THE EDGE
Solutions for a Competitive Edge
OCTOBER 2006

"...big changes in engines and chassis built after January 1, 2007."

Five Things to Know About '07 EPA-Compliant Chassis

New EPA diesel emissions standards will require big changes in engines and chassis built after January 1, 2007. While the new rules do not apply to engines built before January 1 (even if they are sold in 2007), once they are gone, the 2007-compliant engine will become the rule.

The EPA wants engine builders to slash particulate emissions by 90 percent, and NOx and hydrocarbon emissions by more than 50 percent. That will require new exhaust systems, filter devices, cooling packages, and fuel and oil requirements. Vactor/Guzzler Manufacturing's chassis buyer, Jamie Grant, thinks you should know about these five changes in 2007 (though she recommends checking with your chassis OEM or local chassis dealer for final specifications):

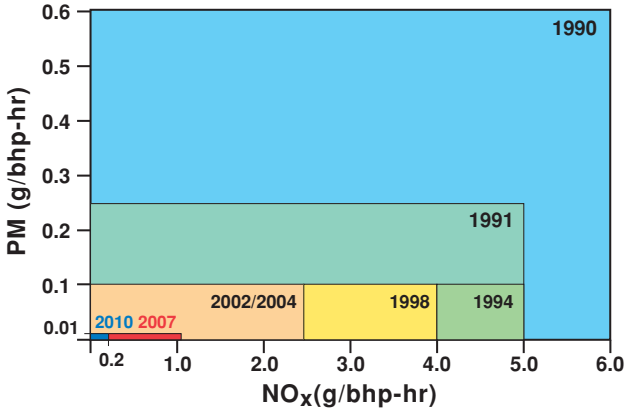
Say goodbye to your muffler. This year marks the end of traditional cab-mounted mufflers. You may still see vertical configurations, but new after-treatment devices (ATDs) will be too heavy for cab-side mounting. Instead, they will mount vertically behind the cab or horizontally under the chassis, between the engine and the exhaust pipe.

The new ATD is designed to trap and eliminate soot particles in the exhaust stream. It requires precise placement. Chassis manufacturers have to measure and install it carefully for correct back-pressures and temperatures. Once installed, operators cannot modify any part of the exhaust system between the engine and ATD. "Once you've mounted it on a truck, you cannot shift it from the right to left side because that would affect engine and ATD pressures and temperatures," says Grant.

Pay attention to your ATD. The after-treatment device's added weight comes from its double-wall construction and diesel particulate filter (DPF). This is the device that traps soot. A catalyst inside the DPF then oxidizes the particles into chemicals that are safe to release into the air. Over time, however, soot and ash coat the filter's surface.

The ATD cleans and regenerates the filter surface with heat. Highway driving often generates enough heat to burn off the soot and regenerate the system without operator intervention.

Sometimes, however, the engine does not heat up enough to do the job. The ATD then switches to active regeneration. Although this usually happens automatically, drivers who do a lot of stop-and-start driving can engage their active regeneration systems manually.



Guzzlers that spend most of their time vacuuming may need to clean their filter on the job. This calls for stationary regeneration. The system gives the operator several hours' notice that it needs cleaning. The operator then decides when to initiate the 30-minute process, which takes place while the vehicle is in park or neutral.

ATD filters also need periodic maintenance. Their external sensors light up a dashboard light when they need cleaning. They must go to a specialized facility for the service.

Look for changes under the hood. "You'll see a number of changes under the hood, starting with larger radiators," says Grant. Some chassis manufacturers have switched to a splayed (flared front) frame and redesigned their grilles to increase airflow and accommodate the new radiators.

Manufacturers are also reshuffling their engine lineups. "They may no longer offer engines that are

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Seven Years: Too Early for a Trade-In?

You purchased your vacuum truck seven years ago. After five years, you finally paid the unit off. You continued to receive depreciation allowances in years six and seven. Those tax deductions drove down operating costs, making your Guzzler really profitable.

Now it's year eight. The depreciation deduction is over, but you don't have any loan either. It's still gravy time, isn't it?

Some owner-operators figure they will rake in big profits over the next three or four years. But those who study the true costs of operating a vacuum truck realize that now may be the best time to trade in their vehicle for a new rig.

Guzzler Product Manager Deepesh Nayanar thinks there are many reasons to consider a trade-in in year seven or eight. "As trucks age, they cost more to operate and maintain, and their value as a trade-in declines," he explains. "Besides, the gap between a brand-new rig and an older truck may not be as wide as you think."

