but had forgotten. Or a new material supplier you'd wanted to check out. Write it all down and resolve to act on it.

Besides reviewing your own year, maybe it's worthwhile to share the exercise with your team, the way I used to do with my family. It could be a great experience if you keep it light and keep it positive. Who knows what good things your people may remember — ideas you can use that otherwise might have been lost forever.

When you're done, before hanging that year on the line, you'll have wrung all the value from it that you can. ■



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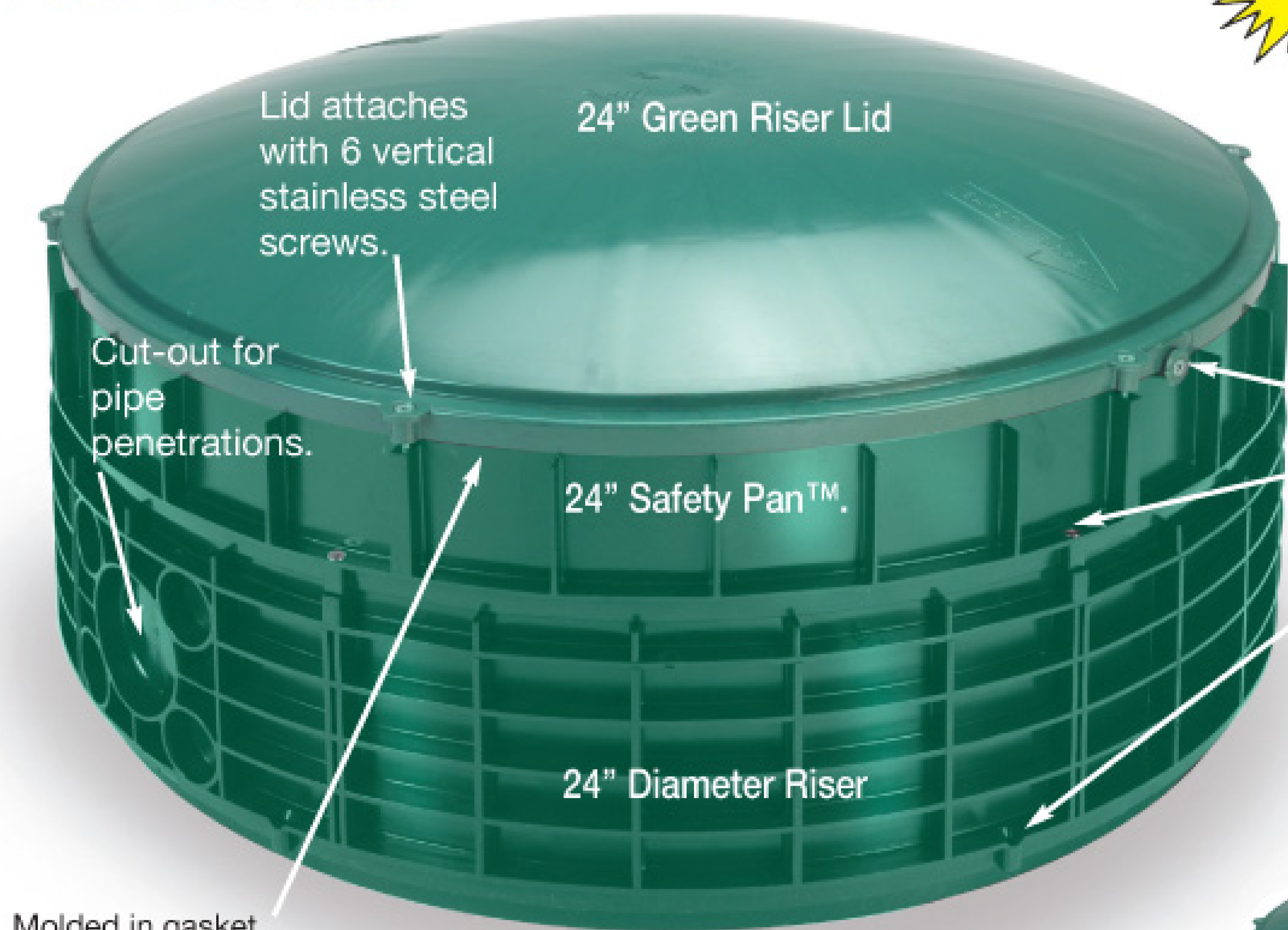
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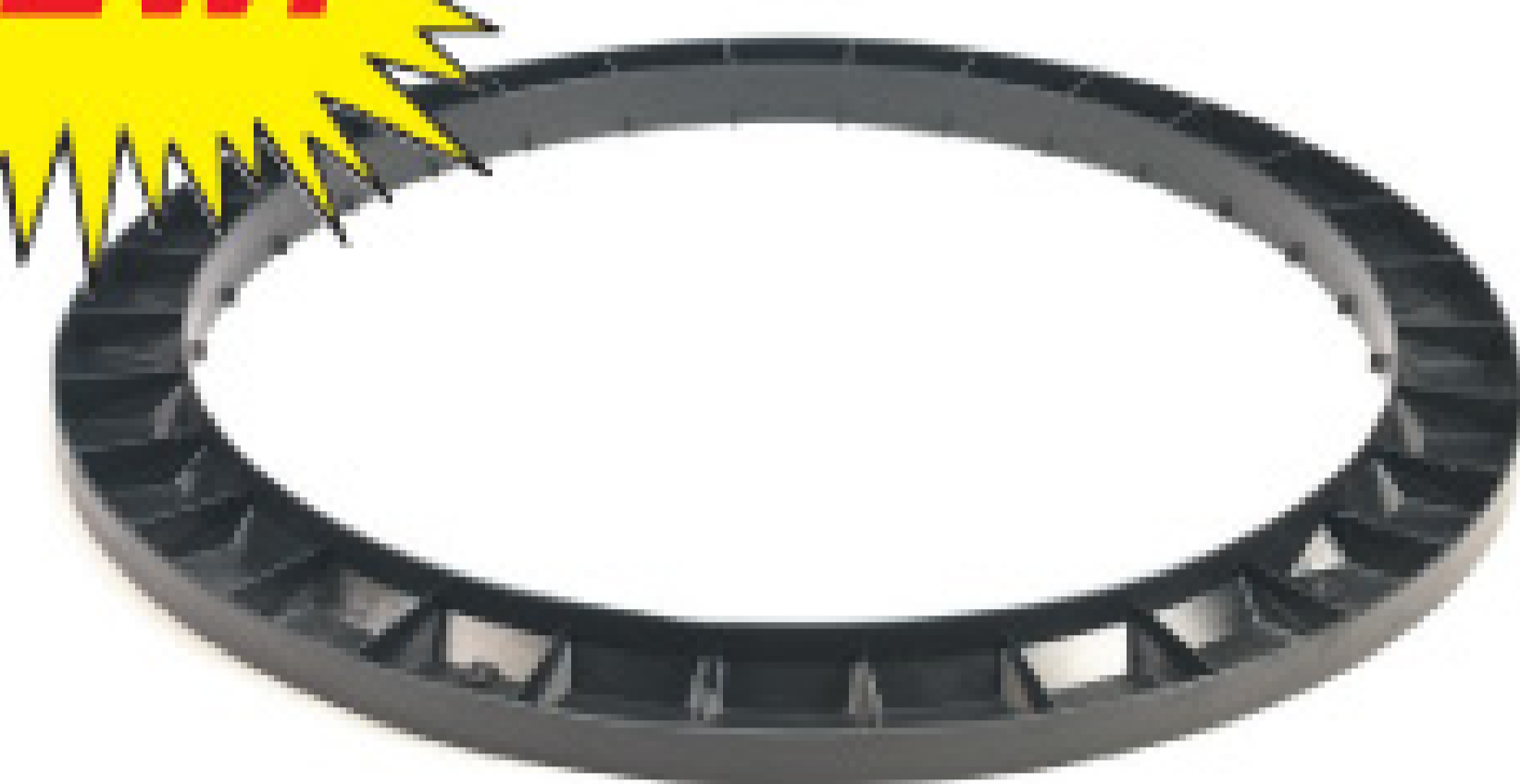
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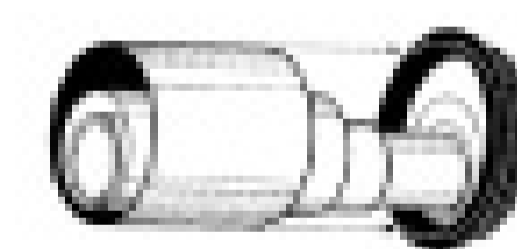
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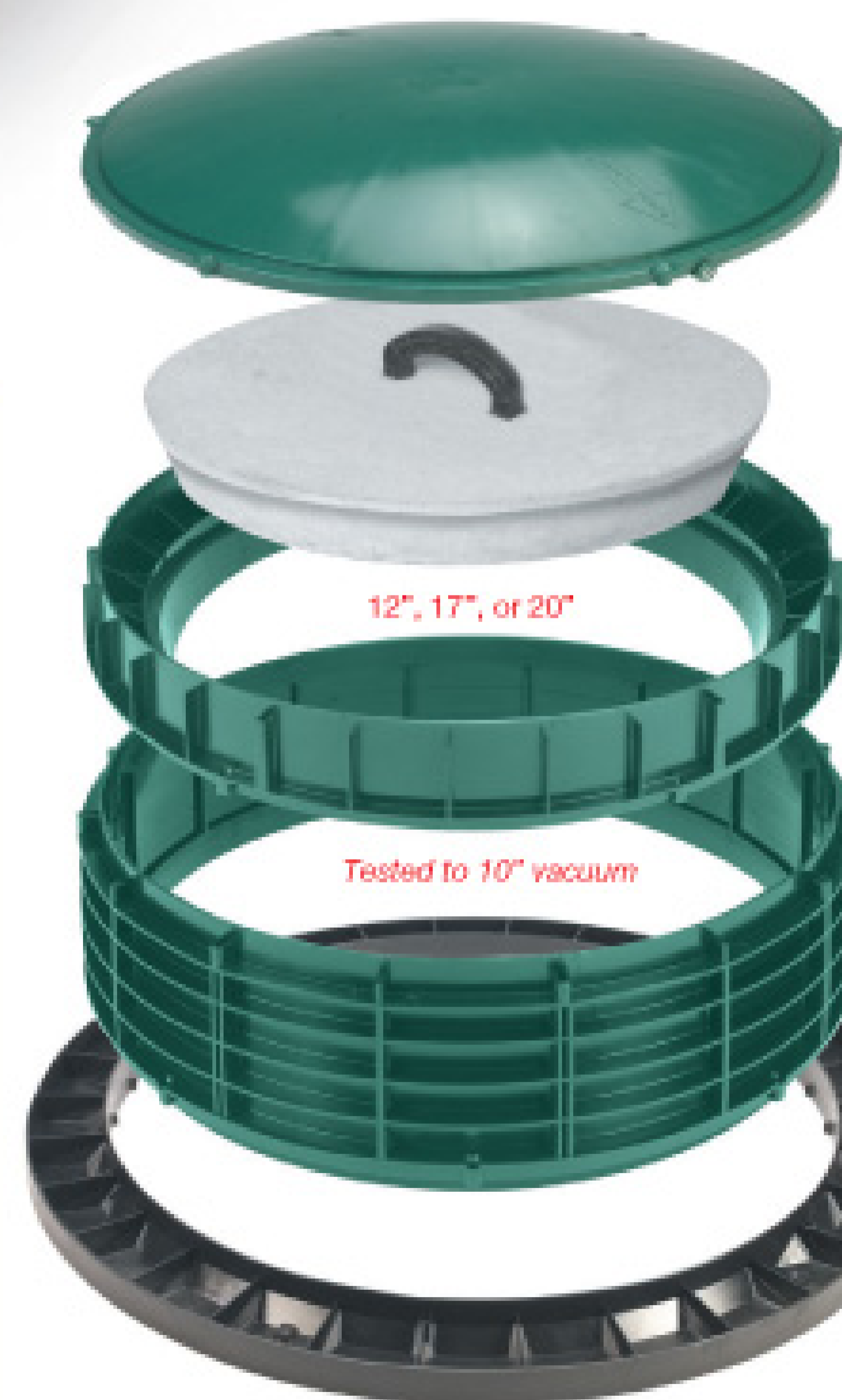


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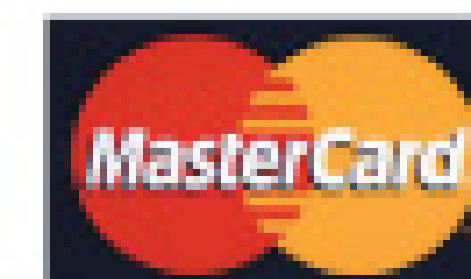


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5,624,123
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Jim Anderson and David Gustafson are with the University of Minnesota's widely recognized onsite wastewater treatment education program. Jim is director of the university's Water Resources Center, and Dave is the university's extension onsite sewage treatment educator. Readers are welcome to submit questions or article suggestions to Jim and Dave. Write to ander045@umn.edu.

Absorption Width in Mound Systems

In troubleshooting a mound failure, it is essential to determine whether the soil beneath the system has adequate capacity to treat effluent

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

We often get one question from installers who are troubleshooting sewage breakouts at the toe of the down-slope dike of a mound system: Can't I just haul in a little more soil and cover up the breakout?

The answer is somewhat more complicated than it might first appear, and it often goes all the way back to the original design and installation. There are at least three key items to consider when determining cause of the breakout and deciding how to fix it.

Back to the beginning

The first question is whether the original soil was properly scarified and protected. This means the vegetation was clipped and removed and the soil surface carefully prepared to maintain a good infiltration surface contact with the sand media.

The soil must have been worked when it was too wet so as to avoid compaction or smearing. This is the old KIDD principle of Keep It Dry, D-----. In addition,

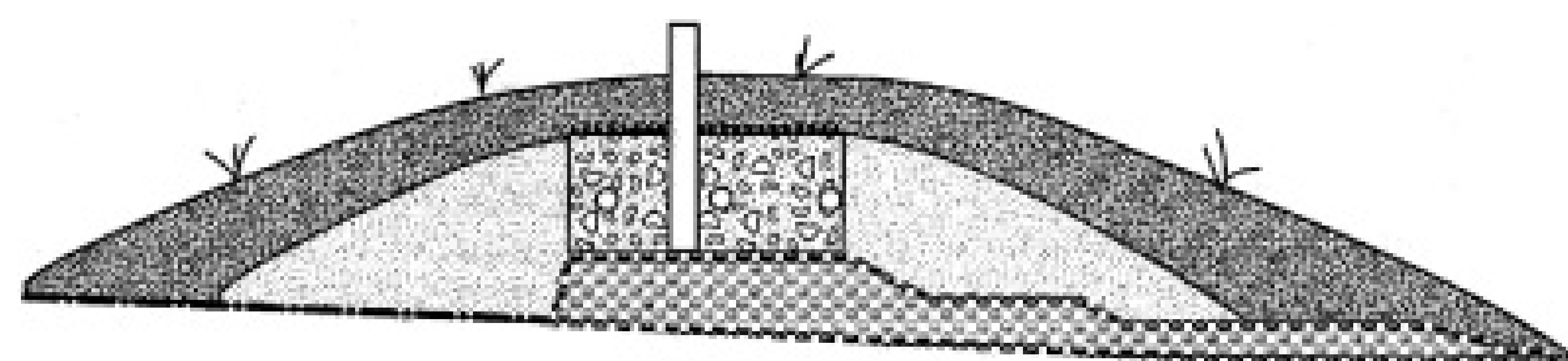
during installation, equipment must be kept off the area under the mound, and any remaining vegetative stubble must be turned green side down.

These actions address the KINN principle (Keep It Natural, N-----) of keeping the soil infiltrative surface as natural as possible. This provides a good infiltrative surface and avoids any potential slime development that can create a short-circuiting pathway for the effluent to run out the toe of the dike.

The second key is to use clean sand as the media to distribute the effluent over the bottom of the mound. Use of dirty sand (more than 5 percent silt and clay) usually results in failure at the rock or media bed, but use of less than clean sand can create problems with the effluent not being distributed evenly across the mound absorption area, creating the opportunity for breakouts to occur.

Enough area?

The third key is whether there



The absorption width is the area under the mound from the up-slope side of the rock bed to the end of the down-slope dike.

ABSORPTION RATIOS FOR MOUNDS BASED ON PERCOLATION RATES

Perc rate of original soil under sand layer, minutes per inch	Texture	Absorption Rate
Faster than 5	Sand	1.00
6 to 15	Sandy Loam	1.50
16 to 30	Loam	2.00
31 to 45	Silt, Silt Loam	2.40
46 to 60	Sandy Clay Loam, Silty Clay Loam, Clay Loam	2.67
61 to 120	Silty Clay, Sandy Clay, Clay	5.00
Slower than 120*		-

* These systems must be "other" or require special design.

This table provides an example of absorption width multipliers by texture and percolation rate. Check state and local regulations for your sizing table.

is enough absorption area under the mound. You perform this analysis after evaluating the first two keys. The absorption width of a mound is the width of soil under the sand layer that receives the treated effluent. This soil must have the capacity to absorb the full amount of effluent generated by the system.

The total absorption area is the product of the length of the rock bed and the absorption width. The berms located at the short ends of the rock bed layer are necessary for mound construction but are not part of the absorption area calculation.

Adequate absorption width is essential to the successful operation of the mound. The required

absorption width depends on the allowable loading rate of the soil under the clean sand layer of the mound. The allowable loading rate in turn depends on the infiltration ability of the soil in contact with the sand.

In Minnesota, we determine this soil-sizing factor based on percolation rate or soil analysis. Most areas are moving toward using soil analysis exclusively. This analysis is based on soil texture, soil structure and consistency. An example absorption width multiplier table is provided above. Check your state and local regulations for your sizing table. By evaluating the soil and the absorption width, you can answer the question of whether sufficient

area to absorb the effluent was provided under the mound.

Making calculations

On original soil with slopes less than one percent (level), the absorption width is the sum of the up-slope berm width, the rock bed width and the down-slope berm width. On ground sloping more than one percent, all effluent is presumed to move down-slope, and the absorption width becomes the rock bed width and the down-slope berm width.

If 1.2 gallons per day is the loading rate on a square foot of the clean sand, but the soil under the sand can absorb only 0.24 gallons per day per square foot, then 5.0 times as much absorption area must be available as sand in contact with the rock layer. Since only the side berms are used in determining the absorption area, the term absorption width is preferred to absorption area.

Another way to express the absorption width requirement is to

Adequate absorption width is essential to the successful operation of the mound. The required absorption width depends on the allowable loading rate of the soil under the clean sand layer of the mound. The allowable loading rate in turn depends on the infiltration ability of the soil in contact with the sand.

use the absorption width ratio, which is the area of soil required to absorb the effluent percolating downward from one square foot of the rock layer. Since the rock layer is sized in Minnesota on the basis of 0.83 square feet per gallon of wastewater per day, the loading rate is 1.2 gallons per day per square foot. If the soil under the clean sand does not have this absorption capability, then the effluent must be spread out over additional soil area.

