Aerodynamic "Plasma Actuators"

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What Is A “Plasma Actuator”?

The “Plasma Actuator” is an electrical device designed to reduce the aerodynamic drag of a vehicle by altering the pattern of airflow. The concept has been in development for many years and has already been proven in the fields of aeronautics and space science. Plasma Actuators have been designed, in partnership with the University of Glasgow, to mimic the effect of a standard physical boat tail.

Studies on standard physical boat tails have found that up to 7% in fuel reduction can be achieved and plasma actuators are expected to generate similar fuel savings. However, many operators are unwilling to invest in standard physical boat tails due to the high risks of damage and associated costs to repair.

What Does This Mean To Your Operation?

“One standard tractor/trailer combination travelling 60,000 miles in a year at an average of 10mpg will consume 27,277 litres of diesel and create 84 tonnes of CO_2 at a cost of over £22,094*.

Based on a fuel saving of 7%, the “Plasma Actuator” system would save you £1,445 a year.

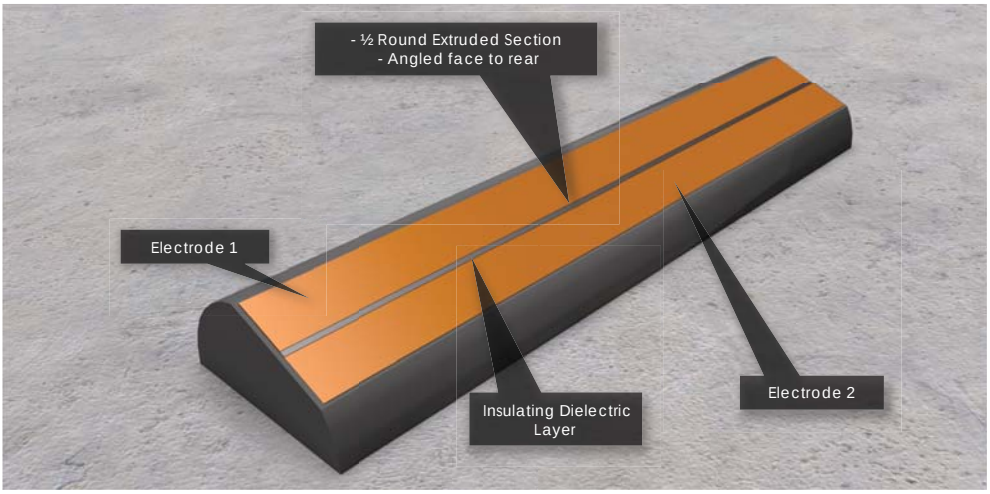
* Based on 81 pence per litre.

Key Features & Benefits

- Fuel savings of up to 7%
- Instant activation
- Has no effect on length of trailer
- Does not affect internal cubic capacity
- Extremely durable
- Can be easily retrofitted

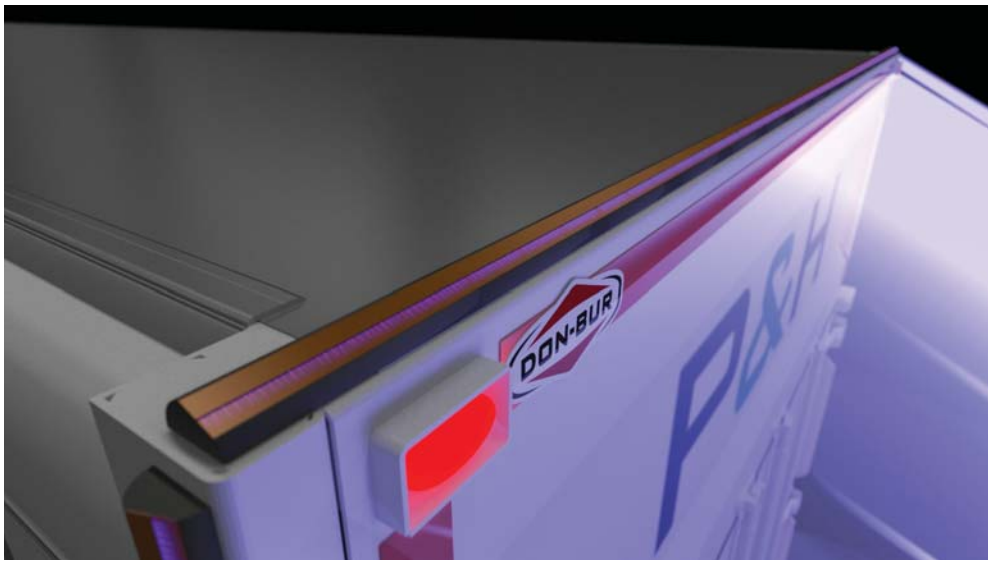
Plasma Actuators are intended to offer transport operators a simpler, more durable solution than boat tails. They do not increase the overall length of the trailer and do not have any negative effect on internal cubic capacity. Furthermore, they are much less susceptible to damage than physical boat tails.

