

Reducing Emissions: Aerodynamics and Loading



Reducing aerodynamic drag and vehicle weight make significant contributions to fuel efficiency.

Weight is particularly relevant when it comes to stop-start driving, such as in urban traffic.

The faster a vehicle travels, the more critical aerodynamics become.

Remove excess weight from your vehicle

The amount of fuel required to accelerate a given vehicle is proportional to the vehicle's weight. The heavier the load, the more fuel used. While it varies, carrying another 250 kg adds about 1 L/100km.

Increased weight also causes increased flexing of the tyres. More rubber on the road means more rolling resistance to overcome and more fuel used. ¹

Losing weight

- When buying, leasing or renting a vehicle, match it to your needs. Don't choose an oversized vehicle.
- Remove unnecessary loads from the vehicle, e.g. tool boxes, golf clubs and other portable equipment.

- Evenly distribute the weight over the axels to help maintain equal contact with the road. This may help to reduce overall rolling resistance.
- Tyres should be inflated to the correct pressure and rated for the load being carried. Heavy loads and touring may require you to adjust tyre pressure.

Aerodynamic drag

Aerodynamic drag is the braking affect of air on the vehicle. A vehicle consumes fuel to overcome this load. The greater the drag, the more fuel is burned.

Aerodynamic drag is proportional to the frontal area of a vehicle and depends on how "boxy" the vehicle's shape is. The size, shape and speed of a vehicle, and its accessories, determine aerodynamic drag.

Aerodynamic drag at any given instant is proportional to the square of the vehicle's speed. Doubling the speed from 50km to 100km increases drag by four times. At highway speeds, aerodynamic drag may account for more than half of all fuel use. Reducing drag, therefore, becomes critical to reducing fuel use.

Further information:

Email: DPTI.LowEmissionVehicles@sa.gov.au

Web: www.lowemissionvehicles.sa.gov.au



Government of South Australia

Department of Planning,
Transport and Infrastructure

Reducing Drag – Light Vehicles

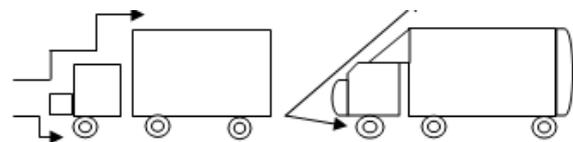
- Remove protruding accessories such as roof racks, bike racks and towing mirrors when not in use. If the entire unit can't be removed, at least take off any cross bars to reduce the frontal area, which causes drag.
- Store rooftop luggage boxes when not required.
- When using racks, place items on the roof so that the smallest face of the pieces face forward. Lowering the front facing area reduces drag.
- Ideally, the leading face of additional loads or racks will be streamlined. Flat faces increase aerodynamic drag for a given frontal area.
- When driving on the highway keep windows rolled up to reduce drag. Using the air conditioner for comfort is likely to be more fuel efficient (see *Ecodriving: Smart Use of Air Conditioning*⁶ for more information).



Reducing Drag – Heavy Vehicles

- Overcoming drag consumes more than half the energy used by heavy vehicles at high speed.

- Drag can be reduced in heavy vehicles by bridging gaps in the overall shape (e.g. between a cab truck and its trailer) or introducing geometry changes to any forward facing surfaces of both the truck and the trailer.⁶
- Before purchasing after market devices to reduce drag or fuel consumption, make sure the maker's claims have been independently verified. Consider the cost of installing the device and how long the payback



Bad aerodynamic shape

Good aerodynamic shape

period will be.

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See Also:

- [Reducing Emissions](#)
- [Reducing Emissions: Vehicle Emission Types](#)
- [Reducing Emissions: Why Reduce Emissions?](#)
- [Reducing Emissions: Vehicle Selection](#)
- [Reducing Emissions: Vehicle Use and Operation](#)
- [Reducing Emissions: Refuelling / Recharging](#)
- [Reducing Emissions: Maintenance and Tyres](#)
- [Reducing Emissions: Low Emissions at Low Cost](#)
- [Reducing Emissions: Offsetting Emissions](#)
- [Ecodriving: Smart Use of Air Conditioning](#)

External Links:

- [Truck Buyers Guide](#)

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