For example, a silty clay soil having a moderate to strong structure, and a percolation rate of 61 to 120 mpi, has a soil-sizing factor of 4.2 square feet per gallon per day. Multiplying the soil-sizing factor of

the rock layer of 1.2 gallons per day per square foot results in a ratio of soil area to rock layer of 5.00.

So to answer the question we started with when troubleshooting mound failure on the down-slope dike, you need to evaluate the soil infiltrative condition and then decide the appropriate course of action. Simply adding soil and hoping for the best is not enough. You need to determine the width necessary and add sand and topsoil to the width needed. This assumes the soil under the mound has not been compacted or smeared. ■



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An Engineer Responds

To the Editor:

Having just received my copy of *Onsite Installer*, I read Roger E. Machmeier's letter to the editor ("Clusters of Concern," October 2008). While I understand and agree with most of his concerns, I take umbrage with his comments regarding engineers.

His comments are very general and unreasonable to the profession. While it may be that a few individuals have done an inadequate job in design, it is quite unreasonable to make a blanket statement that applies across the board. Let's face it: If it's a large system, then it requires an engineer to design it. I would suggest that the overwhelming majority of large systems that engineers have designed do work well.

To suggest that in general we do not understand the differences between the performance requirements of small systems and large systems is complete nonsense. Those of us who specialize in wastewater system design are well aware of in-soil flow dynamics and the limitations of existing standards and practices, and we apply values based on industry data that are more appropriate for the site and flow conditions.

Along with this we conduct environmental impact assessments, not just on the area being considered but on surrounding areas as well. All of this leads to superior design and performance.

One other point: Design is driven by cost and regulation. Cost sets an upper limit on what can be done, and regulation sets a lower limit on what must be done. Engineers by and large would like to design the best system possible, whereas project owners generally like to see a restrained bottom line.

Neither position is unreasonable, so if there is a need to improve the performance of systems or differentiate between them, then the regulations will have to be changed accordingly.

Bert Telder, P.E.
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Initial research at Baylor University focused on utilizing 4 different configurations of Hoot systems.



Hoot has spent the last 6 years and millions of dollars in Research & Development working to get Total Nitrogen below 10 mg/L. During this time the Nitrogen issue has been marginalized and regarded by some as "less important than making sure a riser is screwed down."

Hoot set out to prove that cost effective Nitrogen Reduction could be achieved, and the technology made available at a price that people could afford.

WASTEWATER TECHNOLOGY

NSF/ANSI Standard 245 - Nitrogen Reduction Wastewater Treatment Systems

Final Report:

Hoot Aerobic Systems
Hoot ANR-450 Wastewater Treatment System
06/05/2015/000



NSF International
793 N. Dixboro Road
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In 2006, Hoot began 3rd Party NSF testing to "Prove" what was previously discovered through research. Cost effective, efficient Nitrogen Reduction to below 10 mg/L can be achieved.

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The Hoot-ANR is just one of a series of three treatment systems by Hoot that perform <10 CBOD₅ & <10 TSS at the lab and in the field. Additionally, Hoot offers two Nitrogen Reduction Technol-

ogies; one utilizing timed recirculation and another that achieves the maximum Nitrogen Reduction, for the most sensitive environments, that reduces Total Nitrogen as far as possible (5.8 mg/L under the Standard 245).

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Some recently advertised studies, NOT certifications, have allowed for system performance to be ignored for the first 16 weeks of the study. The NSF Standard 245 allows a maximum of only a 3 week startup. At the end of week 4, the Hoot-ANR achieved a 92% reduction. (2.7 mg/L TN)

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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.

Ontario Tightens Controls in Large-Scale Systems

By **Scottie Dayton**

The Ontario Ministry of the Environment is enforcing the use of a Municipality Responsibility Agreement (MRA) that stops the development or expansion of communal systems greater than 2,500 gpd if an MRA isn't in place. MRA provisions state that if a large onsite system fails, the nearby municipality agrees to take over treatment.

The ministry also halted expansions where municipalities wouldn't enter into MRAs due to their open-ended cost and liability to the cities. In other cases, the ministry didn't approve projects after munic-

ipalities declined entering into MRAs with property owners requesting a Certificate of Approval for onsite systems.

According to the Ontario Association of Sewage Industry Services, the industry can be a significant problem-solver if it participates in the debate with the Ontario Association of Municipalities. Failure to do so could relegate the onsite industry to systems covered only under the Ontario Building Code, leaving wastewater treatment options for developers and existing sites considering expansion restricted to city sewers.

Wisconsin

The state Legislature adopted code changes that clarify onsite component review fees, allow onsite systems on properties occupied no more than 120 days per year to be inspected or pumped less frequently, and require government agencies to submit code revisions to the Department of Commerce (DoC) 30 days before the first scheduled public hearing.

The changes also give the DoC the power to overrule jurisdictions challenging the interpretation of the code and government agencies denying onsite permits if the applications meet code requirements. The revisions state that the code dictates what happens when an approved onsite plan is modified, and that counties must inventory all onsite systems within three years and have a maintenance reporting program in five years. These revisions were to be effective in late 2008.

Indiana

The state Environmental Health Association-Wastewater Management Committee (IEHA-WMC) proposed revisions of the onsite sewage disposal rule. According to Gary Chapple, pollution control

director, Fort Wayne-Allen County Department of Health, the code had areas that conflicted with accepted industry practices and could void the warranty on new septic tanks.

Revisions include defining a bedroom, rewriting the elevated sand mounds section to comply with industry standards, requiring effluent filters, allowing drops in house sewers, reducing the dispersal area for systems with perimeter drains, and changing the loading rate table to correct an error.

The proposed changes are at www.iehaind.org/minutes/iehawwmc.pdf.

Pennsylvania

A bill referred to the Committee on Environmental Resources and Energy would make it a third-degree misdemeanor for persons to apply human biosolids as fertilizer during agricultural operations. Penalties range from \$10,000 for the first violation to \$20,000 and 30 days in jail for the third and subsequent violations. In Pennsylvania statutes, a person also means a corporation. ■



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Machine Matters is designed to help readers get the most from excavators, backhoes, skid-steers and other mechanical equipment through proper maintenance, operation and financial practices. Readers are welcome to submit ideas for this column and can send them to Ted J. Rulseh, editor, by calling 800/257-7222 or e-mailing editor@onsiteinstaller.com.

Technology Saves

Today's advanced diesel engines run cleaner and more efficiently, helping installation contractors cope with the rising cost of fuel

By Greg Northcutt

The dramatic run-up in the price of diesel fuel has highlighted the impact of fuel efficiency on profits for onsite installers. "Just a few years ago not many equipment owners were talking to us about fuel consumption," says Peter Robson, excavator product manager for Komatsu. "Today, we can have a very lengthy conversation about it."

Fortunately, today's excavators, backhoes and compact loaders do more work with less fuel than the

models of 10 or even five years ago. Much of the efficiency increase is driven by federal regulations requiring new off-road diesel engines to meet a series of increasingly stringent standards for reducing exhaust emissions. Tier 1, 2 and 3 emissions standards were phased in from 1996 to 2008. The final Tier 4 standards are to become effective between 2008 and 2015.

As it turns out, the technology required to meet these standards also helps cut fuel consumption.

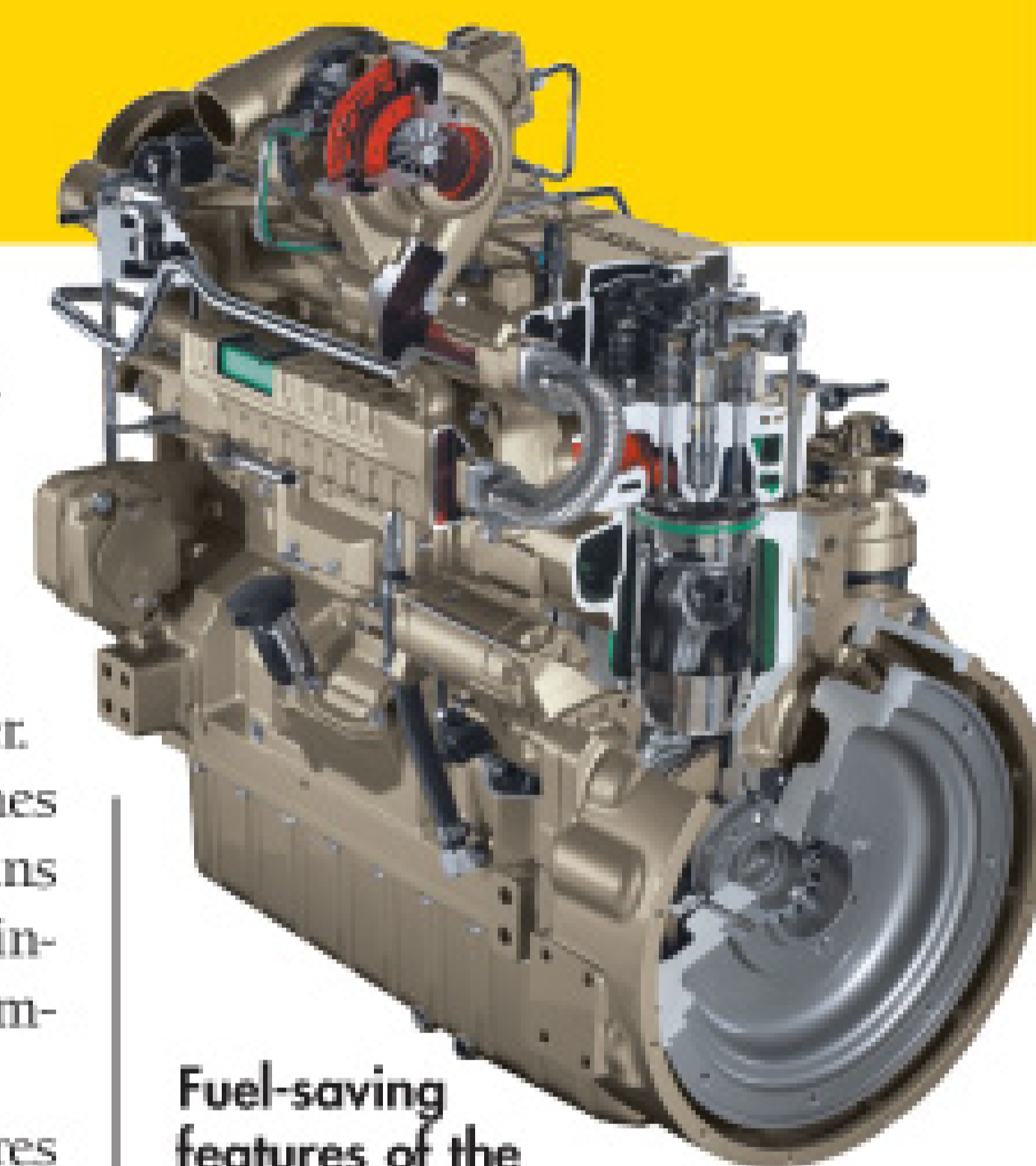
Consider the latest engines from John Deere Power Systems. "These engines are significantly more fuel-efficient than they were five years ago," reports Doug Laudick, product manager. "Our Tier 3 PowerTech Plus engines achieved record fuel economy gains over our Tier 2 models while maintaining or improving other performance characteristics."

Among the fuel-saving features of these Tier 3 engines are a variable geometry turbocharger (VGT), which adjusts exhaust pressure based on load and speed to improve performance while providing best-in-class fuel economy. Air-to-air after-cooling, the most efficient method of cooling intake air, enables the engines to meet emissions regulations with better fuel economy and the lowest installed costs.

Better technology

One of the biggest advances for improving fuel efficiency has been the switch from the mechanical fuel pump controlled by a throttle linkage to electronic control of fuel injection. With the Tier 3 engines of Case CX B Series excavators, for example, this technology has improved fuel efficiency by up to 20 percent, notes Rick Hall, product development manager with Case Construction Equipment.

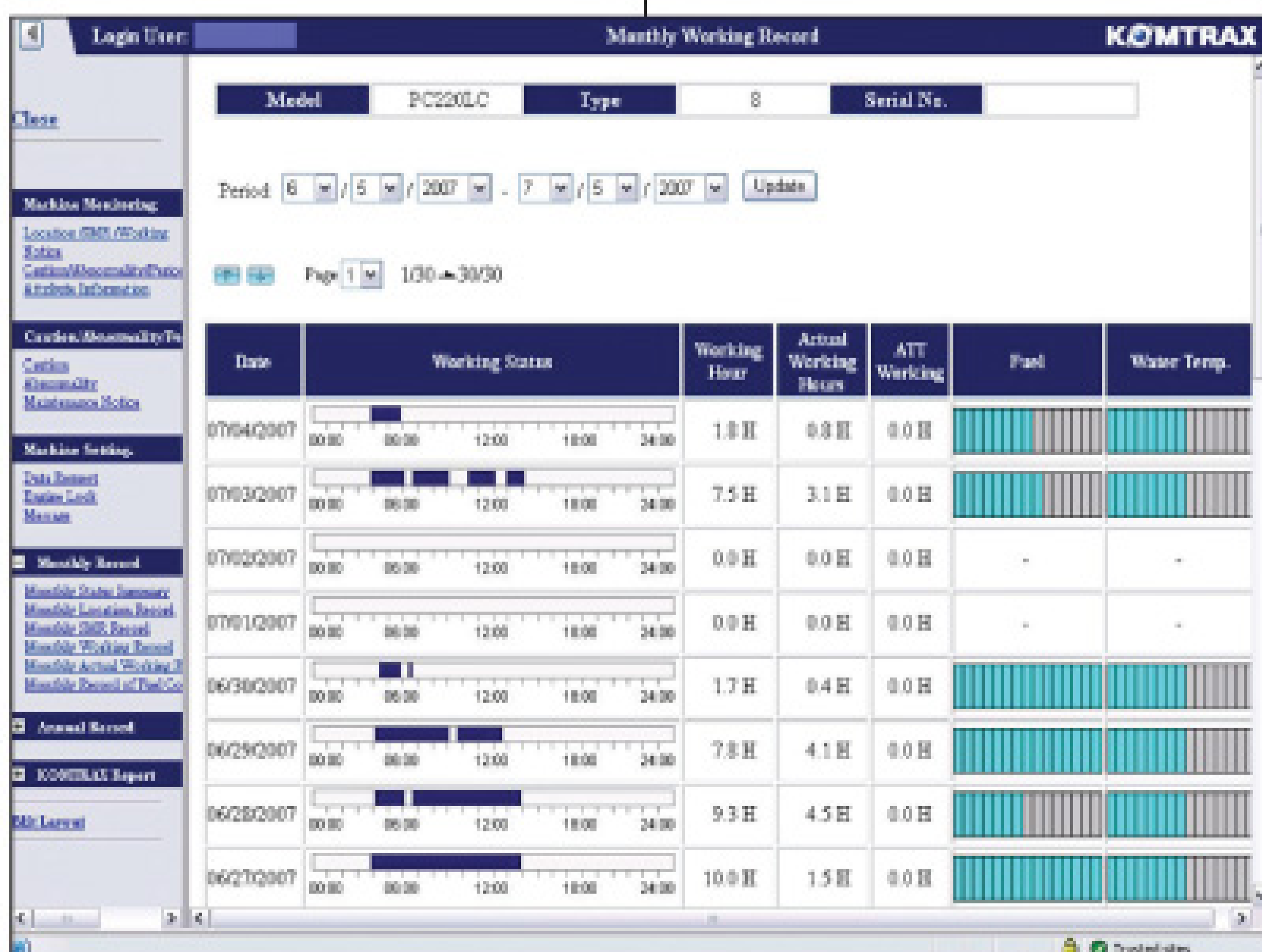
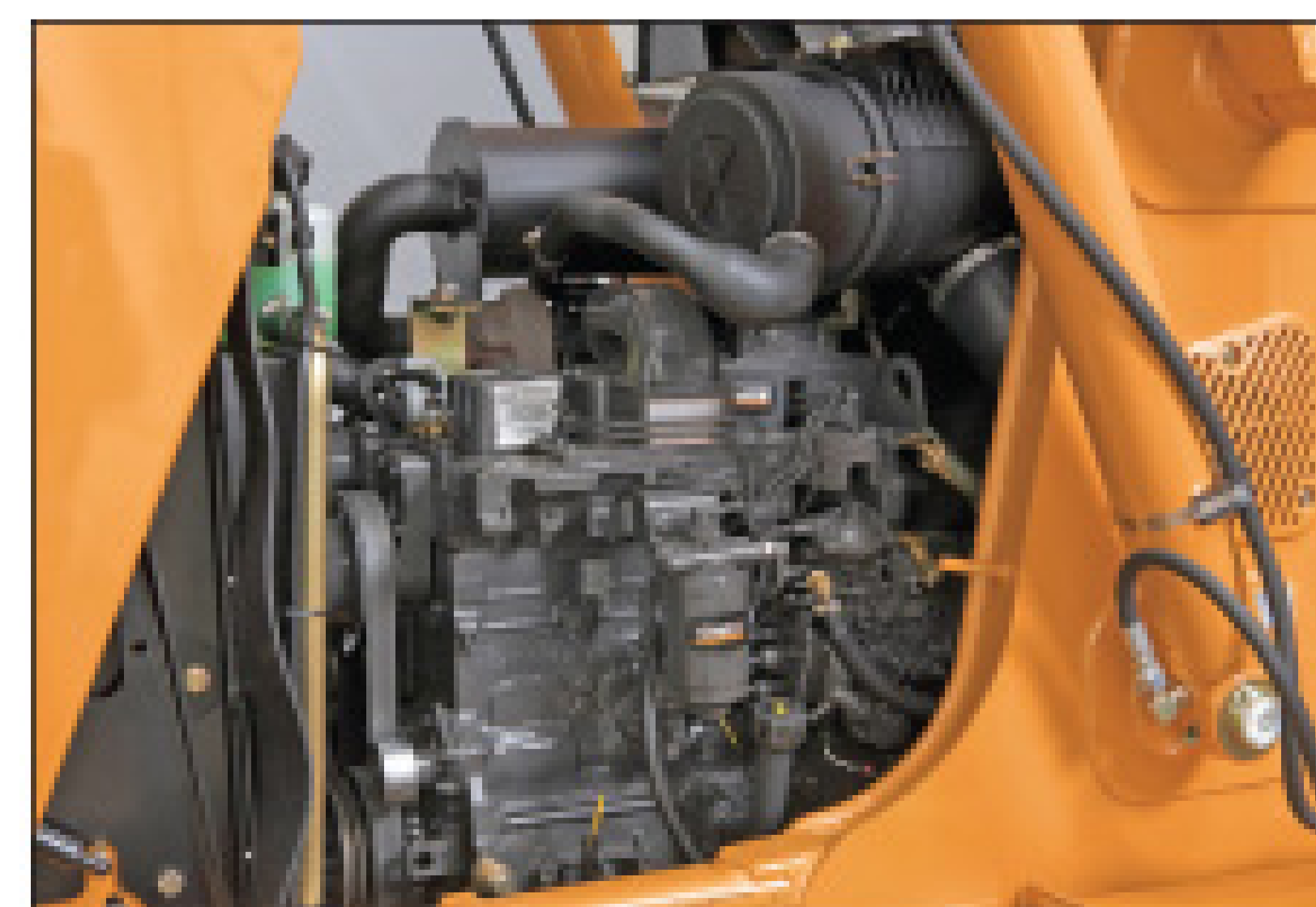
"This system better matches the power produced by the engine



Fuel-saving features of the Tier 3 John Deere PowerTech Plus 9.0-L engine include a variable-geometry turbocharger (VGT) and air-to-air after-cooling.

with the power required by the transmission and hydraulic and hydrostatic pumps," he says. "As a result, the engine doesn't run faster than needed for the job, saving significant amounts of fuel."

