

Component Coverage

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FlowBelow

Aerodynamic



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Saving fuel with aerodynamic products

When running a heavy-duty fleet, there's no such thing as small savings. Even a seemingly small percentage of fuel economy saved can add up to thousands of dollars and be the difference between a profitable fleet and one that lags behind the competition. That's why a large variety of aerodynamic products are available to help fleets save in small ways.

A heavy-duty truck moving at highway speeds is bound to experience a great deal of wind resistance, and mitigating it in any small way can be very valuable. From side skirts and gap fairings to wheel covers and rear fairings, tractor and trailer aerodynamic products aim to reduce drag from wind resistance as a truck heads down the highway and, ultimately, improve the fuel economy of the fleet.

Before investing in this technology, a fleet has to know whether it's going to be worth it based on its application. Charles Fetz, vice president of design and development for Great

Airtab



Dane Trailers, explained what a customer's thought process should be when thinking about aerodynamics: "If I was the customer, I would be thinking about two things. First: Do I have enough time at high speeds for this device? And second: Do I have a suitable application for return on investment without it needing to be repaired or maintained?"

"For a lot of trucks running regional- to long-haul application, it's pretty straightforward," Fetz continues, "but food service trailers and short-haul vehicles are not buying aerodynamic solutions."

"Long haul trucks running at 62 to 65 MPH for the majority of the time will see the most benefit," agrees Andy Acott, sales manager for Laydon Composites. "Slow speed, short runs still see a benefit, but not as much."

"Although there are a number of devices on the market today, trailer side skirts and low-rolling resistance tires have proven to be most effective, and as a result they are

the most adopted by U.S. fleets," says Brian Fanelli, director of sales for Wabash composites.

There are a wide variety of aerodynamic products available for use with tractors and trailers, all with different benefits and features. We asked the makers of each of these products to highlight their uses and benefits, particularly when it comes to fuel efficiency, as all these different products have different savings and benefits to offer.

Tractor products

FlowBelow manufactures the tractor-mounted AeroKit, which consists of quick-release wheel covers and a pair of tandem fairings that work together as a complete aerodynamic system to address the complex air flow around the exposed rear wheels of the tractor.

"In general, the efficiency benefits from aerodynamic devices are additive, so fleets can benefit from utilizing multiple technologies to



Andersen Flaps

gain maximum efficiency and savings," advises FlowBelow President Josh Butler.

Aeroserve Technologies are the makers of the Airtabs, a small device that creates twin vortex trails that combine to reduce base pressure drag or the vacuum that exists at the rear facing surfaces of the vehicle.

"The addition of Airtabs to any vehicle has no downside and will not make a poor handling worse," says Kent Smerdon, vice president of international marketing for Aeroserve. "Airtabs will not degrade the vehicle's operation, safety or stability in wind or weather; they can only improve it."

In terms of the fuel savings of any

one aerodynamic device, Smerdon says he would be wary of promises exceeding 10%. "Short of a drastic redesign of the entire tractor-trailer combination, including radical changes in the way loading and shipping is done (almost always from the rear), there is only so much aerodynamic improvement one can accomplish with an 18-wheeled, 80,000 lb. box that travels all day through air at 60 to 70 MPH," he points out. "There is a limit. You can hide the stacks and breather and sculpt the mirrors all you like...it all helps, but it's still a big truck that rolls on 18 big wheels."

Trailer products

Stemco manufactures the TrailerTail family of products, which reduce aerodynamic drag and streamline airflow at the rear of the trailer, as well as EcoSkirt side fairings, which reduce aerodynamic drag on the bottom of the trailer where air hits the trailer's rear axles.

The company says it gears the



TrailerTail products toward reducing fuel consumption and providing safety benefits, including reduced side-to-side sway and improved visibility in the rearview mirror.

"Installing TrailerTail alone saves 5% of the vehicle's fuel when traveling at highway speeds, which equates about 0.3 to 0.5 miles per gallon in real-world applications," says Jeff Grossmann, engineering manager of aerodynamics for Stemco. "When fleets want to calculate their expected fuel savings per

year with aero devices, they should always look at the total number of miles they drive at highway speeds, not their percentage of time spent at highway speeds, because engines burn substantially more fuel per minute at higher RPMs."

Laydon Composites offers a total of seven Smartway EPA approved aerodynamic devices for trailers, consisting of various trailer skirt models and gap fairings.

"The gap fairings, when mounted on the nose of a 53 ft. trailer or two



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pup 28 ft. trailers, reduce the distance between the back of cab and front of trailer," Acott explains. "In a cross wind, large amounts of turbulent air pass through this gap causing tremendous drag on the trailer. The gap fairing prevents air from passing through the gap." Acott went on to say that all Laydon skirts are EPA certified at 5% minimum fuel, but that testing has shown up to 6.4% for just a skirt and 11.75% with skirts, gap fairings and wheel fairings. The gap fairings have consistently measured 1% fuel savings at both track and wind tunnel tests.

