



Polar Uses Engineering Technology, Aerodynamics to Help CVI Improve Fuel Economy with its Pneumatic Bulk Tankers

Like most truckers today, Ryan Viessman knows that a more streamlined tractor-trailer can improve fuel economy and sweeten the bottom line. Trouble is, Viessman's company doesn't operate the same equipment as most truckers.

Viessman is director of operations for Cliff Viessman Inc. (CVI), a Gary, S.D., trucking business with 70 pneumatic bulk trailers that haul refined sugar, flour, and starches from shippers throughout the Midwest.

Side skirts and other fairings—so effective at improving the aerodynamics of dry vans and refrigerated trailers—generally aren't practical for pneumatic bulk trailers. They're hard to install without interfering with access to piping, outlet valves, and other equipment, and they can add several hundred pounds to the weight of the vehicle.

"Bulk fleets everywhere face the same problem," Viessman says. "How do we bring aerodynamic improvements to the trailer that are simple and low cost, have zero impact on our operations, and require little or no maintenance?"

The company challenged its long-time trailer supplier, Polar Tank, to find the answer.

Trailer aerodynamics directly affect your total horsepower needs and, therefore, your fuel economy, says Duane Plumski, Research & Development Engineer, Polar Tank Trailer. The typical van or refrigerated trailer accounts for 65 to 75% of a tractor-trailer combination's total aerodynamic drag.

"A pneumatic trailer is more streamline than a flat-fronted trailer, but there are elements like external rings, handholds, and piping that disrupt the airflow," Plumski says. "We analyzed virtually every aspect of the trailer to see what we could do to reduce the aerodynamic drag and potentially improve fuel economy without affecting capacity or operations."

He and Polar engineers put their 3D modeling tools to work.

"With our software, we can design, visualize, and simulate the trailer's drag effects before it's built," Plumski notes. "We can predict how design changes will affect not only fuel economy but the strength, durability, and operation of the vehicle."

Eliminating Sources of Drag

To improve aerodynamics, Polar engineers first focused on the overall shape of the trailer, starting with the front face.

The front of a trailer accounts for approximately 30% of its aerodynamic drag. Polar engineers lowered the tank's front end-cone and tipped it forward slightly to reduce the profile and soften the impact of air coming over the tractor.

They also reduced areas along the trailer that disrupt the air flowing over the trailer.

One obvious source of drag: the external side rings, which wrap vertically like ribs around the aluminum tank. The benefit of external-ring bracing is a smooth interior; in contrast, a trailer that's smooth on the outside will have struts inside the tank for structural support.



“In our experience, cleaning trailers with internal ribs is a major issue,” says Joey Viessman, who manages the company’s fleet in Renville. “Product collects around the bracing and makes it hard to unload or clean out.”

Plumski says his engineering team made sure those transition points between the internal ribs don’t hinder the ability to empty the trailer completely.

“Our priority was to ensure that no change would alter the capacity of the tank, the distribution of the payload, or the ease of loading or off-loading product,” he says. “We preserved the round sloping interior surfaces and designed the ribs so that the trailer will empty cleanly but you get the aerodynamic benefit of the smooth exterior.”

Delivering Results

To date, CVI has two aerodynamic pneumatic trailers from Polar and has ordered four more. They haul an average 55,000-pound payload on round trips of 500 miles a day behind day cab tractors.

The result: all things being equal, the new Polar trailers average roughly 0.3 mile a gallon better than the externally ringed trailers.

“Customers notice and appreciate it when you’re taking steps to get better fuel economy,” Ryan Viessman says. “We’ve lowered our governed speed. We run wide-base tires. We’re EPA SmartWay designated.”

“We want to see that same commitment from our suppliers, even a supplier like Polar that we’ve been using for years and years. When we sat down and said fuel efficiency is a priority for us, they came up with a response that’ll be good for anyone who’s running dry bulk trailers and trying to manage their fuel costs.”