The Case 580 Super M 3 Series loader backhoe uses a 79-hp Tier 3 engine with electronic fuel injection, which helps cut fuel costs.



Operators of most Komatsu machines equipped with Tier 3 engines can use information like this, provided by the KOMTRAX wireless equipment-monitoring system, to improve both fuel economy and operating efficiency.

Meanwhile, engineers are working to improve combustion efficiency by increasing combustion pressures. "The idea is to make sure there's the right amount of air for the specific amount of fuel at just the right time," Hall says.

Improvements in the design of hydraulic systems have also cut fuel consumption. "One thing we've done at Komatsu is to reduce restrictions to oil flow and reduce back pressures that caused a parasitic draw of power on hydraulic systems," says Robson.

Another fuel-saving advance has been to replace the mechanical-hydraulic link between engine and variable-displacement hydraulic pumps for controlling hydraulic flow with a fly-by-wire system that features electronic signals and variable-displacement piston pumps. "This fly-by-wire system produces a much faster response of the hydraulic pump for much more efficient fuel use," Robson says.

Better data management

Accurate information also plays a critical role in making most efficient use of your machine and the fuel to operate it. "The key to machine efficiency is not how much horsepower you have, but how well you manage it," Robson

"The key to machine efficiency is not how much horsepower you have, but how well you manage it. If you can't manage it efficiently, you'll spend a lot of extra money on fuel."

Peter Robson
Komatsu

says. "If you can't manage it efficiently, you'll spend a lot of extra money on fuel."

That's where Komatsu's KOMTRAX wireless equipment monitoring system can pay off. It uses a network of satellites to relay basic and critical performance data from your machine to your computer. The system is available on most of the company's Tier 3

Tips for Cutting Your Fuel Bill

You can't control the price of a gallon of diesel, but you can soften the hit on profits by getting more work out of each gallon. Clint Schroer, communications manager for Cummins off-highway engines, offers these suggestions.

Adapt to the latest technology. Tier 2 and Tier 3 engines produce more power and higher fuel efficiencies at lower rpm than previous engines. "The power curves of the latest engines are designed to achieve the highest level of productivity at the most fuel-efficient point," Schroer says. And, compared to Tier 3, Cummins Tier 4 engines from 174 to 751 hp will have a fuel economy improvement of up to 5 percent, depending on rating and duty cycle.

Reduce idle time. Forget that conventional wisdom that starting a diesel engine uses more fuel than letting it idle for a while. "That's not the case anymore," Schroer says. "If you're not using your machine, shut it off, or at least idle at lower rpm."

Eliminate restrictions. Replacing dirty or clogged air filters can improve fuel efficiency.

Don't overwork your machine. Forcing a machine to dig or push harder or lift loads heavier than it was designed for wastes fuel. Also, if possible and equipped, use any fuel economy modes or features that your machine has.

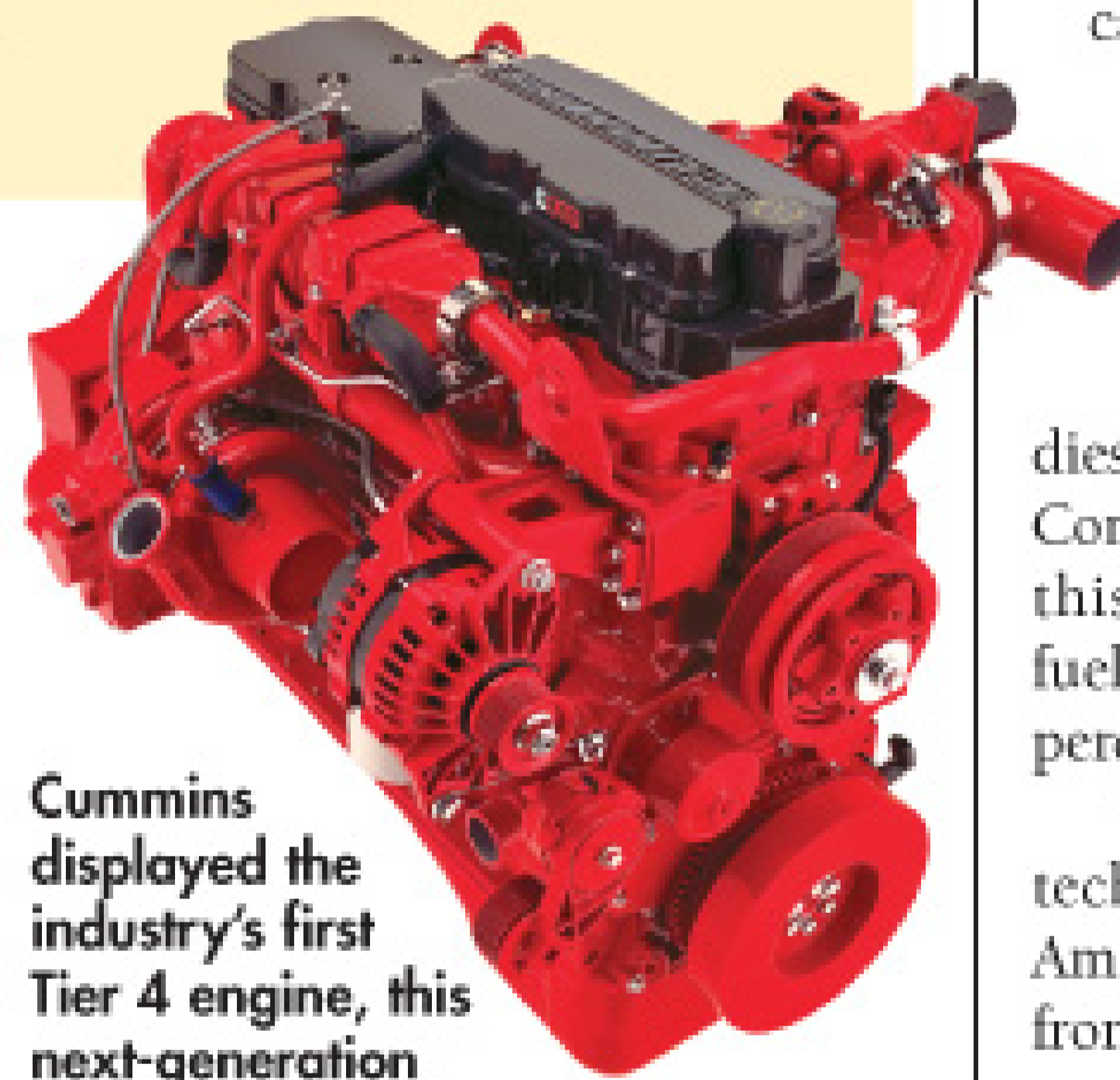
Don't over-fill the engine crankcase. Exceeding the recommended engine oil level can cause the crank to dip into the oil in the pan, creating excess frothing of the oil. This reduces engine performance, wasting fuel.

Reduce fan operation. An inoperable fan clutch, a faulty thermostat switch, or low coolant levels can cause the fan to operate longer, reducing fuel economy.

engine equipment and can be retrofitted on older machines and non-Komatsu equipment.

KOMTRAX provides information on various machine functions and operations, including actual fuel consumption, average hourly fuel consumption, residual fuel level, actual working hours (engine on time less idle time), hours spent in four different load levels (very heavy, heavy, light and very light) and various modes of operation, such as digging, traveling, hydraulic relief, power mode, economy mode and lifting mode. Such data can reveal opportunities for using equipment and fuel more efficiently.

"For example, this system might show that your machine is being used 80 percent of the time in light-duty applications in the full power mode," Robson says. "Knowing that, you might be able to do the same amount of work using economy mode and reduce fuel costs. Or, the system might show that 40 percent of the time when the machine is operating, the engine is running at idle. Shutting



Cummins displayed the industry's first Tier 4 engine, this next-generation 6.7-L, 300-hp QSB model, at the 2008 ConExpo. With a fully integrated air-intake-to-exhaust after-treatment system, it will offer up to 5 percent higher fuel efficiency than the 275-hp, 6.7-L Tier 3 QSB, depending on rating and duty cycle.

off the engine at those times would also save you money."

Diesel-electric machines

At ConExpo in Las Vegas last March, a number of manufacturers displayed prototypes of hybrid engines designed to save fuel by combining a diesel engine with an electric motor. In June, Komatsu began selling the world's first

"Because of a significantly higher purchase price and possibly higher maintenance costs, the payback period is much longer (on hybrid machines) than most equipment owners are comfortable with today. However, that's not to say that hybrid machines won't be more common in the future."

Rick Hall
Case Construction Equipment

hybrid excavator to the Japanese market.

The PC200-8 Hybrid uses a newly developed electric motor, which replaces a conventional hydraulic motor, to turn the upper structure. The system also uses a capacitor to store the energy generated as the upper structure slows when turning. It then discharges the electrical energy to a power generation motor that assists the diesel engine when it accelerates. Compared to the standard PC200-8, this hybrid version has reduced fuel consumption an average of 25 percent, the company reports.

"We look forward to when such technology will come to North America, but everyone can benefit from using what we currently have more efficiently," Robson says.

Case is taking a go-slow approach to hybrid engines, Hall notes. "Everyone in the industry is watching development of hybrid technology very closely," he says. "Because of a significantly higher purchase price and possibly higher maintenance costs, the payback period is much longer than most equipment owners are comfortable with today. However, that's not to say that hybrid machines won't be more common in the future."

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

The Education Edge

NOWRA seminars during the 2009 Pumper & Cleaner Expo focus on soils, septic tanks, ATUs, filters, pumps, O&M and industry trends

By **Scottie Dayton**



A track of seminars presented by the National Onsite Wastewater Recycling Association (NOWRA) highlights the education lineup at the 2009 Pumper & Cleaner Environmental Expo International, Feb. 25-28 in Louisville, Ky.

The NOWRA program is part of Education Day on Wednesday, Feb. 25. The complete program includes 46 seminars presented by industry experts across the full range of environmental service industries. Seminars are also offered on Thursday and Friday mornings.

A summary of the NOWRA program follows. The presenters for all the seminars are Ted Loudon, private consultant and past president of NOWRA, and Mark Hooks, regional regulatory consultant with Infiltrator Systems Inc. For a complete seminar schedule, see the Expo pages in this issue of *Onsite Installer*.

Overview and Industry Trends: Wastewater Chemistry and Biology

After an overview of the evolution of wastewater treatment, Loudon and Hooks will describe

the basic science that influences wastewater treatment and the variable characteristics that affect methods used to treat wastewater. The seminar will include a NOWRA overview, member benefits, and new opportunities.

Soil and Site Evaluation Overview

Professionals in onsite installation need a baseline understanding of the soil parameters controlling the efficacy of treatment and the ability to recognize important site issues. Loudon and Hooks will talk about soil morphology, landscape description, interpretation of data, and non-soil data.

Septic Tanks: Function, Inspection, Installation and Troubleshooting

What goes on inside a septic tank once the onsite system is operational? Loudon and Hooks will describe wastewater treatment processes, design features that improve tank function and facilitate operation and maintenance, and the importance of tank capacity and structural integrity.

Aerobic Treatment Units and Media Filters

Compared with conventional septic tanks, ATUs break down organic matter more efficiently, achieve quicker decomposition of organic solids, and reduce the concentration of pathogens in the wastewater. Loudon and Hooks will highlight the principles of treating wastewater using ATUs and media filters, and focus on the effluent quality parameters that may affect design and use. They will describe various units and media including sand, peat, and recirculating filters.

Pumps and Controls: Function and Troubleshooting

Pumps are the heartbeat of pressurized onsite systems. Loudon and Hooks will detail the design, component selection, and configuration of systems to deliver effluent under pressure. They will describe the different pumps and their associated purposes.

Operation and Maintenance of Systems

Modern treatment technologies are highly mechanical and require more management than conventional septic tanks and stone beds. With proper design and a thorough maintenance program, contemporary onsite systems should perform well and treat wastewater for a long time. Loudon and Hooks' seminar will provide basic information for ensuring long-term system reliability through regular, intensive maintenance schedules.

Here are several other Expo presentations of interest to onsite installers, soil testers, design engineers, and maintenance service providers:

Installer Certification Course

The 2009 Expo program again includes the Certified Onsite Installer Course sponsored by *Onsite Installer* magazine. The course runs from 8 a.m. to 5 p.m. on Thursday, Feb. 26. Jim Anderson and David Gustafson of the University of Minnesota onsite program will train participants on the basics of installing onsite systems. An optional exam will be given afterward.

Those who pass will be recognized as Certified Onsite Installers and will be prepared to move on to continuing education sessions, such as the NEHA national installer credential and the NAWT Certified Inspector Course.

Wednesday, Feb. 25 (Education Day)

- How to Work with Regulators and Regulations – Tony Smithson, National Environmental Health Association (NEHA)
- Pumpers and O&M: Providing the Full Service – Craig Gilbertson, Onsite Wastewater Section Chair, NEHA
- Routine Maintenance Inspections: Increase Profits While Lowering Cost to System Owner – Kit Rosefield, NEHA
- Using the Certified Installer Credential to Help Your Business – Christl Tate, NEHA

Thursday, Feb. 26

- Providing Decentralized Wastewater Sustainability – Eric Evans, Aquatest

To find out more about the education program or any other Expo offering, visit www.pumpershow.com. Register online or by calling 800/257-7222. ■



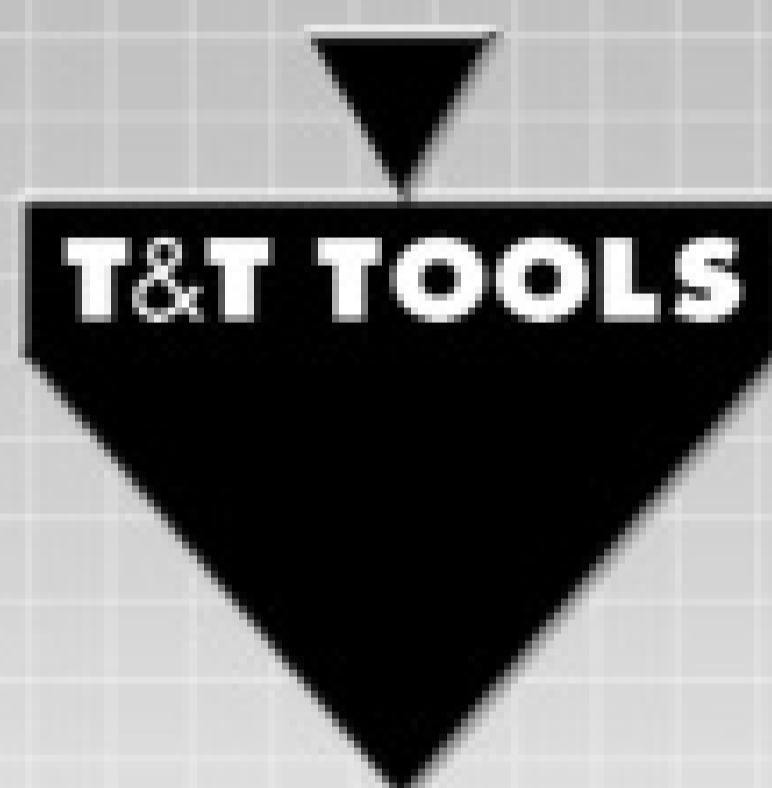
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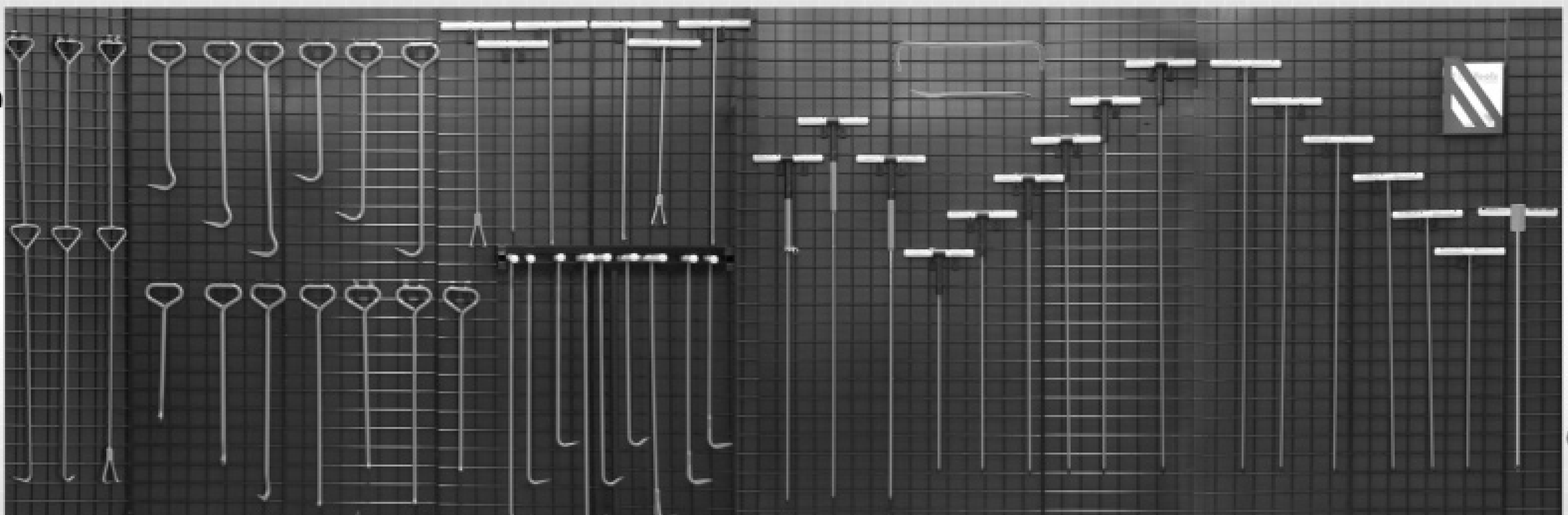
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EDUCATION DAY