Plasma Actuators are comprised of two electrodes separated by an insulating 'dielectric' layer and are placed strategically along the top and sides of the rear frame of the trailer, where it is expected to be at its most effective.

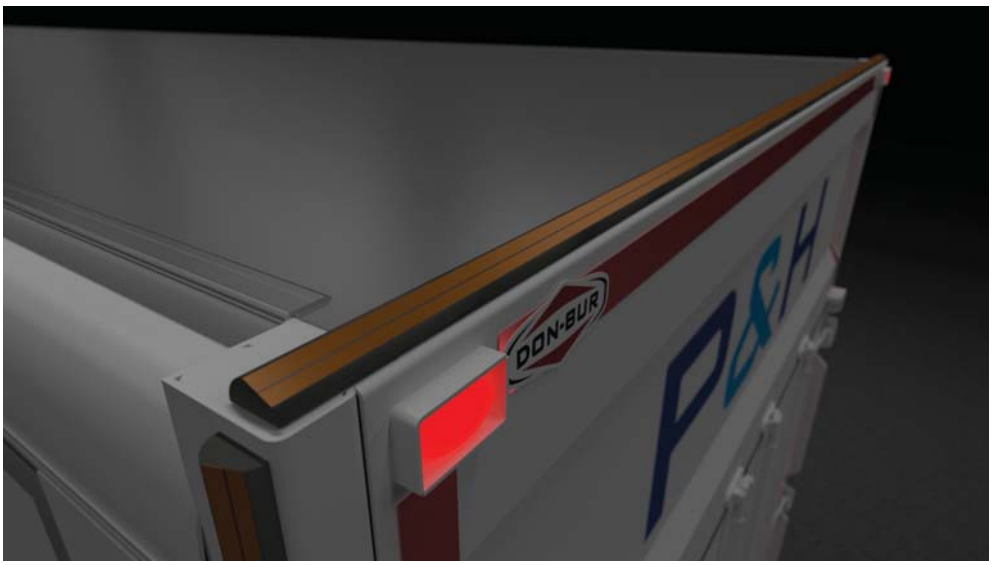


The amount of power required to run Plasma Actuators is extremely low (circa 30W dependent on length) and thus could be powered by a simple trickle charged battery or even a small solar panel fitted to the roof of the vehicle.