Fleet Engineers offers four different products in the aerodynamic field: AeroSaver, its fiberglass reinforced poly side skirt; AeroSaver Classic, its aluminum trailer side skirt; the AeroPan trailer belly panel, which helps increase fuel economy by reducing drag on the underside of the trailer while protecting the cross-members in the event of a tire

blow out; and AeroSlipper Quarter Fenders, which help reduce drag by eliminating the full length tube typically located across the width of the fender.

Each of these devices adds between 1 and 6% fuel economy but, Gary Roberts, business development manager for Fleet Engineers warns that "a fleet manager can't just add all these devices and expect to get 18% savings. They all work together to potentially give you half that savings."

Barry Andersen is the president of Andersen Flaps, which makes the Eco-flaps splashguard that reduce drag and cut fuel consumption on both tractors and trailers, as he explains, "By reducing the heavy road spray in inclement weather, Eco-flaps effectively increase visibility, both for truck drivers and passing motorists. Eco-flaps also withstand the stress of high wind and side wind better. Within

one month of fuel savings, Eco-flaps have been proven to pay for themselves."

Wabash National offers five trailer aerodynamic devices: two side skirts, the DuraPlate AeroSkirt and the AeroSkirt CX; a side skirt alternative, the Ventix DRS (drag reduction system); and two tail devices, the AeroFin Tail Device and the AeroFin XL. These products can be used individually or combined for additional fuel savings.



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"Stand-alone devices available on the market yield anywhere from 1% to 8.9% improvement in fuel economy," says Wabash's Fanelli. "With SmartWay Elite device combinations, however, a fleet can save 9% or more in fuel usage at highway speeds."

Great Dane offers a wide variety of aerodynamic products, including undertray devices, boat tails and gap fairings, as well as side skirts, which is its main aerodynamic offering. While these aerodynamic solutions can be very helpful for fleets, Great Dane's Fetz advises customers not to let their expectations for fuel savings get too high. "From what I've been told by representatives of some of the biggest fleets, in a real-world situation, a truck with get about



Wabash's Ventix DRS

half of what the test numbers will claim," he relates. "That's not because the device isn't doing its job, but because the real-world drive cycle is different, full of stop and starts, traffic issues, etc., so the drive cycle's going to have different results than a 65 MPH test."

Weighing options

Some may question whether the weight of aerodynamic components can be a burden on the trailer. (A set of skirts, for example, typically weigh about 175 lbs.). While that's a valid concern, the benefits still outweigh

the costs. "The weight of a trailer skirt doesn't affect a truck's fuel efficiency much—it is a factor, but a small one," Great Dane's Fetz says.

"In most cases, the drag reduction and fuel savings benefits of aero devices far outweigh the 'cost' from the added weight of the devices, subject again to the average mileage and speed the fleet is running in its operation," FlowBelow's Butler says. "Aero manufacturers generally make every effort to keep the device weights to the minimum required to deliver the highest functionality, efficiency and durability."

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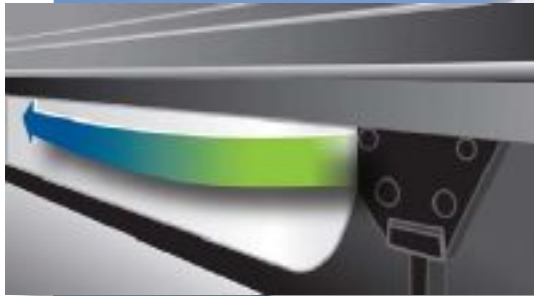
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The Stemco TrailerTail.

"The weight addition is low enough that in the event that the trailer happens to be at max weight, the benefits should offset the weight increase," agrees Fleet Engineers' Roberts. "Removing 200 lbs. of freight to gain 5 to 6% in most cases makes economic sense."

What the future holds

So what innovations are coming to the world of trailer aerodynamics? Our surveyed experts had a plethora of ideas about what might be com-

ing to this segment down the road.

Laydon's Acott mentions the possibility of larger trailer skirts and more use of boat tails; Andersen talks about the growing number of customers who combine Eco-flaps with other aero devices; and Aeroserve's Smerdon hopes that the coming innovations will "closely examine device life cycle costs, weight and safety. The limits for aerodynamic improvement on the basic trailer 'as-is' are rapidly approaching and until it is redesigned, the limit may

have been reached already."

"We could see higher efficiencies, especially with GHG Phase II and the EPA SmartWay program coming," Great Dane's Fetz suggests. "We might also see greater durability, although these devices are already pretty durable. It's also possible we could see more solutions for the rear of the trailer, although that presents its own set of challenges."

"You are starting to see trailer manufactures using more adhesives. This allows them to eliminate some rivets down the side of the trailer. The rivets all create drag. I also think you will see some trailer manufactures start to cover up the cross members to reduce the drag," Fleet Engineers' Roberts says.

"Fleets will see more tractor-trailer design integration from the outset with the OEMs," Butler of FlowBelow predicts. "The tractor and trailer should be viewed as a total system and the aerodynamic and other fuel efficiency enhancements added should be engineered to optimize the 'system' as a whole. Thus, more and more currently available aerodynamic 'add-ons' will be incorporated into the tractor and trailer design and engineering from the factory versus added later as aftermarket items." ▀

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