Wednesday
February 25th, 2009

- Full day of seminars
- Exhibit hall closed
- Schedule subject to change

ROOM C201 & C202

LRN Leaders Resource Network

- 8:00 - 9:00 How to Become a Value Leader
- 9:30 - 10:30 Credit Collections: Getting Paid
- 11:00 - 12:00 The Value of Internet Marketing
- 12:00 - 1:00 **Lunch Break**
- 1:00 - 2:00 Selling Value
- 2:30 - 3:30 How to Add Value to Every Customer You Have and Future Customers
- 4:00 - 5:00 How to Determine Your Operating Costs

ROOM C203

WJTA / PSAI / CBSA

- 8:00 - 9:00 What an Air Mover Can Do For You
- 9:30 - 10:30 The Basics of High Pressure Waterblasting
- 11:00 - 12:00 Waterjetting Applications
- 12:00 - 1:00 **Lunch Break**
- 1:00 - 3:30 Understanding Your Cost to Insure Profitability (PSAI)
- 4:00 - 5:00 Cross Bores of Gas Lines in Sewers (CBSA)

ROOM C204 & C205

SSCSC Southern Section Collection Systems Committee

- 8:00 - 9:00 Trenchless Pipe Rehabilitation
- 9:30 - 10:30 CCTV Pipeline Inspections
- 11:00 - 12:00 The Nuts and Bolts of GIS
- 12:00 - 1:00 **Lunch Break**
- 1:00 - 2:00 The Nitty-Gritty on Pipeline Cleaning
- 2:30 - 3:30 Confined Space and Protective Equipment Safety Requirements
- 4:00 - 5:00 Manhole Inspections

ROOM B101 & B102

NAWT National Association of Wastewater Transporters

- 8:00 - 9:00 What are My Disposal Resources
- 9:30 - 10:30 Treatment Processes, What is Out There?
- 11:00 - 12:00 Evaluating Costs as Part of the Decision Making Process
- 12:00 - 1:00 **Lunch Break**
- 1:00 - 2:00 Meeting Part 503 Requirements
- 2:30 - 3:30 Turn Grease Trap Waste Into Gold
- 4:00 - 5:00 Developing a Business Plan

ROOM B103 & B104

NOWRA National Onsite Wastewater Recycling Association

- 8:00 - 9:00 NOWRA Overview & Industry Trends
- 9:30 - 10:30 Soil & Site Evaluation Overview
- 11:00 - 12:00 Septic Tanks: Function, Inspection, Installation & Trouble Shooting
- 12:00 - 1:00 **Lunch Break**
- 1:00 - 2:00 Aerobic Treatment Units & Filters
- 2:30 - 3:30 Pumps & Controls
- 4:00 - 5:00 Operation & Maintenance of Systems

ROOM C101 - C104

NASSCO National Association of Sewer Service Companies

- 8:00 - 9:00 Robotics For the Future, What Does it Mean for You?
- 9:30 - 10:30 Small Diameter Epoxy Coatings
- 11:00 - 12:00 Root Control, How Does it Work and Why is it Needed?
- 12:00 - 1:00 **Lunch Break**
- 1:00 - 2:00 OSHA Regulations
- 2:30 - 3:30 Choosing the Correct Chemical Grouts
- 4:00 - 5:00 Trained Technology Inspectors

ROOM C105 - C108

NEHA National Environmental Health Association

- 8:00 - 9:00 How to Work With Regulators and Regulations
- 9:30 - 10:30 Pumps: Operation & Maintenance
- 11:00 - 12:00 Routine Maintenance Inspections
- 12:00 - 1:00 **Lunch Break**
- 1:00 - 2:00 Using the Certified Installer Credential to Help Your Business
- 2:30 - 3:30 T.B.D.
- 4:00 - 5:00 T.B.D.

ROOM C109 - C112

SCOTT HUNTER Business Track

- 8:00 - 9:00 The Art of Personal Sales
- 11:00 - 12:00 The Art of Personal Sales (Part 2)
- 12:00 - 1:00 **Lunch Break**
- 1:00 - 2:00 Yes, We Have to Work Together, but Does it Have to be So Painful?
- 4:00 - 5:00 The Art of Being Outrageously Successful!

FEBRUARY 25-28

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THURSDAY

February 26th, 2009

ROOM C101-C104

Portable Toilet Track

- 8:00 - 9:00 Portable Sanitation Start Up
Hampel
- 9:30 - 10:30 Selling Portable Restrooms Services
Satellite Industries
- 11:00 - 12:00 T.B.D.

ROOM C105 - C108

Liquid Waste Track

- 8:00 - 9:00 Decentralized Wastewater Sustainability - **Aquatest**
- 9:30 - 10:30 Discover the "GREEN ERA" and capitalize on it! - **Lenzyme**
- 11:00 - 12:00 Modular Waste Water Treatment
Big Fish Environmental, LLC

ROOM B103 & B104

Municipal Track

- 8:00 - 9:00 Why Measure Sewer Flows from Private Services? - **City Meter**
- 9:30 - 10:30 Polymer Solutions for Wastewater Treatment - **Fort Bend Services**
- 11:00 - 12:00 Rotary Jets for Material Removal
StoneAge

ROOM C109 - C112

Sewer & Drain Track

- 8:00 - 9:00 Bacteria Mythbusters -
ProClean by Duracable
- 9:30 - 10:30 Solutions for Nineteenth Century Manholes - **AP/M Permaform**
- 11:00 - 12:00 Manholes & Leakage Solutions
Sealing Systems

FRIDAY

February 27th, 2009

ROOM B101 & B102

Sewer Cleaning Track

- 8:00 - 9:00 High Pressure Hose Safety & Proper Use
Spir Star
- 9:30 - 10:30 The Better Jetter, Secrets to Jetting
US Jetting
- 11:00 - 12:00 Chemical Root Control
Douglas Products

ROOM B103 & B104

Business Track

- 8:00 - 9:00 Maintenance Agreements for Commercial Accounts
Spartan Tool
- 9:30 - 10:30 First Rate Customer Service
RooterMan
- 11:00 - 12:00 Insurance and Risk Management
Heffernan Insurance

ROOM C101-C104

Miscellaneous Track

- 8:00 - 9:00 Keys to Proper Power Take-Off
Muncie Power Products
- 9:30 - 10:30 Vacuum Tank, Chassis and Pumps
Amthor International
- 11:00 - 12:00 Lateral Replacement Program
TT Technology

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Certified Onsite Installer Course
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All Day Course - 8 a.m. - 5 p.m.
Dave Gustafson, P.E., Jim Anderson, PhD

The Engineered Septic Systems team. From left, Damon Clark, Terry Craven, Josh Clark, Kim Clark and Blue Miller. (Photo by Paige Green)

Going Green

Engineered Septic delivers sound onsite treatment solutions to challenging sites for environmentally conscious residents of California

By Gil Longwell



Engineered Septic Systems Inc., Santa Rosa, Calif.

OWNERS: Kim Clark, Blue Miller, Terry Craven, Josh Clark

YEARS IN BUSINESS: 5

MARKET AREA: 100-mile radius

SPECIALTY: Advanced onsite installations for challenging sites

EMPLOYEES: 5

AFFILIATIONS: NOWRA, California Onsite Wastewater Recycling Association, National Association of Wastewater Transporters

WEB SITE:
www.engineeredseptic.com

Kim Clark, a Princeton University grad and founder of Engineered Septic Systems, says he “stumbled into the onsite installation business” when he was faced with an onsite treatment challenge that no one could help him overcome.

An attorney for more than 45 years, Clark owned a tract of land in California, which, he was told, could not support conventional onsite systems. “If I had not found a permissible solution to the problem, I would have wound up owning a park,” he says.

To overcome his problem, Clark tapped long-time business associates Blue Miller, a contractor, and Terry Craven, a professional engineer, to identify innovative technologies that would let him develop the property.

The project team selected a three-chamber fiberglass aerobic treatment unit (ATU), Model SM-500, made by Southern Manufacturing Company of Port Arthur, Texas. Their success, and the realization that there was a need for

onsite solutions for challenging properties, led to the formation of Clark’s business in 2003.

Original partners Clark, Miller and Craven were joined by Clark’s son Josh, now project manager. Located in Santa Rosa, Calif., the company works in the five counties north of the San Francisco Bay, serving an area within 100 miles of the office.

Engineered Septic is a design-

green movement in California, where innovations like solar and wind power and energy and water conservation are popular and becoming more so. “Advanced treatment systems appeal to many homeowners and communities as a modern way to protect the environment and the limited groundwater supplies. It’s very trendy to offer green technology,” Josh Clark observes.

“Advanced treatment systems appeal to many homeowners and communities as a modern way to protect the environment and the limited groundwater supplies. It’s very trendy to offer green technology.”

Josh Clark

build enterprise, and the company Web site captures the concept in a single sentence. “We engineer it, we install it, we maintain it and we stand behind it.”

Growing awareness

Engineered Septic recognizes the

The company builds awareness of alternatives to the standard mound systems that so many designers present to landowners as the only option. “Kim spends a lot of time teaching landowners that they do have a choice,” Josh says. “He delivers a better mousetrap

that costs less to install and operate and is better for the environment.”

Father and son agree that customers need not understand the science to appreciate the higher treatment levels and reduced environmental impact the systems achieve.

Kim, also a successful real estate broker and land developer, says he “helps the lost through the wilderness of property development.” For contractors, spec builders and individual property owners, he simplifies onsite permitting, design and installation by offering all those activities in a complete package.

Always adjusting

Putting the word “engineered” into the company name and having an engineer on staff gives the company a leg up on the competition. Josh, as project manager, has daily contact with every project. “That

continuity sets us apart from good installers who must work with outside design engineers,” he says.

The company has never lost money on a job, and Kim attributes that to Josh’s day-to-day roles of materials purchasing agent, work scheduler, equipment rental agent and billing clerk. Damon Clark, Kim’s other son, serves as an on-call employee supervising subcontractors and doing hands-on work.

Reacting to recent economic conditions, the company has reduced its labor force and consolidated from two offices to one. But there was no need to reduce the already trim equipment fleet.

“From the outset, we decided we did not want to own big pieces of equipment,” Kim says. “There are a lot of good, skilled equipment owners with whom we do business.”

Josh adds, “These folks want

our business and will be at our job-site on time with reliable machinery. These are good partnering relationships.” Depending on the season and economy, the company fields three to six subcontracted installation teams.

The equipment inventory includes one Ford 250 and two Ford 350 diesel pickup trucks, a Mitsubishi model MM30 tracked excavator, a Ditch Witch trencher and two dedicated transport trailers.

Benefits of diversity

When it started in business, Engineered Septic could not handle all the business that came. As the market changed, Kim and Josh saw many first-time installers competing for work. While experienced installers recognize costs that first-timers may not, “We have found that customer education is the most effective way to overcome the challenge of a competitor’s unrealistically low pricing,” says Kim.

The pace of business is steady, and that lets the company be selective in the projects it accepts. The partners seek out challenging sites where they can help people by offering viable solutions. Larger installations are also more desirable.

“But, there is no single magic fix for every site,” Kim observes. “To say there is would be like selling snake oil, and we won’t do it.” To address the challenges of diffi-

cult terrain, shallow soils, or the effluent of an affluent lifestyle, the company always looks for emerging onsite technologies to add to its problem-solving portfolio.

The company has become a stocking distributor for two onsite technology manufacturers. “We maintain a storage yard where we stock various parts and major components,” Kim says. Buying in truck-load lots brings the best possible pricing and cuts per-unit shipping

Educating Regulators

Engineered Septic Systems regularly introduces new technologies to regulators, some of whom are reluctant to change, partner Kim Clark observes.

Even as changes are introduced in the field, California is working on a statewide set of onsite system regulations. The base regulations would provide counties with a platform upon which to enact additional and more stringent requirements, if they wish.

Clark believes the base-level approach will be a welcome improvement to the installer community, although continuing variation from county to county may not be a good thing. “Adding technology for the sake of technology is something that usually adds costs without adding benefits,” he says. That is a message he shares with clients and regulators alike.



An Engineered Septic crew sets a trash tank on an installation job. (Photo by Josh Clark)



Damon Clark supervises backfilling of an AdvanTex aerobic treatment system. (Photo by Josh Clark)

costs. Another of Josh's duties is inventory control. "With a well-stocked yard, we can deliver units to other installers and be sure that our own needs will always be satisfied," he says.

The company installs, services and is a dealer for Hydro-Action Industries of Beaumont, Texas, which manufactures the Hydro-Action AP500 treatment unit; and for the Southern Manufacturing Co.'s SM-500. The firm also installs the AdvanTex AS20 made by Orenco Systems Inc.

Engineered Septic designs specify FRALO plastic septic tanks for

"We have found that customer education is the most effective way to overcome the challenge of a competitor's unrealistically low pricing."

Kim Clark

most installations. The company also stocks and distributes these tanks, made by Roth Global Plastics, Inc.

Educating all

Kim Clark believes installers should learn from each other and that regulators must be open to new technologies and concepts. From greater knowledge and skill, rewards flow to three beneficiaries: the client, the installer and the environment. "I offer encouragement to and help other installers learn about new technologies," Kim says.

County-to-county variation in regulations is a challenge. "If we were building the same system in adjacent counties, one would require two inspections, the other six," Josh says. Other impacts on system pricing include greater regulator oversight during site evaluation and more detailed design requirements.

The impact on cost can be dramatic. The price of a system serving a four-bedroom house in one county could be in the \$50,000 range, while across the street in another county, the same installation would cost about \$20,000. "These variations are without any change in effluent quality or treatment or



A work crew is shown with a hand-dug leachfield next to Golden Gate National Recreation Area. (Photo by Ashley Wexler)



Engineer Terry Craven and the Engineered Septic team set a control panel before final inspection. (Photo by Paige Green)

absorption technology," Josh says.

The company is regularly represented at California Onsite Wastewater Recycling Association (COWRA) meetings, and at NOWRA events. "But membership in onsite organizations is not enough," says Kim.

In the company's service area, each county health department convenes an onsite advisory committee, and Kim or Josh attend those meetings regularly. "We want to know the regulators on a first-name basis and we want to be known in the regulator community as a strong and positive voice for constructive change," Kim says.

Caring for their own

About half the company's customer inquiries result from Internet

searches. Other marketing tools include a Web site and the Yellow Pages. "We have one phone number and it answers 18 hours a day," explains Josh. Kim handles most incoming calls.

With firm control of costs, in-house design and a thorough understanding of onsite projects, "We can answer questions that site evaluators, system designers or installers who work alone cannot or will not answer," Kim says. The most frequent question is: Which system costs more? Josh ranks engineered mounds as most expensive, followed by at-grade mounds and then drip systems.

After installation, Engineered Septic provides two years of monitoring and maintenance. Two years

is also the warranty window for the firm's installations. While after-care is a requirement of the various technology manufacturers, it is also a business practice the partners believe in.

The company's post-warranty management program includes periodic hardware inspections and equipment checks and filter cleanings or replacements as needed. The company has relationships with several pumpers and makes referrals when appropriate. "A homeowner interview is part of our management program," Josh says. Long after the sale, the company creates opportunities for owners to continue to ask questions and build their knowledge levels.

Making a difference

The partners of Engineered Septic have done things differently since day one. None was searching for a new job and none wanted a new career. They wanted to find a solution to Kim's problem.

Along the way, they realized that his problem was not unique and that they could help other landowners with similar issues. Their vision has shaped a design-build service package that meets the needs of the sites and the cultural expectations of the market.

Not content to sit back and wait to be regulated, Kim and Josh take new system technologies to the regulators, encouraging them to learn about them and include them in the regulatory scheme. "We may have stumbled into the business," says Kim, "but we have never stumbled in our efforts to help clients meet their unique disposal needs." ■