How It Works

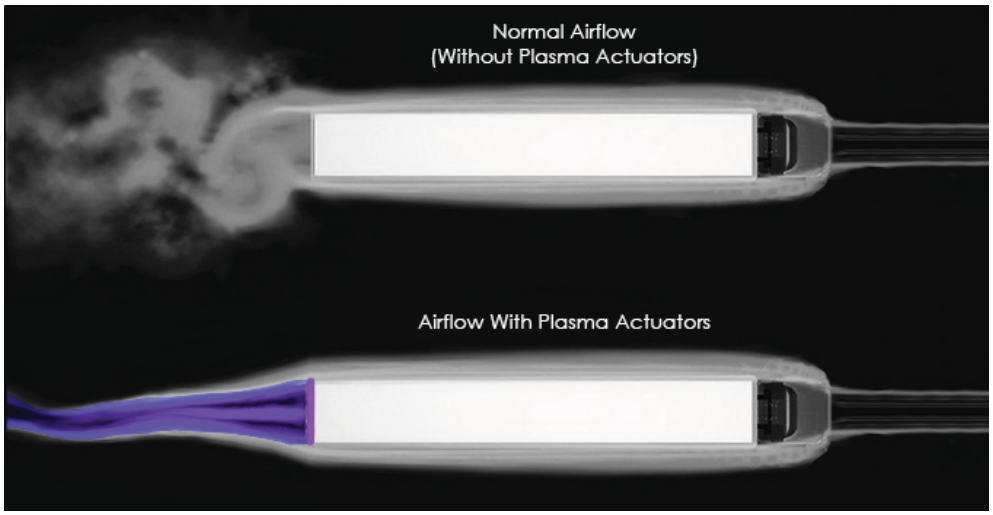


The Plasma Actuators are positioned at the end of the trailer along the sides and top of the rear frame and are angled inwards and downwards, respectively. Once activated, the resulting airflow is up to 10 m/s, then to avoid any discomfort to pedestrians, they are deactivated by a speed sensor once the vehicle reaches less than 10mph.

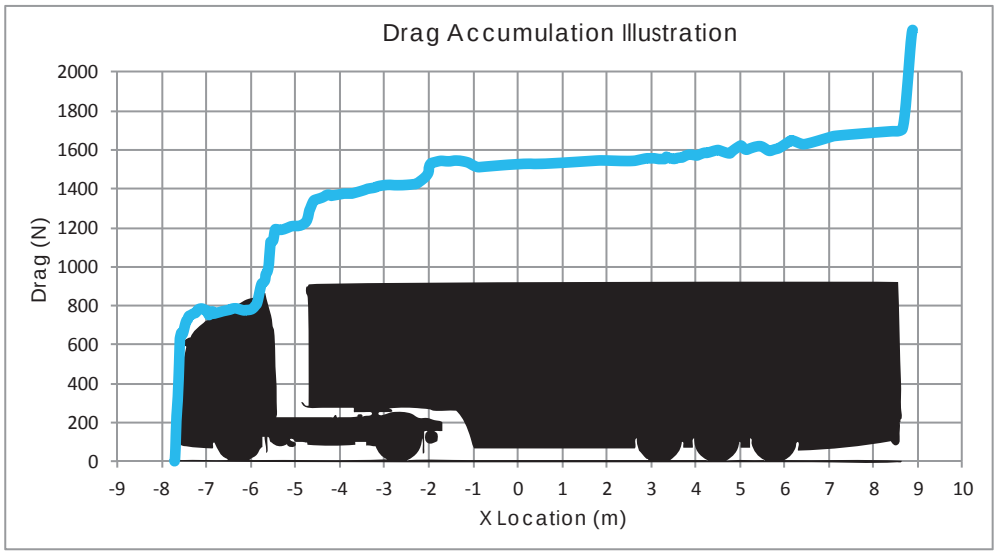


Due to a standard trailers box-like shape, there is a sudden 90 degree angle at the rear of the trailer, where separation occurs and "good" boundary layer airflow breaks down into chaotic turbulence. The resultant pocket of low pressure created at the rear literally "sucks" the trailer back; increasing fuel consumption. This area accounts for around 25% of total aerodynamic drag on a tractor trailer combination and although aerodynamic drag can not be eliminated completely, manipulating the airflow can contribute significantly to reducing it.

Plasma Actuators fitted to the rear direct the airflow inwards and downwards (see below) into a more controlled fashion. This reduces the build up of turbulence; ultimately reducing aerodynamic drag and, in turn, improving fuel efficiency.



As part of Don-Bur's ongoing approach to providing aerodynamic, fuel saving solutions, further studies are ongoing to determine potential benefits as a result of positioning plasma actuators on additional areas of the trailer.



Thank You

If you have any questions about this document, or would like to discuss your operational requirements, please call the Don-Bur sales department on 01782 599 666.

Established in 1981, the Don-Bur Group has become internationally recognised for its innovative development of trailers and rigid vehicle bodies, designed to minimise operational costs and increase efficiency.

Don-Bur has committed to research and develop solutions with primary focus on aerodynamics and optimum utilisation of available cubic capacity.

Based in Stoke-on-Trent in the West Midlands, Don-Bur has a 500 strong flexi workforce and generates a group annual turnover of £50 million. Vertically integrated divisions include an 18 acre primary manufacturing site, curtains and load restraint division, graphics house and two after-sales service sites (repair, servicing, refurbishment and ATF Station).

The comprehensive structure provides a complete and fully accountable solution for clientele, catering for all commercial vehicle needs throughout their lifespan.