



tow vehicle set up guide



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Factors Affecting Towing, Weights and Tow Vehicles

Boating is a great activity that the whole family can enjoy. To ensure safe driving conditions and optimum towing performance, it is important to correctly set up your boat and trailer package. It is the trailer owner's responsibility to ensure that the appropriate towing set up, load distribution, and tow vehicle are used for safe and legal towing.

Tow vehicles vary in capacities and attributes and these variances must be taken into consideration when towing trailers. Please take the time to check your trailer to vehicle setup to ensure safe towing. Failure to correctly set up your towing package can negatively affect your towing performance. If in doubt, refer to a towbar/suspension/towing specialist.

This towing guide should be read in conjunction with your vehicle, trailer and tow bar owner's manuals.

i. Definitions:

Axle Group: Combination of all load bearing axles.

Tow Ball: Vehicle side of coupling assembly. The rating of the tow ball can be found on the top of the ball. Non rated tow balls should not be used.

Tow Bar Tongue: Platform that links the tow ball to the towbar. In heavy duty applications the tongue can be adjustable in height or can be inverted to adjust the tow ball height.

Weigh Bridge: Location/facilities where cars, trailers, trucks can be accurately weighted.

Tongue Weight [TW]: Weight transferred from the trailer onto the Tow Bar Tongue (via the tow ball) of the tow vehicle. This is also known as Ball Weight.

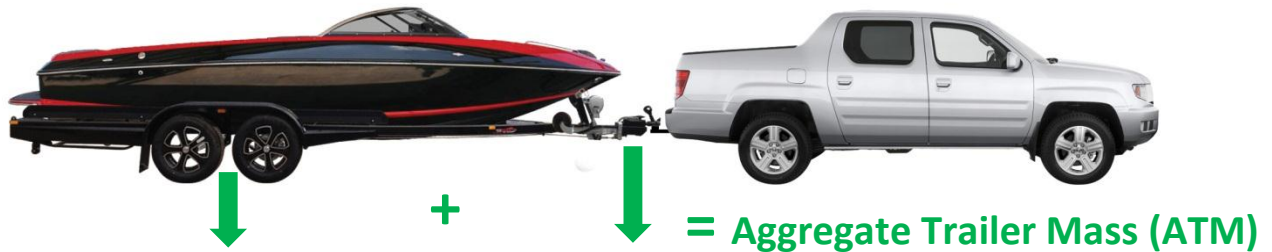


Gross Trailer Mass [GTM]: *Actual* weight of the trailer package **measured at the axle group only** (i.e. weight transmitted through the axles when coupled to the tow vehicle). The GTM figure on your trailer's Vehicle Identification Plate (Vin Plate), is the **maximum permitted GTM** of the trailer.



You must ensure that the total weight of the boat, engine, gear and trailer do not exceed the maximum permitted GTM at the wheels and the maximum permitted ATM overall.

Aggregate Trailer Mass [ATM]: *Actual* weight of the trailer package **OVERALL** (i.e. total weight transferred downwards GTM & TW – or total weight not coupled to the tow vehicle). The ATM figure on your trailer's Vehicle Identification Plate (Vin Plate), is the **maximum permitted ATM** of the trailer.



Do not tow the boat with water in the ballast tanks/bladders or excessive gear/lead etc... Always empty the contents or the tongue weight will be incorrect and GTM, ATMs and/or other limits may be exceeded. This may also result in the improper distribution of the weight on the trailer.

ii. Tow Vehicle Ratings

Your tow vehicle must be capable of towing the combined masses of the trailer, boat plus any equipment and fuel that it carries.

The **towing capacity** and **tongue weight rating** for most vehicles is found in the vehicle's handbook and should always be referred to. You must not exceed the towing limits specified by the vehicle manufacturer.

The tow **bar** rating and tow **ball** rating is normally found on the tow bar, or on a sticker placed on the side face of the driver's door near the door catch.

The **tow bar** and **tow ball** fitted to your vehicle must have the correct capacity equal or higher than the package you are towing.

The **Tongue Weight (down force) rating of your tow bar** must be equal or greater than the Tongue Weight (down force) of your trailer package – your specific vehicle set up and other factors (especially tow ball *height*) will vary the tongue weight.

Generally speaking, the bigger the boat the larger the tow vehicle/tow bar rating is required.

1. Larger Boat/Larger Car



2. Smaller Boat/Larger Car



3. Smaller Boat/Smaller Car



4. Larger Boat/Smaller Car



iii. Boat Trailer Package

Tongue Weight

The tongue weight (down force) is the weight that is transferred on to the car tow ball from the trailer. Most people will be familiar with the towing capacity of the car or tow *bar* itself; but not so familiar with the Tongue Weight Rating. It is however a key factor in how your trailer tows and your car performs.

Measuring Tongue Weight

Tongue weight can be measured by placing a set of heavy duty scales under the coupling at its normal ball height. If heavy duty scales are not available the tongue weight can be obtained by using a public weigh bridge however this method requires the trailer to be weighed twice. The first weigh is with the trailer and load disconnected from the tow vehicle and standing alone on the weigh bridge (*actual* ATM). The second weigh is with the trailer and load coupled to the tow vehicle and only the trailer axle group on the weigh bridge (*actual* GTM). The difference between the two weights is the Tongue weight.

As a rule the tongue weight should be between 5% and 10% of the combined weight of the *actual* tow package (**ATM**). You must also be aware however, that some car and towbar manufactures' can recommend a Tongue Weight range different to this industry standard.