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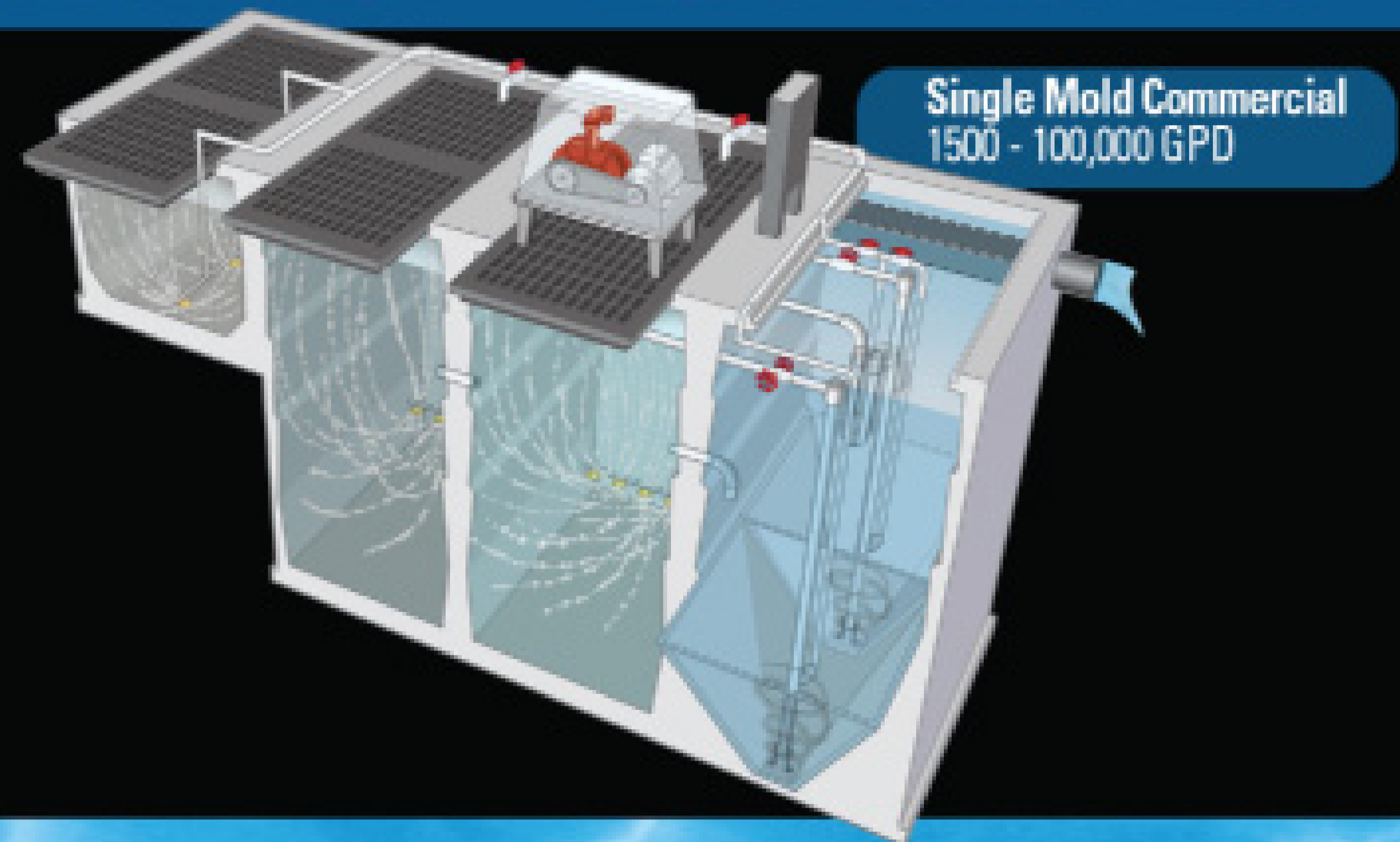
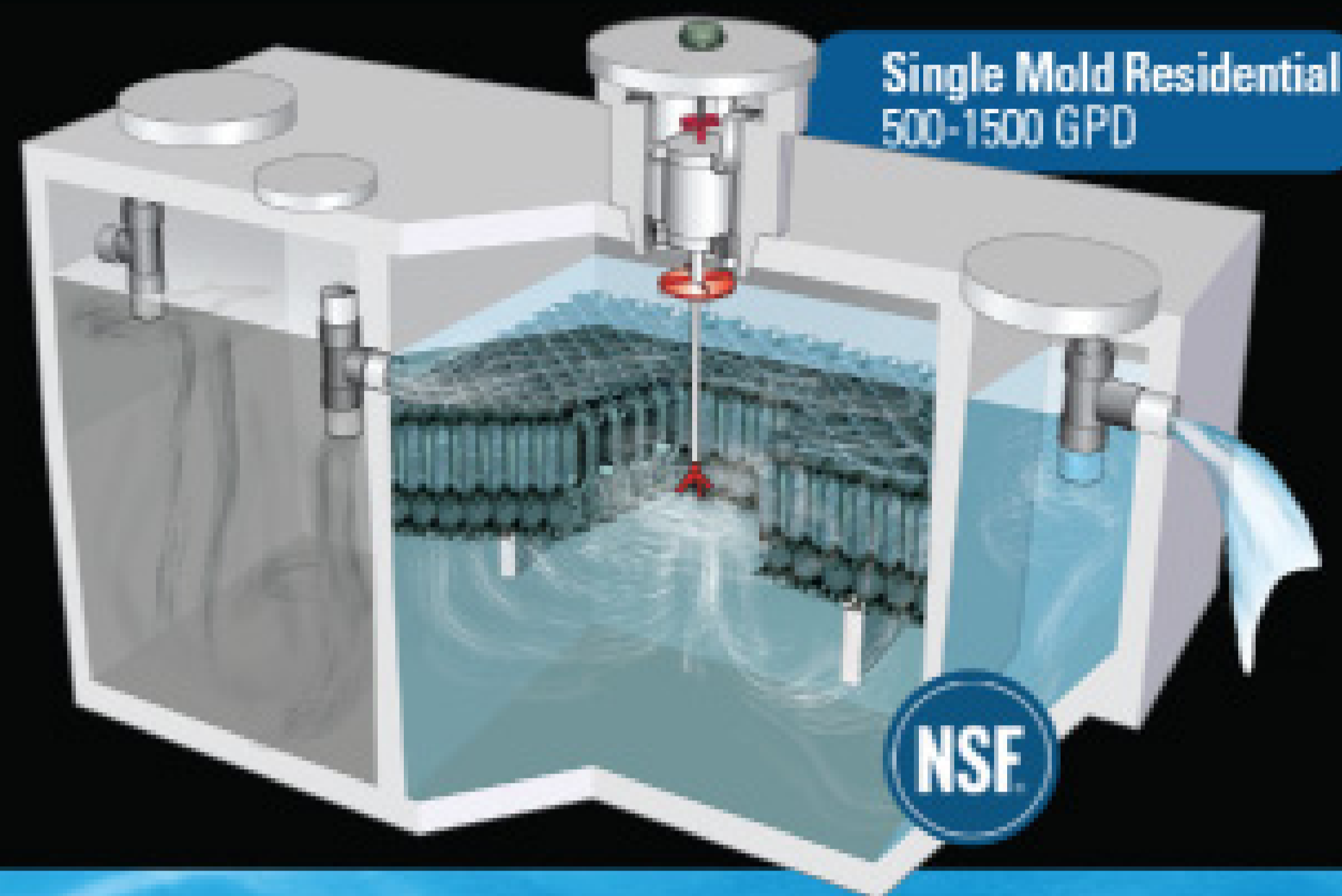
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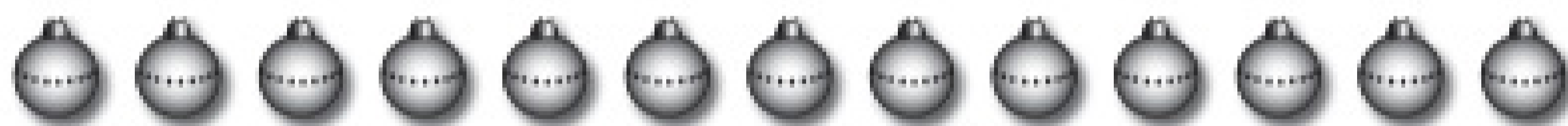


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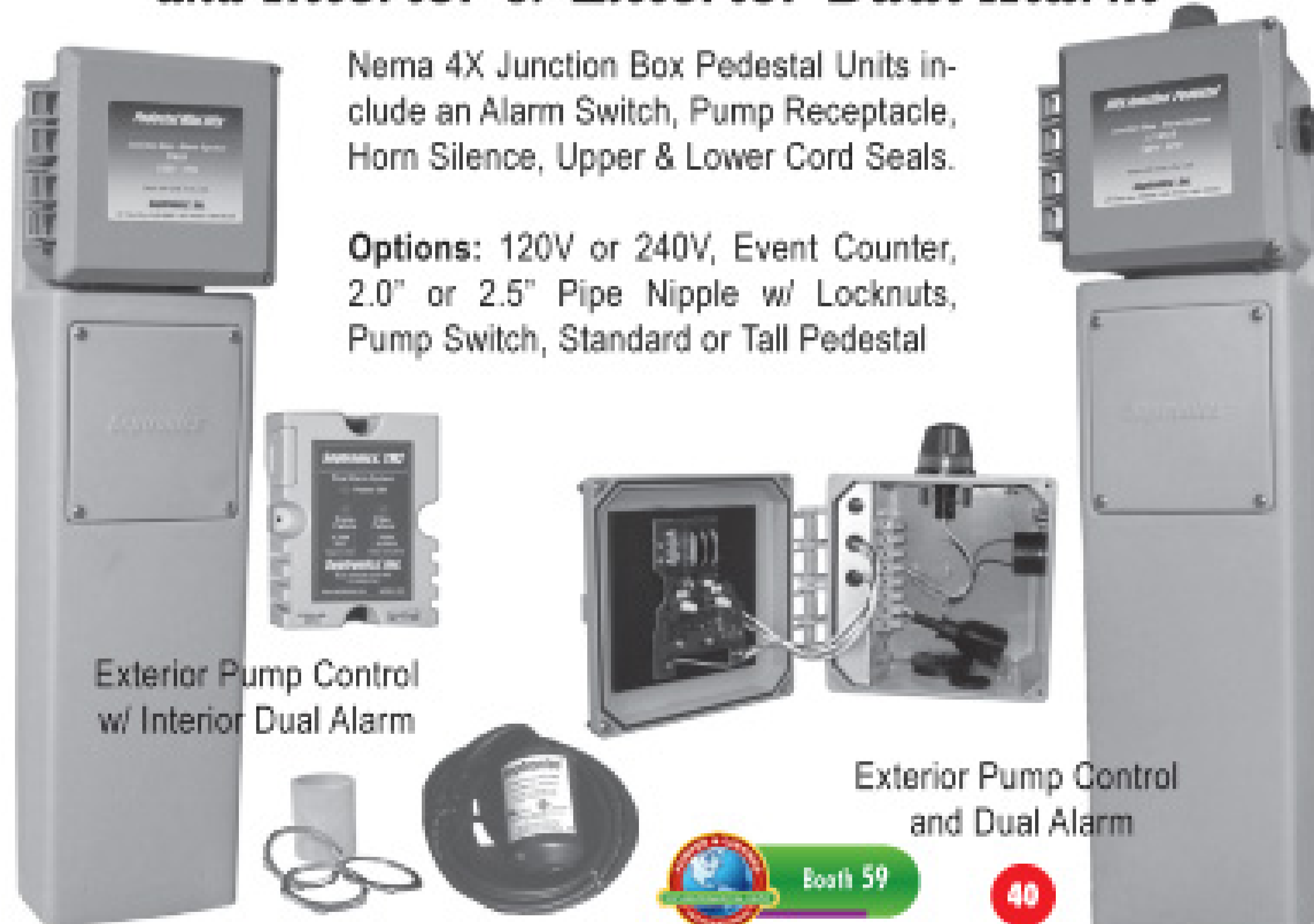


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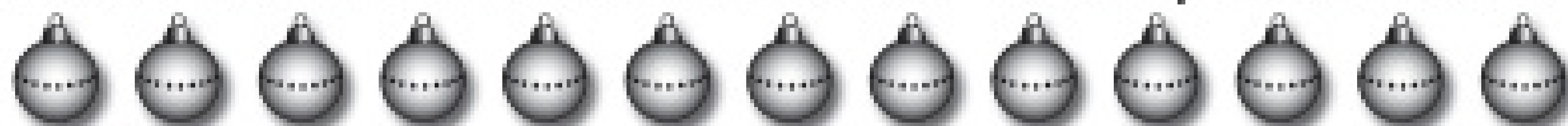
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Beating Par

A treatment system using membrane technology and an innovative drainfield helps an exclusive golf club comply with New Jersey ground-discharge regulations

By **Scottie Dayton**

The Trump National Golf Club in Colts Neck, N.J., opened in 2005, but the onsite treatment system wasn't completed until September 2008. Permitting for the drainfield, a pilot project and one of the largest in the state, took years.

The state Department of Environmental Protection (DEP) requires groundwater discharge to meet coliform, pH and total nitrogen limits. Therefore, Gregg Barkley, P.E., of VanCleaf Engineering in Hamilton, N.J., chose UV disinfection and an ultrafiltration system that uses thin, hollow membrane strands. Run by a computer, the complex treatment train is cost-effective, surpasses discharge limits and requires minimum maintenance.

Site conditions

Soils are sandy loam atop clay mixed with sand. The water table is 20 feet below grade. The 350-acre site was a vegetable farm.

System components

Barkley designed the system to handle 18,000 gpd. Its major components are:

- Three pumping stations with grinder pumps.
- 2,000-gallon concrete grease trap.
- A treatment plant package from Zenon Environmental Inc., Oakville, Ontario. Package components are:
 - 9,000-gallon concrete trash trap (septic tank). All tanks formed in place inside a 40-



Tim Wolf levels a trench before connecting the drip lines. (Photos courtesy of AA Frankenfield Contracting)

- by 40-foot building.
- 18,000-gallon equalization chamber with two 2-hp Myers pumps.
- 6,000-gallon anoxic cell.
- 12,000-gallon activated sludge tank with two 3-hp Goulds recirculation pumps.
- Four ZeeWeed membrane filter modules from Zenon Environmental.
- Two 5-hp/50-cfm Aerzen Delta blowers.
- Skid with two permeate pumps, two backwash pumps, 200-gallon holding tank, sensors, control panel and computer.
- 5,000-gallon dosing chamber with two 2-hp Myers jet pumps.
- 20,000 feet of 1/2-inch WasteflowPC tubing and drainfield package from Geoflow, Corte Madera, Calif.

System operation

Wastewater discharges from the clubhouse, restaurant grease trap and pro shop to individual pumping stations, then flows through 2-inch HDPE force mains to the treatment plant. The first four in-ground tanks, separated by 12-inch walls, form a square at floor level.

Wastewater enters the trash trap, from which effluent flows by gravity through an 8-inch pipe into the equalization chamber. Alternating pumps run every half hour for 15 minutes, sending 40 gpm through 2-inch PVC pipe to the anoxic cell. In the cell, influent combines with mixed liquor (stabilized sludge) recirculating from the activated

System Profile

Location:	Colts Neck, N.J.
Facility served:	Trump National Golf Club
Designer:	Gregg Barkley, VanCleaf Engineering, Hamilton, N.J.
Installers:	Greene Environmental Services Inc., Trenton, N.J.; AA Frankenfield Contracting, Bloomsbury, N.J.
Site conditions:	Sandy loam soil; water table 20 feet below grade
Type of system:	Membrane filter treatment plant, Zenon Environmental Inc., Oakville, Ontario; drainfield package from Geoflow, Corte Madera, Calif.
Hydraulic capacity:	18,000 gpd



Frankenfield's custom-designed three-shear vibratory plow has 1 1/2-inch-diameter, carbide-tipped bullets that pull in the 1/2-inch tubing without smearing it with mud or filling it with dirt. Drip lines were buried 14 inches deep.

increase that number to 14,000 mg/l, or 1.4 percent solids. The extended time absorbs all the carbonaceous demand. Our total nitrogen levels for October were 0.30 parts per million. The DEP limit is 10 ppm."

The system automatically cleanses itself using permeate from the holding tank. Once the permeate pumps fill the tank, they direct liquid to dedicated 3-foot by 6-inch tubes with six UV bulbs. Permeate



PEX tube uncoilers enabled workers to feed 500-foot lengths of drip line into the ground at 4.5 mph.

sludge chamber (secondary treatment).

Installer Henry Greenemeir of Greene Environmental Services Inc. in Trenton, N.J., hauled in 11,000 gallons of seed sludge at system startup. A 30-second dose of MicroC, an ethanol-based product similar to corn syrup, is injected into the mixture four times per hour to begin the nitrification/denitrification process.

"The microbes don't have the main course because the hydraulic flow isn't there yet, so we give them all the dessert they want," says Greenemeir. To ensure a homogeneous mixture, the liquid is gently aerated for 15 seconds every 15 minutes.

Liquid in the anoxic cell over-

"Conventional systems hold suspended solids at 3,000 to 5,000 milligrams per liter. The membranes allow us to increase that number to 14,000 mg/l, or 1.4 percent solids. Our total nitrogen levels for October were 0.30 parts per million. The DEP limit is 10 ppm."

Henry Greenemeir

flows through an 8-inch pipe into the activated sludge chamber, where air rising from 90 3-inch fine-bubble diffusers rolls the mixture. Alternating pumps run every half hour for 15 minutes, returning 350 gpm of mixed liquor to the anoxic cell through a 3-inch PVC line.

In a corner of the activated sludge chamber, four membrane cassettes hang in a stainless steel rack 18 inches below the water. Each membrane, mounted side-by-side in two alternating cassettes, has 500 square feet of filtration area in its numerous fiber strands and filters down to 100 microns.

When a cassette activates, a dedicated pump draws a vacuum through a 2-inch reinforced hose connected to the top of the membrane. The vacuum gently pulls 10 gpm through the hollow, reinforced strands. The filtered permeate has zero to 5 mg/l suspended solids.

"Conventional systems hold suspended solids at 3,000 to 5,000 milligrams per liter," says Greenemeir. "The membranes allow us to

then discharges to the dosing chamber, where alternating pumps send 40 gpm at 104 feet of head to the drainfield headworks.

Effluent is directed to one of three 6,667-square-foot zones. Zone 1 is 1,000 feet from the treatment plant and Zone 3 is 800 feet away. Each has 24 laterals on 2-foot centers with drip emitters at 24-inch intervals. Each zone has a manhole containing a zone valve, electric solenoid control valve, and an air/vacuum vent to eliminate air blocking the lines.

Installation

Installation of the treatment plant was straightforward. Greenemeir subcontracted the drainfield to Art Frankenfield of AA Frankenfield Contracting in Bloomsbury, N.J. Previously, the site, on a 15-percent slope, was cleared, grubbed, contoured and covered with topsoil.

For the job, Frankenfield designed a three-shear vibratory plow with 1 1/2-inch-diameter, carbide-tipped bullets. WaterWick in Southampton,

N.Y., built it. "Larger bullets allow the tubing to pull in without smearing with mud or filling with dirt," says Frankenfield, who buried the drip lines 14 inches deep.

Because a wheeled machine lacked traction to pull the heavy plow and would tear up the ground, Frankenfield purchased a John Deere CT332 skid loader on tracks, then mounted the plow in front. "Driving in reverse was difficult because I had no reference to tell which way I was going," he says. "And my back and neck muscles cramped from hanging out the window."

Drawing on his fighter pilot experience, Frankenfield made an aiming device from 1 1/4-inch electrical conduit that protruded in a "U" off the back of the skid loader. He welded a vertical bar at the center of the "U," then reinforced it with diagonal arms. "I could see my bombsight through the wireless backup camera I bought from Harbor Freight Tools," he says.

A length of tubing clamped to each side of the skid loader's frame extends 6 inches on either side of the crosshairs. Frankenfield painted those 6 inches red.

A 2 1/2-inch monitor mounted on the dash allowed Frankenfield to



Frankenfield built its aiming device from 1 1/4-inch electrical conduit.

align the aiming system with the red line painted on the ground. "The skid loader has a joystick, so it was like flying my F-104 Thunderchief until the plow caught that 1947 Packard and stopped cold," he says. The team had found the farmer's buried junkyard.

After pulling up some car parts with the loader's hydraulics,

Frankenfield increased the vibratory impulses on the plow and raised the pressure to 1,780 psi, enabling the bullets to rip through the remaining buried metal and open holes large enough to insert the tubing without damaging it.

Because the 500-foot rolls of tubing came coiled like a garden hose, feeding it into the ground at 4.5 mph was difficult for Frankenfield's three men. He bought three PEX tube uncoilers and solved that problem. The crew used two-way radios to tell Frankenfield when to stop so they could splice more tubing together. Installing the tubing took three and a half days. When pressurized, only two lines had cuts from hitting pieces of buried metal.

Maintenance

Greene Environmental holds the one-year service contract. Because the computer controls the entire system and ties into an autodialer alarm, Greene's state-licensed operator spends just two to four hours per week on maintenance. He also

monitors coliform, pH and total nitrogen limits monthly and sends reports to the DEP.