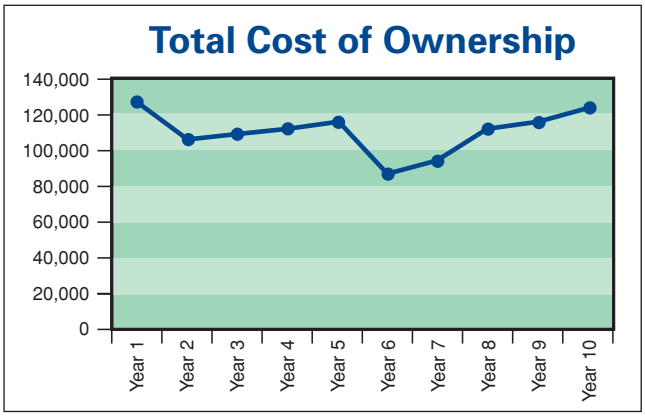
Nayanar looked at total cost of ownership (TCO) and found fuel the most expensive part of running a vacuum truck. At $3/gallon, diesel never accounts for less than two-thirds of operating costs.

The problem is that older trucks use more fuel than newer trucks. As motors and blowers wear and go out of tolerance, they need more fuel to do the same job. A truck that consumes 13 gallons/hour in year one will often end up consuming nearly 16 gallons/hour in year seven and nearly 19 gallons/hour in year ten.

That's enough to boost average fuel bills from roughly $81,000 in year one to $99,000 in year seven and $116,000 in year ten.

How does that play out on a vacuum truck that costs $215,000? Assume the operator puts down 10 percent ($21,500) and a trade-in drops the cost of the truck to $175,000. The operator finances this at 9 percent for five years ($33,500/year). He receives $25,600 depreciation (worth a $9,700 deduction at 38 percent tax rate) for seven years.

The first year, TCO equals the down payment, routine maintenance, finance charge, and fuel minus depreciation. It comes to $127,400 (including $81,000 for fuel). The second year, with no down payment, TCO falls to $106,955 ($82,000 fuel).



Without finance charges, TCO drops to $87,600 and $93,200 in years six and seven. But without depreciation in year eight, TCO jumps to $109,500 ($104,000 fuel). That's higher than it was in year two, and it keeps rising after that.

Nayanar's estimate does not include the cost of a major maintenance service. Most vacuum trucks don't need them early in their life, but bearing repairs and blower rebuilds become more likely as trucks age.

At the same time, truck values decline with each passing year. At trade-in time, owners receive less credit and must put down more cash towards a new vehicle.

Buying a new truck after seven years has intangible benefits that are harder to quantify. "New trucks are more reliable and have less downtime," says Nayanar. "Even well-maintained trucks suffer from productivity declines as parts wear and go out of tolerance. With a new truck, your crew works more efficiently and gets the job done faster."

Finally, there's image. "If your equipment looks new and well-maintained, customers and potential customers think you are a first-rate operation," says Nayanar. "Sure, it's unfair that people judge on appearances, but we all do it. So why not make those appearances work for you?"

"If you bought your Guzzler before 2000, your operating costs are going up while your intangible benefits and trade-in value are going down," says Nayanar. "Maybe now is the time to consider a trade-in."

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Certified Revives Vacuum Trucks – continued

currently available, but buyers will have a broad range of offerings from which to choose," Grant explains.

Fill it up right. Since June, refineries have been producing ultra-low-sulfur diesel, which has only 15 parts per million (ppm) of sulfur compared with 550 ppm in ordinary diesel. This will reduce the amount of sulfur that turns into tiny droplets of airborne sulfuric acid in the exhaust.

Sulfuric acid is not good for anyone's lungs, and it damages expensive diesel particulate filters. Without ultra-low-sulfur diesel, they will require premature maintenance and even replacement. Operators must also use low-ash/low-sulfur engine oil (SAE CJ-4), which has no more than 1 percent ash content. It will be available in all the usual weights on January 1, 2007.

Don't expect everything at once. Manufacturers will begin rolling out new 2007-compliant products after the first of the year. "Not every configuration of fuel tanks, ATDs, and frame options will be available on January 1," warns Grant. "Still, customers will have plenty of choices from day one, with more to come as the year goes on."

Determining the Right Speed to Convey Material

by Phil Stein

One of the most common questions in air moving is, "What is the correct speed to operate my blower?", or "How fast do I run my machine"? It is probably the most difficult question to answer. Too many material and job condition variables affect performance to give a simple answer.