Example of Tongue Weight Calculation

Weigh No. 1	2400kgs (<i>Actual</i> ATM weight)
Subtract Weigh No. 2	2200kgs (<i>Actual</i> GTM weight)
Difference	200kgs (Tongue weight)

Tongue Weight Percentage Calculation

$(\text{Tongue Weight} \div \text{Actual ATM}) \times 100 = \text{TW} \%$

$(200 \div 2400) \times 100 = \mathbf{8.33\% \text{ Tongue Weight}}$ which is within the industry standard

Factors Affecting Tongue Weight

Position of the boat on the trailer.

By moving the boat forward or back on the trailer your tongue weight will change.



Moving the boat further forward will **increase** TW.



Moving the boat back will **decrease** TW.

Stowage of gear in the boat.

Your boat should **not** be used to transport heavy items such as camping gear and wake ballast. An allowance has been made for the boat to carry normal water sport items and these should be placed in the boat over the axle group.

- i) Items placed forward in the boat will increase the TW.
- ii) Items placed at the rear of the boat will lighten the TW.



Be Aware! Your trailer is not rated to carry excessive gear such as camping equipment etc...

Tow ball height.

Your tow ball height should be such that the trailer sits level **when fitted** to the tow vehicle. As a guide the centre of the tow ball should be between 400mm and 450mm from the road surface when measured on level ground **with the trailer on the vehicle. THIS IS OFTEN GIVEN LITTLE ATTENTION YET IS A SIGNIFICANT FACTOR.**

Large boats with large Tongue Weights may compress the tow vehicle's suspension. In these instances, suspension upgrades, adjustable height tow balls or other towing upgrades may need to be considered to ensure a level trailer-to-vehicle connection. Similarly, **any** car with soft suspension will have their towball height decreased under load, and this will affect TW.





Increasing the ball height will **increase** the TW



Lowering the ball height will **decrease** the TW

As these factors are variable, it is the responsibility of the vehicle owner to ensure their vehicle is capable of towing their boat and trailer package; and at a level height; and any additional load is not excessive. A tongue height of a vehicle is an area that may need expertise from towing/suspension specialists.

Fuel level.

Most centre mount engine boats have a fuel tank located at the rear of the boat. The amount of fuel in the tank will greatly affect the tongue weight.

- i) A full tank of fuel will lighten the TW.



- ii) Lower fuel levels increases the TW.



V Drive or rear engine mount boats generally have a fuel tank located above the axle group and as a result the fuel level does not affect the Tongue Weight as significantly as centre mount boats.

Outboard Boats/Fish Sports Trailers

Generally speaking, boats with Outboard Motors fitted to them are matched to our Fish and Sports Range of trailers. The Outboard Motor creates a large variable load at the extreme rear of the package that varies from dealer to dealer, brand to brand, horse power to horse power.

All of the previously discussed factors still have the same effect on outboard packages, however to provide additional adjustment to counter this (if required), this range of trailers comes with an adjustable wheel base. By moving this wheel base towards the rear, the TW will increase; conversely, moving it towards the front will decrease the TW.

Towing Checklist

This checklist covers six conditions that must be satisfied to optimise safe towing performance. Use this checklist to verify your towing package. Failure at any one of these points will compromise the performance and/or safety.

				✓ or ✗
1.	_____ kgs Actual Gross Trailer Mass of your trailer package	IS EQUAL OR LESS THAN	_____ kgs The Maximum permitted GTM of the Trailer (vin plate GTM)	
2.	_____ kgs Actual Aggregate Trailer Mass of your trailer package	IS EQUAL OR LESS THAN	_____ kgs The Maximum permitted ATM of the Trailer (vin plate ATM)	
3.	_____ kgs Actual tongue Weight	IS EQUAL OR LESS THAN	_____ kgs The Maximum permitted Tongue Weight of the vehicle	
4.	_____ % Actual Tongue Weight as a percentage of Actual ATM	IS WITHIN	The 5-10% industry average standard	
5.	_____ kgs The Actual Aggregate Trailer Mass of your trailer package	IS EQUAL OR LESS THAN	_____ kgs The Tow Vehicle Tow Bar's and Tow Ball rating	
6.	Your Tow Ball Height is at the correct height range and your towing package is level when coupled to the tow vehicle			

iv. Towing Your Trailer

Towing requires a greater degree of knowledge and skill than normal driving in addition to the driver's legal responsibilities.

When towing, you should always:

- ✓ Allow for extra length and width when entering traffic
- ✓ Apply the accelerator, brakes and steering smoothly, especially in wet or slippery conditions
- ✓ Maintain extra space than normal between you and the vehicle in front to allow for a longer stopping distance
- ✓ Engage a lower gear in both manual and automatic vehicles to increase vehicle control when travelling downhill
- ✓ Allow more time and a greater distance in which to overtake. When towing, your vehicle's capacity to accelerate is reduced
- ✓ Be aware that towing can be more stressful than normal driving and is more likely to cause fatigue. Therefore, more rest stops should be planned.

Trailer Sway

If your trailer begins to sway, try to remain calm and avoid the natural instinct to apply the tow vehicle's brakes. Don't try to counter or correct the sway by steering, alternatively **hold the vehicle steady and try to stay in the lane**. If you trailer is fitted with Electric brakes, gently apply them using the manual control on the tow vehicle's fitted electric brake controller. Otherwise, *where conditions permit*, continue at a steady speed or accelerate slightly until the sway stops.

When a condition of sway has been corrected, slow down and pull off the road safely. Check that any additional load is correctly distributed within the trailer and identify what caused the sway.

External factors such as cross winds and overtaking trucks and buses can create significant side thrust forces which can increase the chance of trailer sway.

If you require any further information or advice, consult a towing/suspension specialist.