"The discharge must be below 200 colonies per 100 milliliters," says Greenemeir. "In October, we had five colonies." The trash tank is inspected, pumped and cleaned quarterly. ■

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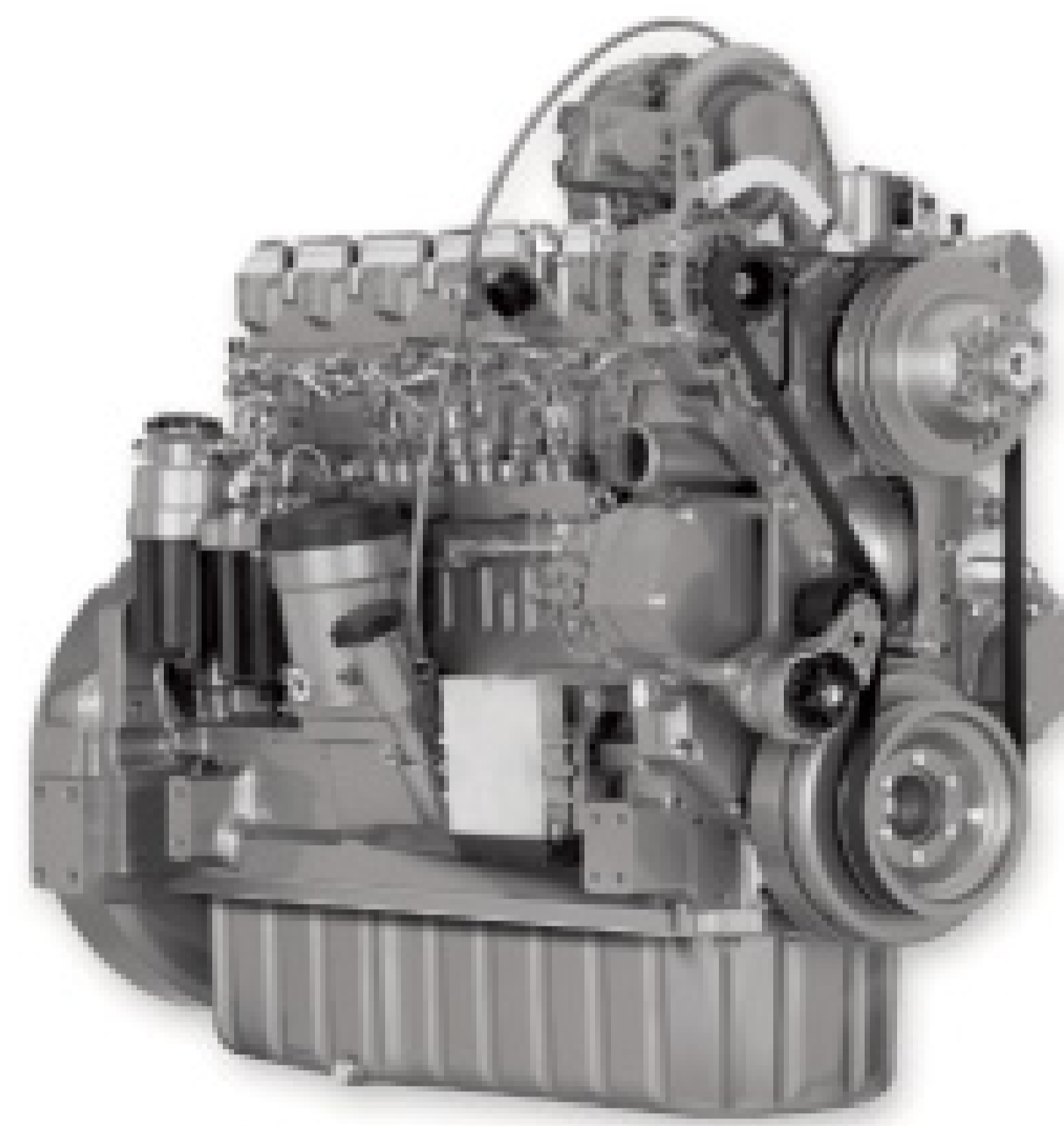
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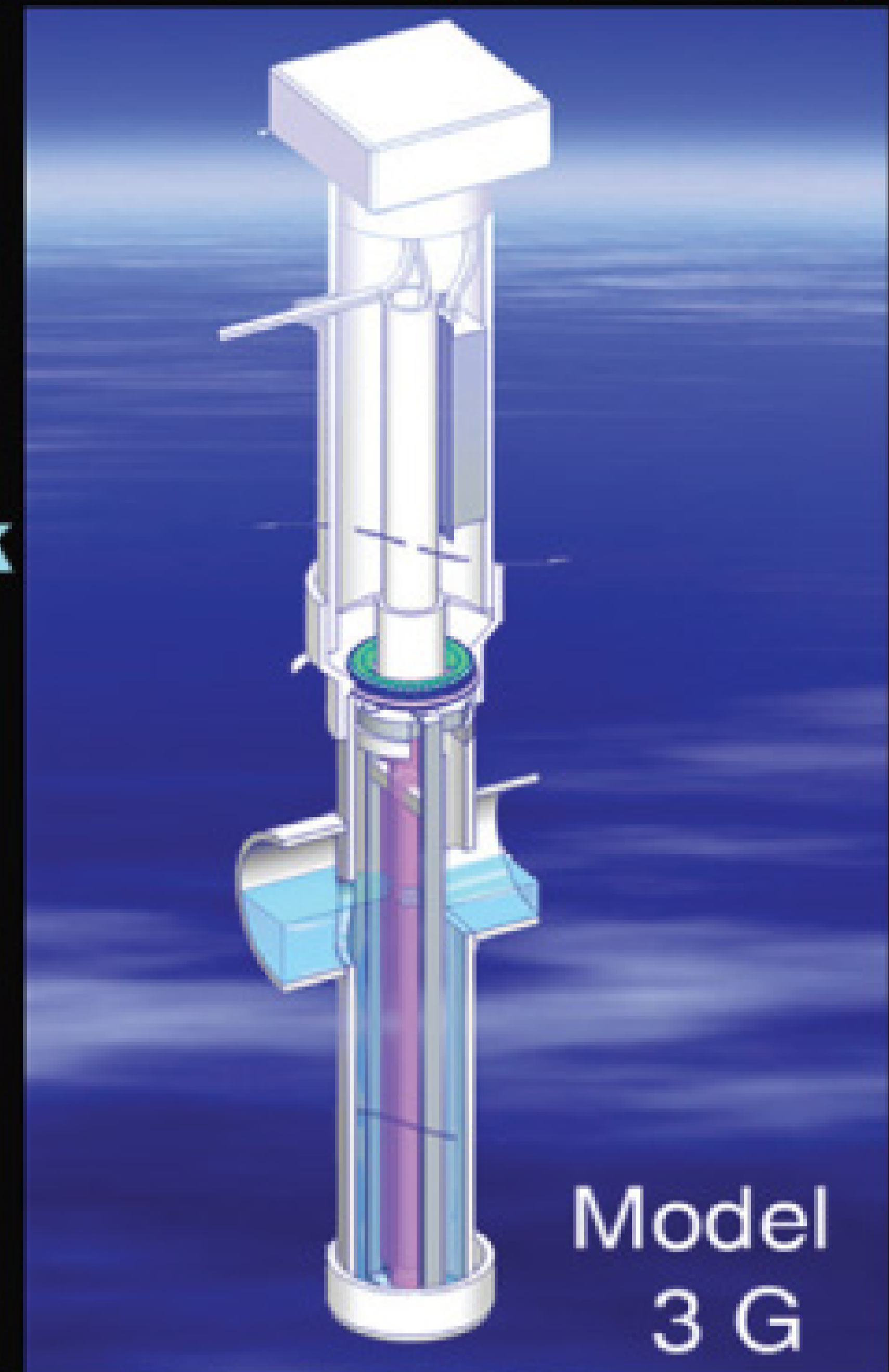
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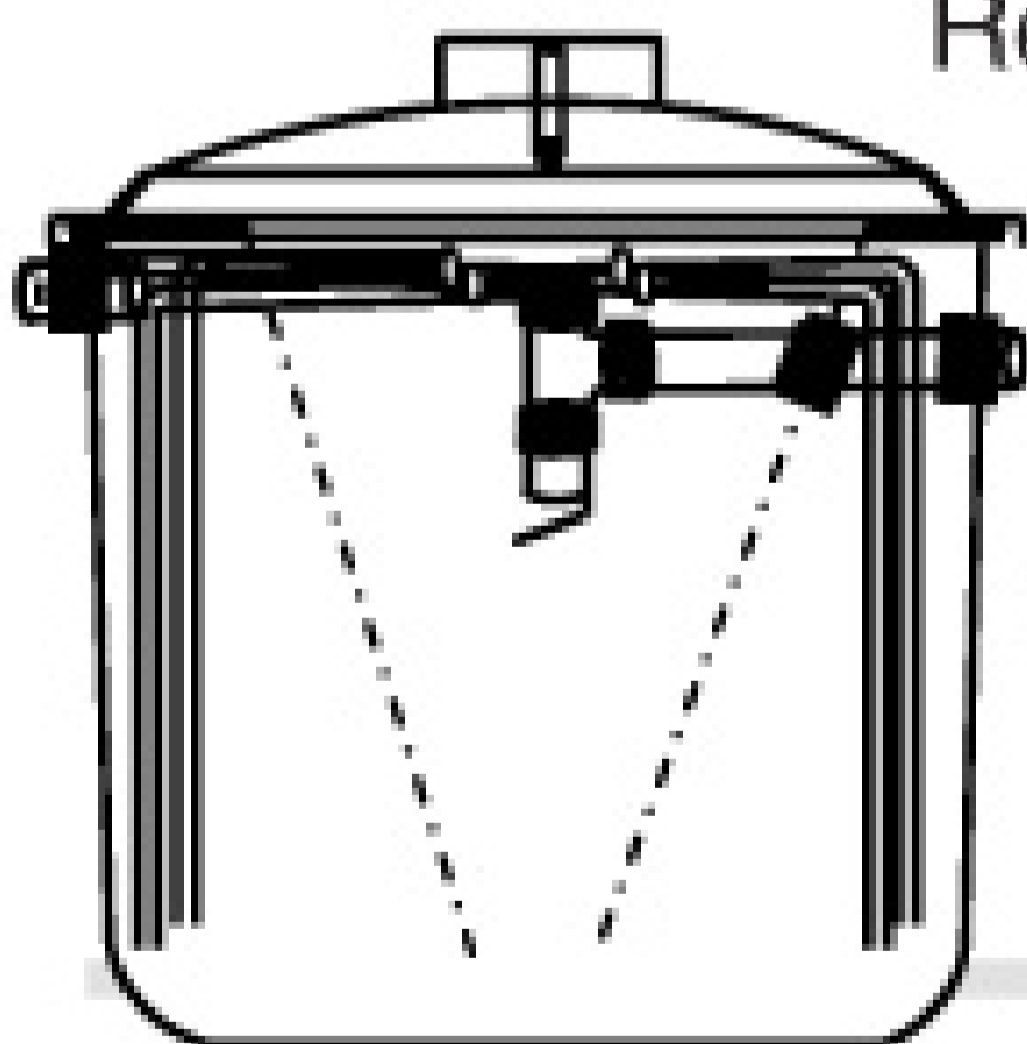
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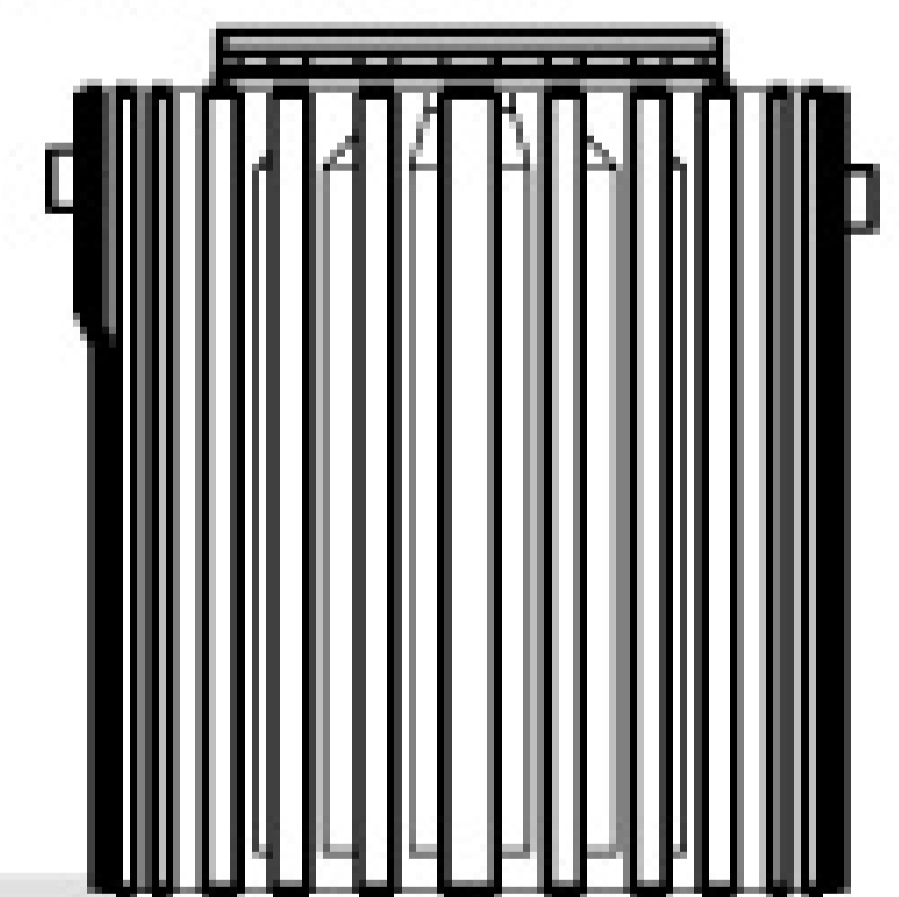


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Why ATU Vents?

Installation professionals question why ATUs can't simply be vented through the existing house plumbing stack

Question:

I am curious to know the function of a vent on an ATU. Homeowners hate to see them, hiding them costs time and money, and they can be a source of odors. I install Clearstream units, and they don't have a vent. They seem to work just fine. If the ATU can vent through the house plumbing stack (which it should unless there is

a serious dip in a pipe that creates a P trap) and the air pump is not drawing more amps than it should, why do most manufacturers install a vent?

Answers:

Not all ATUs are created equal. Some are not allowed to vent back towards the house, so there is no other option. It just goes to show you why some are more popular than others.

It depends on the airflow rate (cfm). Some systems use a low flow rate and are all right to vent through the plumbing stack. Possibly Clearstream is one of them. Bio Green is another. If you install a system that uses a blower rather than a compressor and has a very high airflow rate, it will try to vent through the plumbing stack and all that air will slow down. I have seen it actually stop the flow down the pipe to the septic system.

Also, many older homes only had small vent stacks (1.5 to 2 inches), which are not large enough to handle the ATU venting. Some even vented into the walls, which could cause more problems. When you flush the toilet watch the water in the bowl; if it fluctuates up and down, you know the vent is not big enough or is partially plugged.

When I do an install, any brand, I always use an underground biofilter and use drain rock to surround perforated pipe, filter cloth and soil to neutralize the odor problem. You can use chamber sections and soil or bark mulch — it will work just as well.

In fact, when I went back to one of my installs during a rainy day, you could see the bubbles coming up through the ground. Just be sure to use a breathable sandy loam, minimum 6 inches, maximum 9 inches, and make sure water cannot flow down the vent pipes back into the ATU, overloading it. Double-check the amperage of the blower when you are done to confirm. The nice part is that it's all underground out of sight. There are no complaints of "a thing sticking out of the ground."

I've been operating, maintaining and installing aerobic units for 35 years, from 1000-gallon household units to 6-million-gallons-per-day municipal plants.

I like the vents on aerobic units. Assume the air compressor puts out 2 to 20 cfm. Each cubic foot contains about 7.5 gallons. In an hour, that's 900 to 9,000 gallons of sewage air that has to escape the ATU. If it goes up through the house vents and stinks, then what? Your customer is going to be unhappy.

Some ATUs have timers to adjust on/off cycles. If the homeowner has house guests contributing more sewage, and the run time is not increased, more unpleasant odors will be created. If there is not enough aeration, the bacteria will shift to the anaerobic mode, creating a rotten egg smell. The heavy, unpleasant odors will spill out over the roof, and unless there's a stiff breeze, create a problem.