In difficult applications, most machines probably operate at or near "wide open" in hopes that more RPM and horsepower will overcome problems created by poor job setup or lack of proper application knowledge. For some materials, that is the worst thing an operator could do.

Take fly ash, for example. Running at full throttle can exceed the maximum conveying velocity, the speed that moves the material fastest and still allows separation to occur in the tank. While running wide open might produce good results in the beginning, it creates problems as the material fills the tank and reduces the internal space used for particle separation.

As the same amount of air passes through this smaller space, it increases the velocity of the ash. Dust just can't fall out of the turbulent air stream. Instead, it begins to fill or clog the cyclone and baghouse chambers. We now have a common problem called "carry-over." The operator will probably need to shut down and go to the dump with less than a full load before returning to optimum productivity.

"What is the correct speed to operate my blower?"

"How fast do I run my machine? "

Larger hoses can accentuate carry-over. It takes more airflow (and blower RPM) to convey material in a large hose. Let's say an 8-inch hose was used for a job that could have used 4-inch hose. Using a 4-inch hose (which must be the same diameter from the truck to the end of the hose), you could theoretically operate the blower four times slower, still reach the same hose velocity, and eliminate much of the carry-over.

Of course, you can't expect to operate an 1,800 RPM blower four times slower (450 RPM) on a one-to-one transfer case. The engine doesn't idle that low. But you could shift the transmission to a lower gear to slow the blower. This keeps the engine in its proper torque curve. You'll still do the job, save $3/gallon on diesel, and reduce wear on your machine, hose, and hose handler.

Correct hose sizing is important, but smaller is not always better. Most of the time, smaller hoses and lower RPM is better if the setup is right. High-velocity air moves many materials easily, and you'll probably avoid trouble if the material does not inhibit the machine's filtration system.

What about low-air-flow applications that require maximum vacuum, like submerged hose ends in thick or viscous liquids. These may require from 27 to even 28.5 inches of mercury. As the mercury rises, less and less air flows through the blower and the entire vacuum system. At the same time, the blower requires more and more horsepower, and higher RPM creates air flow but not necessarily inches of mercury.

If you don't need the air flow but need the vacuum, why run the blower any faster once the vacuum gauge indicates 28 inches Hg? You can't slow the truck engine and still keep it operating in its horsepower and torque range without the risk of killing the engine and spinning the blower backwards. Instead, go to a lower gear, say fifth or sixth, and bring the engine to 1,500-1,800 RPM (depending on your engine specification).

You must also use the right hose, one as large in diameter and as short in length as possible. Viscous liquids move much more easily through a wider hose — up to 9 times faster in an 8-inch hose than a 4-inch hose.

Phil Stein has held positions in operations and sales of industrial and municipal vacuum and pressure-cleaning equipment since 1969. He is currently a strategic accounts manager with Federal Signal.

How Fast?

Remember these factors on your next job and see if you get better results:

- Do I need air flow or inches of mercury?
- Will the material affect my filtration system?
- What's the right hose diameter and length?
- Should I use a transmission gear range or high gear?
- What is the slowest blower (not necessarily truck engine) speed that effectively moves the material?

Industrial Vacuum Contractors Plan Association

Industrial vacuum contractors met with the WaterJet Technology Association (WJTA) in Chicago on August 22 to create safety practices for industrial vacuum training and operations, and to address other industry issues.

The association will develop recommended practices; address such critical issues as grounding, bonding, tank tests, and equipment integrity; improve training; and involve chemical, power, pulp/paper, steel, and other customers in setting standards.

Bill McClister, a vice president at Veolia Environmental Services, said that an association could help build up the vacuum side so it has greater value for customers.

Vactor/Guzzler Sales Director Tony Fuller agreed. "This business is a science," he explained. "If the perception is that we are at the low end of the industry, then we need to change that. An association helps to drive those expectations."

What will recommended industrial vacuum safety processes cover? Participants discussed potential items ranging from offloading, personal protective equipment (PPE) and liquid vs. air practices to temporary repairs, confined space safety, grounding, tie-offs, hose selection, secondary venting, and operations around methane.

Recommended practices will likely cover hearing protection, fall protection, the difference between wet/dry operations, dumping issues, and the use of accessory equipment around vacuum trucks.

The group formed a committee to produce a complete draft of recommended guidelines by the beginning of January 2007. It will then meet on February 6, just before the opening of the Cleaner Pumper Show in Nashville, to review the draft. The group hopes to present the final document to the WJTA board at its August 2007 meeting.

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