An aerobic unit that is working properly will smell like wet earth. If it stinks, the unit is undersized or overloaded, or the blower is too small or is not running enough. ■

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Aero-Stream Receives State Approval Renewal

Aero-Stream's septic system maintenance and restoration product has received renewed approval from the Wisconsin Department of Commerce and is listed on the department's Web site under Approved Plumbing Products. The company's remediation product also has earned the Handyman Club of America approval, is listed by Underwriters Laboratories and meets National Electric Code requirements. ■

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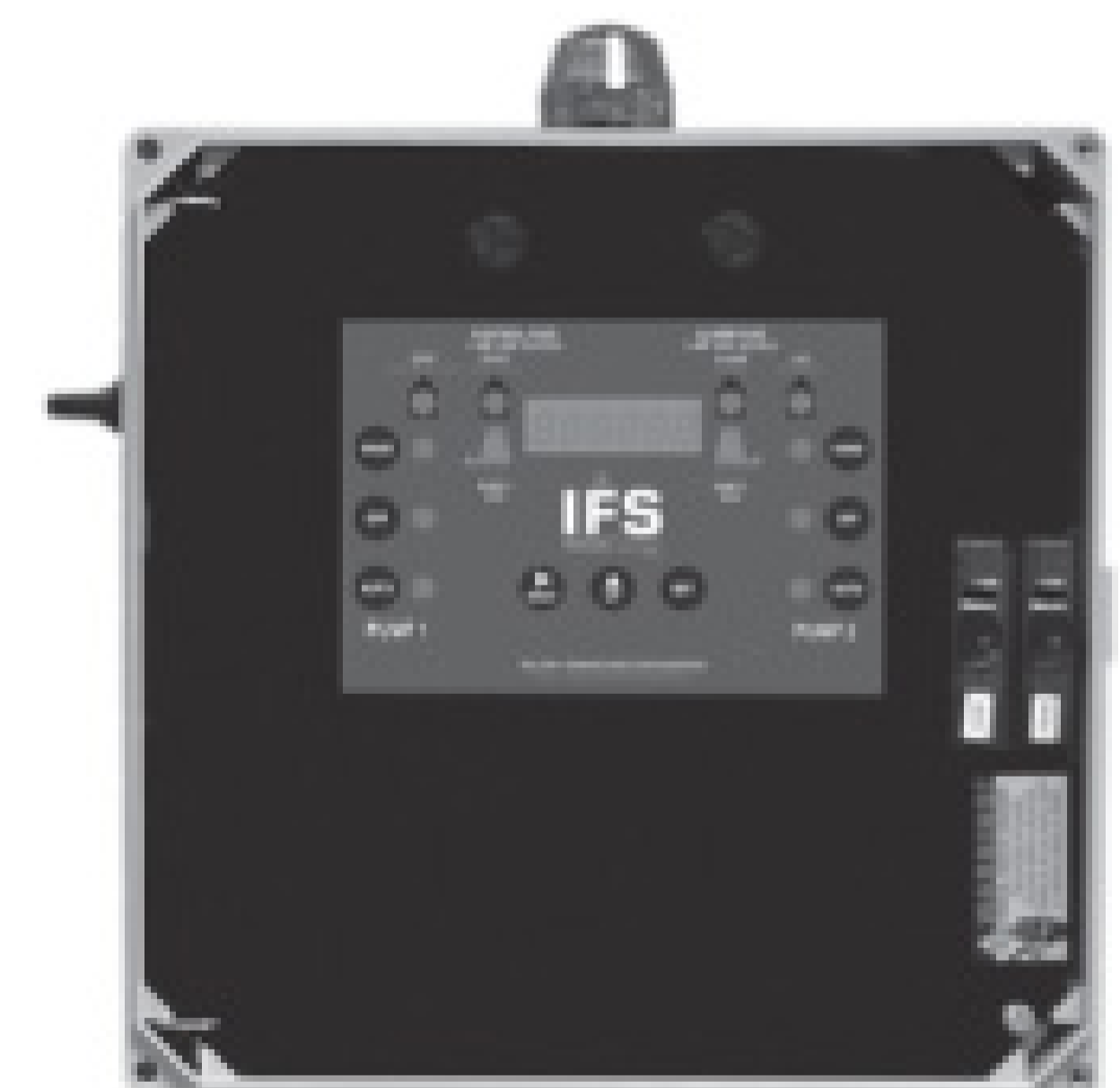
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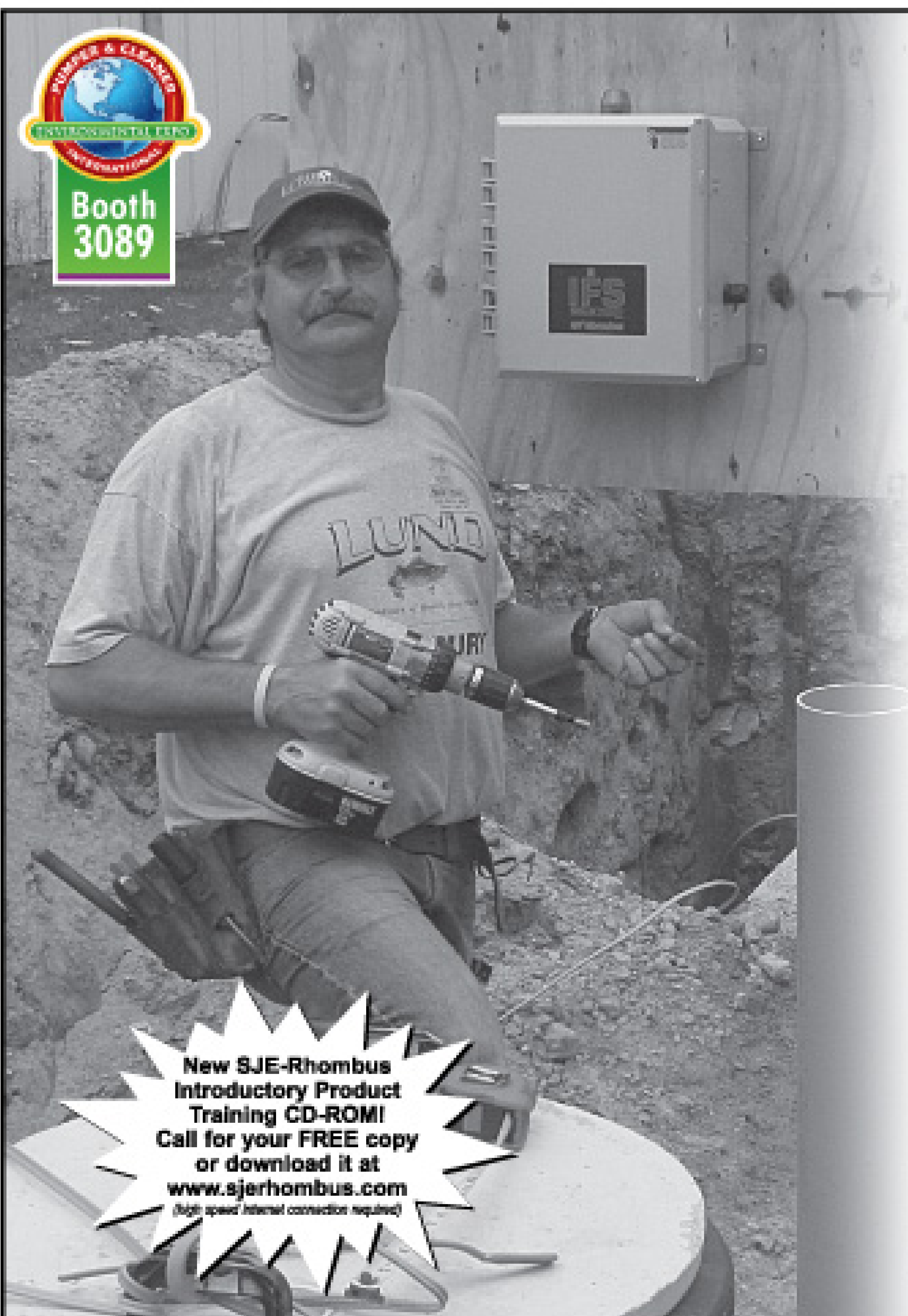
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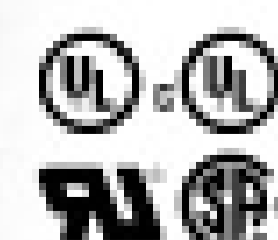
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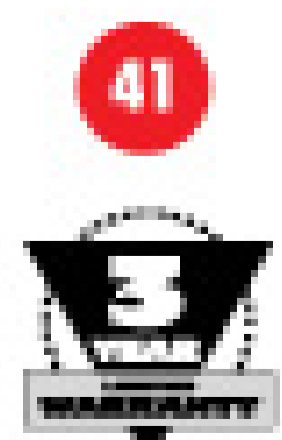


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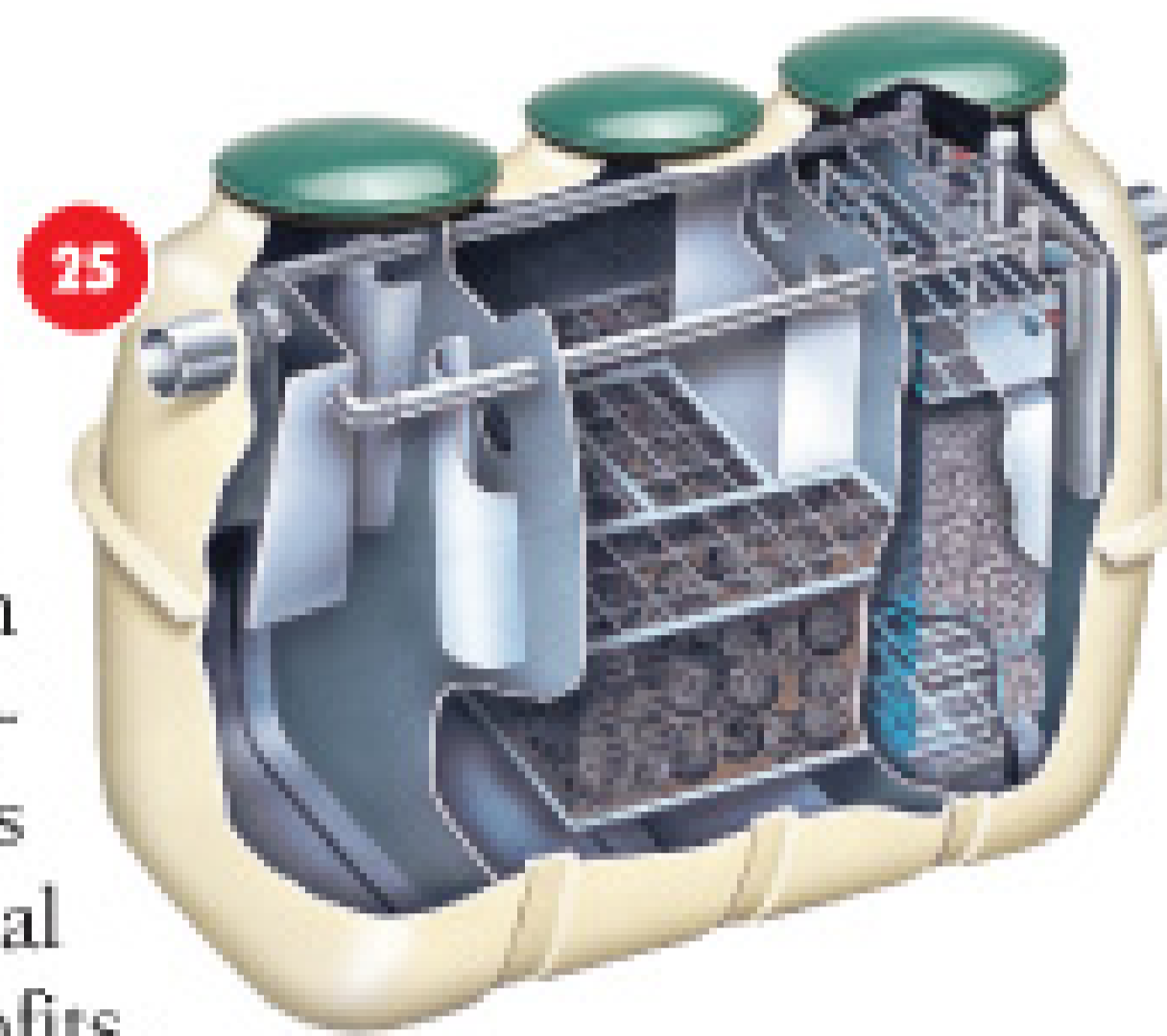
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December 2008

Zoeller Designs Fusion Series Treatment System

The Fusion Series Treatment System from Zoeller Pump Co. combines anaerobic and aerobic digestion in three-bedroom (ZF450), four-bedroom (ZF600) and five-bedroom (ZF800) units. The drop-in units are designed for residential or commercial applications in new construction or retrofits. No septic tank is required, unless mandated by local regulations. There also is no media to change or remove. **800/928-7867; www.zoeller.com; Expo booth 87.**



25

Western Mule Offers P-20 Fold-A-Way Bumper Crane

The P-20 Fold-A-Way bumper crane from Western Mule features 2,000 pounds of lifting capacity, six different boom positions, and vertical boom storage that enables it to fold compact and out of the way when not in use. The lighter duty P10 crane is designed to lift up to 1,000 pounds and is offered with DC, AC and manual hand-crank models. **559/266-6977; www.westernmule.com; Expo booth 3027.**



MSA Introduces Altair 5 Gas Detector

Designed to detect five types of gases, the Altair 5 Multigas Detector from MSA features MotionAlert and InstantAlert warning systems. MotionAlert activates a "man down" alarm if no motion is detected for 30 seconds, while InstantAlert enables users to manually activate an audible alarm warning of a potentially dangerous situation. Other features include optional, high-resolution color display screen, more than 17 preprogrammed languages, Galaxy System compatibility, standard vibrating alarm and data logging. The gas detector also is MSA Link Software-ready. **800/672-2222; www.msanet.com.**

Vermeer Introduces 12-inch Rockwheel Attachment

The wide-cut rockwheel attachment from Vermeer Corp. is designed to cut trenches up to 12 inches wide in a single pass. A hydrostatic motor powers the 84-inch cutting wheel that can cut to a depth of 40 inches. Available on the RTX1250 and RT950 ride-on trenchers, changeable segment pockets make it possible to cut trenches from 4 to 12 inches wide with a single attachment. **888/837-6337; www.vermeer.com; Expo booth 8025.** ■

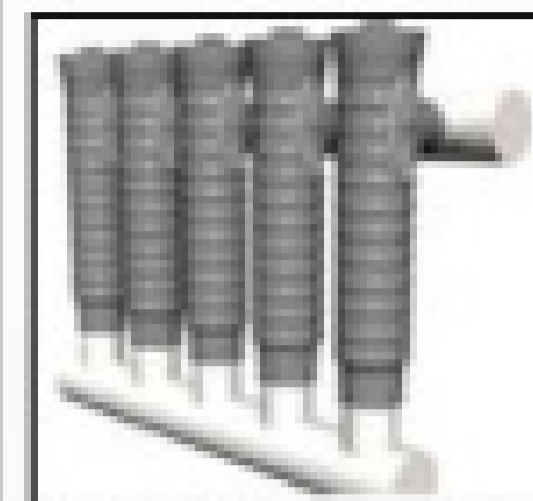


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The Last Line of Defense for Pressurized Distribution Systems



Can be used in a manifold to handle almost any flow-rate

The STF-100 series pressure filter will:

- * Lower total suspended solids (TSS)
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- * Pass up to 83.8 gallons per minute @ 1PSI
- * Allow for easy installation and service
- * Protect from improper system maintenance
- * Protect from system abuse
- * Satisfy your customers

US Patent# 5,885,452
CAN Patent# 2,237,751

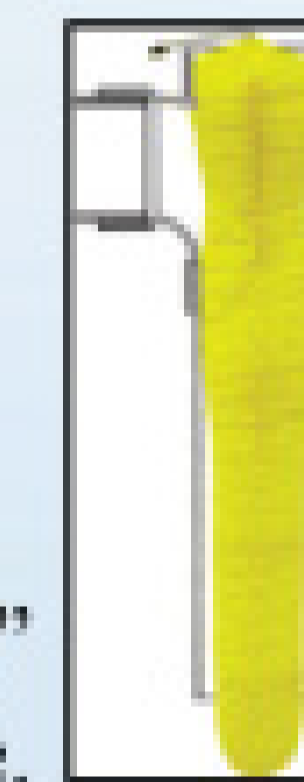


Gravity Flow Bristle Filters for residential or commercial systems, septic tanks, onsite systems, or even your pond!

Very effective at filtering tissue, hair, lint, and other solids common to waste water. And flexible enough to fit just about anywhere, most common applications are standard "tees" and square concrete baffles as shown below.



Left: The 7" filter in a 5" square concrete baffle.



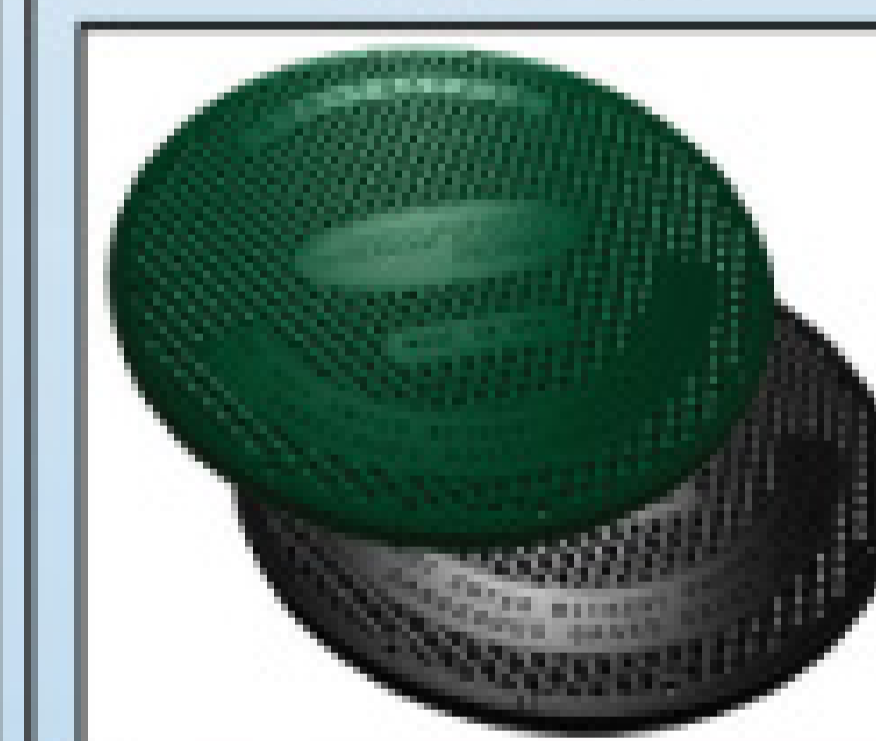
Right: The 4" filter in a 4" Tee.

Sizes Available:

- 4" yellow
- 6" white
- 7" red
- 8" blue

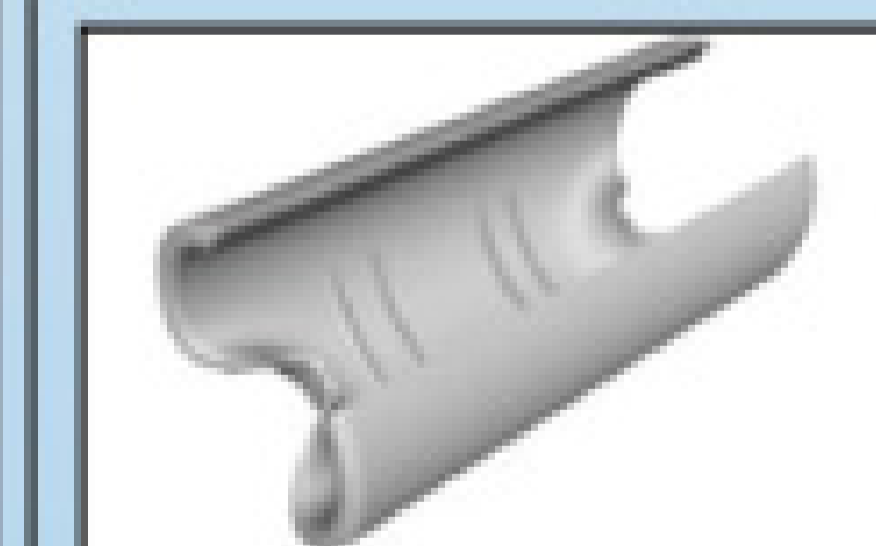
Patent# 6,811,692

Polycarbonate Covers



- * 8,000 lb wheel load rating (H10 Rating)
- * The Ultimate in UV protection and appearance
- * Drop in feature for easy alignment
- * Performance is not affected by temperature
- * Can be used with most 24" risers and pipe
- * Factory installed gasket won't fall out
- * Stainless Steel Screws included
- * Available insulated or easy to do so yourself
- * Available with self locking web
- * Low profile to allow for lawn mowers, etc.

Orifice Shields



Patent# 6,167,914

- * **The Original Orifice Protector**
- * Sturdy design for all applications
- * Easy to position
- * Will not fill with gravel in any position
- * Large discharge area that does not clog
- * Large open area
- * No moving parts to stick
- * Will remain in place, even without glue



Float Tree Accessories

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BUSINESSES

FOR SALE: Sunny South Florida. Full service septic tank business established 20 years. Great potential; great records. Owner retiring. Call Chris 305-297-2171. (PI12)

PORTABLE TOILET BUSINESS located in Albany, NY. 600+ units, 3 service trucks, 2 P&D trucks. 20 years family built business. Excellent growth potential. Call Stanley @ 518-441-7222. (CPT112)

WELL ESTABLISHED PORTABLE RESTROOM BUSINESS located in Massachusetts. Includes 7 pumper trucks, 1000+ portable restrooms including handicap, deluxe, trailered VIP units, as well as hand washing stations, urinals, and trailers. Established client base with over 75% of units out on rental at this time. Serious inquiries only directed to Juan.acc@comcast.com. (PT112)

(2) Septic tank delivery trucks; 1-ready mix truck; 7-Celico septic tank forms (1000-1500 gallon); misc. drop box, riser forms, lift tank forms. Trucks and loaders in good condition. (In service in 2007) All forms in good or better condition. (Used in 2007) Package price \$70,000. 218-829-9678 or 800-829-5755. (IBM)

FOR SALE: Established 15 years, septic pumping business in Eastern Massachusetts. Excellent reputation, 3000+ client list includes residential and commercial customers. Solid income, excellent growth potential. In the midst of busy season now. Sale of business includes a 1995 Ford L-9000 vacuum truck with 330 hp Cummins engine, 3600 gallon tank, 4 years new. Serious inquiries only @ masepticco4sale@gmail.com. (CPT112)

COMPUTER SOFTWARE

WINTAC is the #1 software for scheduling, CRM, billing, service tracking, accounting, marketing, vehicle management. FREE demo at www.wintacpro.com. 1-800-724-7899. (PI02)

EXCAVATING EQUIPMENT

FOR SALE: 2004 JCB 214-4WD Backhoe Loader. 414 hours, Powershift transmission, 92" GP bucket, precision controls, extra-dig, 36" bucket, 18'6" dig depth, turbo engine with 92HP. Original owners. Serial #904623. Comes with trailer. \$48,000 OBO. Contact James 561-737-8818. (PI12C1)

HAND TOOLS

Crust Busters - Portable, lightweight machine guaranteed to mix up septic tanks and grease traps! Save time and money! www.crustbusters.com, 1-888-878-2296. (IM)

JET VACS

2003 Vac-Con VPD4216LHA, mounted on Sterling 9501, 16 yard, 800' hose reel, 1500 gal., 85 gpm/3000 psi, hydrostatic blower, clean good running truck. \$149,800. Call 561-718-2736. (I2)

MISCELLANEOUS

JET FORMS FOR SALE. One monolithic, one non-monolithic. \$12,000 for the package. Call 305-872-2033. (I2)

One 2005 Septic Tank Truck: Non-CDL, 7 septic tank molds from 1000 gal. to 2250 gal., distribution box forms 6-hole to 13-hole, 2 tank flippers, spreader box for drainfield, all Virginia approved. Call 804-892-2466. (IBM)

PUMPS

Hydromatic, Zoeller, Liberty, ABS, Myers, Grinder and Effluent pumps. Lift station packages and high water alarms are also available. Septic Services, Inc. www.septicserv.com. 1-800-536-5564. (IM)

SEPTIC TRUCKS

2007 Mack CTP713B pump truck. 20 front and 44 rear, 5,363 miles. AM/FM, CD player. 4000 gallon tank with 506 Challenger pump. \$145,000. Kevin 850-333-1651. (PTIM12C1)

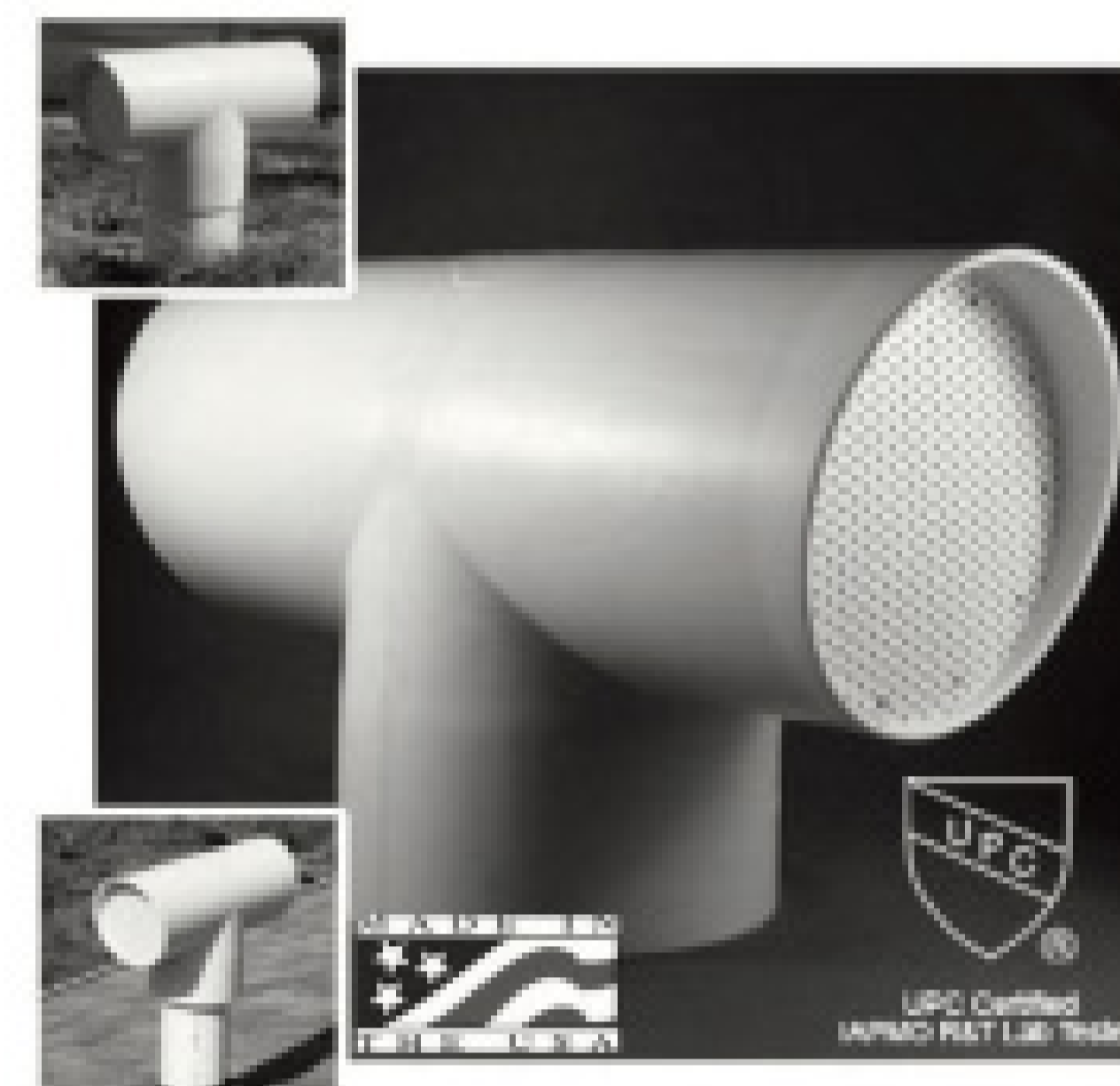
TRUCKS MISC.

1992 MACK - ALL Mack with Del Zotto side shift monorail septic tank hauler. One owner. \$25,000 USA. 314-220-8676. (I12)

SEPTIC TANK SET TRUCK: 1994 Freightliner, Cummins 330E, 20,000 lb. winch, excellent set truck. \$37,500 OBO. 903-818-3307. (I01)

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Tire Chips Aggregate

Recycled tires starred in the Indiana Onsite Wastewater Professionals Association field day. According to the IOWPA newsletter, installers, homeowners and county health department officials watched as Blazer Farms of Kokomo and Cole & Sons Inc. of Russiaville replaced an onsite system using tire chips in the drainfield and perimeter drain. The aggregate is approved by the state Department of Health.

Entech, in White Pigeon, Mich., provided the media. According to president Neal Frey, the aggregate holds more water and has fewer fines than stone. Dick Blazer, owner of Blazer Farms, figured the project would require 124 tons of No. 4 stone, but used only 24 tons of tire chips. The stone alone cost \$1,700. The chips cost \$705.

Installers noticed that rubber material reduced skid-steer wear and tear. The rubber also was lighter and easier for workers to level and rake. Blazer, who is gearing up to use tire chips in most installations, welcomes questions. Call him at 765/438-1513.

2007 Workplace Fatalities

The 2007 preliminary Census of Fatal Occupational Injuries is the lowest since the program began in 1992. The U.S. Bureau of Labor Statistics recorded 5,488 fatal work injuries, down 6 percent from the 5,840 deaths reported in 2006. Final results for 2007 will be released in April 2009. You can access workplace injury statistics at <http://www.bls.gov/data/#injuries>.

CALENDAR OF EVENTS

Dec. 4-5

Kentucky Onsite Wastewater Association Conference, Sloan Convention Center, Bowling Green. Call 270/715-0043 or visit www.kentuckyonsite.org.

Dec. 8-9

NOWRA Installer Academy,

Riviera Hotel, Las Vegas, Nev. Call 800/966-2942 or visit www.nowra.org.

Jan. 8-10

Michigan Onsite Wastewater Recycling Association Conference and Exhibit, Kellogg Hotel and Conference Center, East Lansing. Call Chanin Frank at 989/773-6985, ext. 258, or visit www.mowra.org.

Jan. 13-15

Iowa Onsite Waste Water Association Conference, Polk County Convention Center, Des Moines. Call 515/225-1051 or visit www.iowwa.com.

Jan. 13-15

Ohio Onsite Wastewater Association Conference and Trade Show, Ramada Plaza Hotel and Conference Center, Columbus. Call 866/843-4429 or visit www.ohioonsite.org.

Jan. 15-17

Oregon Onsite Wastewater Association Conference, Corvallis. Call Belinda Rasmussen at 541/389-6692 or visit <http://oronsite.org>.

Jan. 18-20

Pennsylvania Septage Management Association Conference, Holiday Inn, Grantville. Call 717/763-7762 or visit <http://psma.net>.

Jan. 19-21

Missouri Smallflows Organization Conference and Exhibition, Holiday Inn Select, Columbia. Call 417/739-4100 or visit www.mosmallflows.org.

Jan. 22-24

Alberta Onsite Wastewater Management Association Conference, Deerfoot Inn and Casino, Calgary. Call 780/489-7471 or visit www.aowma.com.

Jan. 23-24

Washington Onsite Sewage Association Conference, Vancouver. Call John Thomas at 253/297-2837 or visit www.wossa.org.

Jan. 26-27

Indiana Onsite Wastewater Professional Association Conference, Camp Camby, Camby. Call Scott Rexroth at 317/889-2382 or visit www.iowpa.org.

Jan. 26-28

North Carolina Septic Tank Association Conference and Exposition, Hickory Metro Convention Center, Hickory. Call Connie Stephens 336/416-6394 or visit www.ncsta.net.

Jan. 30-31

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.

Feb. 5-6

Ohio Water Quality & Waste Management Conference, Holiday Inn on Lane, Columbus. Call 614/292-8571 or visit <http://setll.osu.edu>.

Feb. 11-12

Nebraska On-site Waste Water Association Conference. Call Lee Orton at 402/476-0162 or visit www.nowwa.org.

Feb. 14-15

Utah On-Site Wastewater Association Conference, Expo Center, West Valley City. Call Carmell Burns at 435/797-3174 or visit <http://uwrl.usu.edu/partnerships/training/uowa.html>.

Feb. 25-28

Pumper & Cleaner Environmental Expo International, Kentucky Exposition Center, Louisville, Ky. Call 800/257-7222 or visit www.pumpershow.com.

March 1-4

Ontario Onsite Wastewater Association Conference and Exhibition, Sheraton Conference Centre, Richmond Hill. Call Denis Orendt at 905/372-2722 or visit www.oowa.org.

March 8-10

Pennsylvania Association of Sewage Enforcement Officers Conference, Grantville. Call 717/761-8648 or visit www.pa-seo.org.

March 18-19

Tennessee Onsite Wastewater Association Continuing Education Workshop and Annual Meeting, UAW Union Hall, Spring Hill. E-mail Scott Fellwock at scott.fellwock@nashville.gov or visit <http://onsite.tennessee.edu/TOWA.htm>.

April 6-9

NOWRA Technical Exhibition and Conference, Midwest Airlines Convention Center, Milwaukee, Wis. Call 800/966-2942 or visit www.nowra.org.

TRAINING & EDUCATION

Pipelayer certification

The University of Minnesota Extension is offering a three-hour workshop to accommodate a change in the state plumbing code that states all onsite system installers must be certified pipelayers, licensed plumbers or registered apprentices to install sewer or water pipes outside of a building. The schedule:

- Jan. 28 – Fergus Falls
- March 12 – Owatonna
- March 27 – Willmar
- April 17 – Sauk Centre

Call Nick Haig at 800/322-8642 (612/625-9797) or visit <http://septic.umn.edu>.

NAWT

The National Association of Wastewater Transporters Vacuum Truck Technician Training is Feb. 24 in Louisville, Ky. Call 800/236-6298 or visit www.nawt.org.

Minnesota

The University of Minnesota Extension has these classes:

- Jan. 5-7 – Introduction to Onsite Systems, Austin
- Jan. 8-9 – Installing Onsite Systems, Austin
- Jan. 14-15 – Pumper/Maintenance Continuing Education, White Bear
- Jan. 26 – Troubleshooting, Grand Rapids
- Jan. 27-28 – Installer Continuing Education, Fergus Falls
- Jan. 28 – Pipelayer Certification, Fergus Falls

Call Nick Haig at 800/322-8642 (612/625-9797) or visit <http://septic.umn.edu>.

North Carolina

The North Carolina Soils and On-Site Wastewater Training Academy has the following courses at Raleigh:

- Jan. 8 – Principles of Gravity System Design
- Jan. 9 – On-Site Systems Layouts

Call Joni Tanner at 919/513-1678 or visit www.soil.ncsu.edu/training.

Virginia

The following courses by the

Virginia Onsite Wastewater Recycling Association are at Blackstone unless indicated otherwise:

- Jan. 7 – A to Z of Onsite Wastewater, Winchester
- Jan. 21 – Proprietary System Training


Contact Jeff Barr at 703/771-5250 or visit www.vowra.org.

Onsite Installer invites your state association to post notices and news items in this column. Send contributions to editor@onsiteinstaller.com. ■

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- High impact plastic parts
- Operates quietly
- 2-yr. warranty
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- Replacement parts available



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with low pressure alarm & light; with on & off switch



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LA-80B
LA-100
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Hydromatic, Zoeller, ABS, Liberty & Myers Pumps



BIO Control Panel

with Lift Station, Aerator, Timer & High Water Alarm



Myers High Head Filtered Effluent Pump



Conde SDS 6 Engine Driven

Units available 20 to 180 cfm



Moro PM80 Turbo 350 cfm

Moro Pumps: from 175 to 1442 cfm





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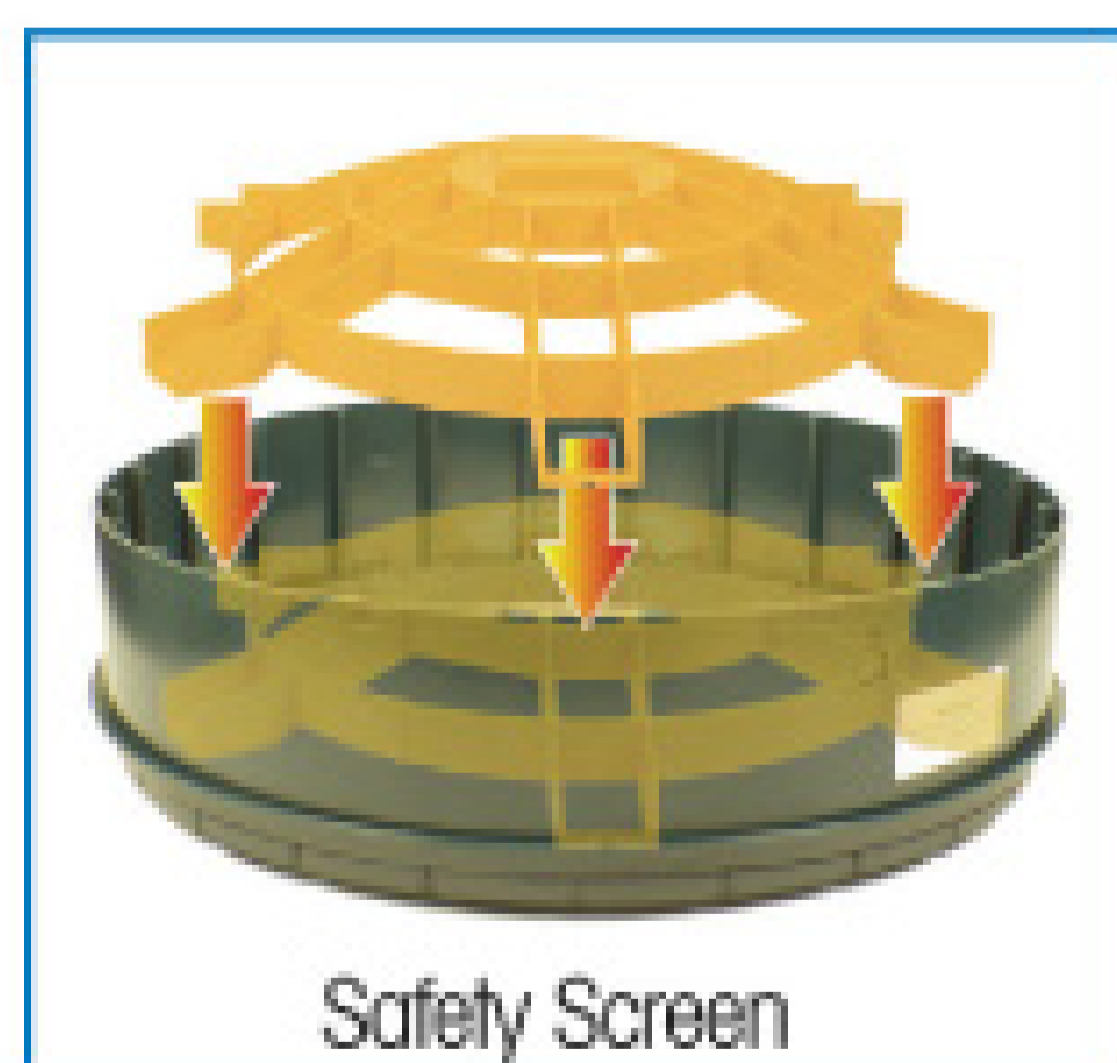
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