

# A-Frame Towing

**A-frame towing is the term used to refer to towing a motor vehicle that has its front wheels on the road and is connected to the towbar of the towing vehicle by a triangular shaped frame.**

This Fact Sheet explains how to undertake A-frame towing of a motor vehicle behind another motor vehicle with a gross vehicle mass (GVM) of up to 4.5 tonnes, in a manner that satisfies the *Australian Road Rules*. Provided that the combination meets the braking distance requirements (below), the brakes of the towed vehicle need not operate while it is being towed.

Rule 294 (1) of the *Australian Road Rules* prevents the driver of a motor vehicle towing another motor vehicle unless:

- the driver can control the movement of the towed vehicle; or
- the brakes and steering of the towed vehicle are in working order and a person who is licensed to drive the towed vehicle is sitting in the driver's seat of the towed vehicle, and is in control of its brakes and steering; and
- it is safe to tow the vehicle.

The towing and towed vehicle will need to be a suitable combination and the A-frame attachment mechanism will need to be designed and constructed to meet set standards.

Persons wishing to undertake A-frame towing may need to seek advice from a [Recognised Engineering Signatory](#) or a [Light Vehicle Engineering Signatory](#) to ensure that the A-frame device meets the technical requirements of this Fact Sheet. A list of acceptable engineering signatories is also available from the Vehicle Services Section of the Department of Planning, Transport and Infrastructure (DPTI).

It is recommended that a copy of this Fact Sheet, together with any reports, approvals or other documents, is carried in the vehicle at all times.

## Coupling design

The A-frame coupling must:

- be designed and constructed with sufficient strength to hold the vehicles together in tow and must comply with the requirements of Australian Design Rule 62. *Mechanical connections between vehicles* relevant to the GVM of the towed vehicle
- permit an adequate amount of angular movement between the towing and towed vehicles, to cater for road undulations
- be secured to a substantial body member of the towed vehicle, such as a sub-frame or chassis member. Connection to the towed vehicle's bumper, suspension or steering components is not permitted, unless approved by the manufacturer of the towed vehicle
- be marked with the manufacturer's name or trademark and the rated capacity. The 'manufacturer' may include the owner in the case of a privately constructed device
- maintain a space between the combination not exceeding 2 metres and ideally as small as practicable.
- be equipped with safety chains or cables (see Figure 1).



Figure 1: Typical A-frame with safety chains fitted

Towed vehicles with a gross vehicle mass (GVM) up to 1.3 tonnes shall be equipped with at least one safety chain (of size detailed in Table 1) complying with AS 4177.4-1994.

Table 1

Towed Vehicle GVM in kg	Nominal material size in mm	Applicable Australian Standard
Up to 1000	6.3	AS 4177.4 - 1994
1001 to 1300	8.0	AS 4177.4 - 1994

Safety cables (fitted in lieu of safety chains) must comply with and be certified to AS 3569-1989 *Steel wire ropes*. The cable fitted with attachments (i.e. snap hooks and quick link) must be equal to or larger than that specified in Table 2.

Table 2

Towed Vehicle GVM in kg	Nominal material size in mm	Applicable Australian Standard
Up to 1300	7.1	AS 4177.4 - 1994

## Towed mass ratio

The tare mass of the towing vehicle divided by the mass of the towed vehicle (including the A-frame) determines the combination's towed mass ratio (TMR).

$$\text{TMR} = \frac{\text{Tare mass of towing vehicle}}{\text{Laden mass of towed vehicle}}$$

## Towing capacity of towing vehicle

Where the vehicle used for towing has a gross vehicle mass (GVM) not exceeding 4.5 tonnes, the towing limits specified by the vehicle manufacturer must not be exceeded. (Most manufacturers specify towing limits for their vehicles in the vehicle handbook.)

The loaded mass of the towed vehicle must not exceed the towing capacity of any component in the combination, including the A-frame, towbar and towball.

As a safety precaution, the combination shall have a towed mass ratio of at least 3.5:1 — that is, the mass of the towing vehicle must be at least 3.5 times the mass of the towed vehicle. This ratio is to provide for adequate levels of vehicle stability, handling and braking performance.

If an A frame combination has a towed mass ratio of less than 3.5:1 the towed vehicle must have working brakes operable by the driver of the towing vehicle. It is recommended that the maximum speed of the combination does not exceed 80km/hr.

## Braking requirements

The requirement for a 3.5:1 towed mass ratio is designed to give a combination adequate braking without the need for the brakes of the towed vehicle to be operated by the driver seated in the towing vehicle.

The vehicle combination must have braking of at least the performance in Table 3.

The parking brake of the towing vehicle must be able to hold the vehicle combination stationary on a 12% gradient.

**Table 3**

	Stopping distance when brakes applies at 35km/hr	Average deceleration rate from any legal speed	Peak deceleration rate from any legal speed
<b>Combination gross mass under 2.5t</b>	12.5 m	3.8 m/s <sup>2</sup>	5.8 m/s <sup>2</sup>
<b>Combination gross mass 2.5t or over</b>	16.5 m	2.8 m/s <sup>2</sup>	4.4 m/s <sup>2</sup>

## Lighting

The following lights must be fitted to the rear of the towed vehicle and be operational whilst under tow:

- two turn signal lamps showing amber light to the rear
- two stop lamps showing red light to the rear
- two reverse lamps showing white light to the rear
- one registration plate lamp at the rear of the towed vehicle to illuminate the registration plate
- two tail lamps showing red light to the rear.

These lamps may be arranged on a portable light bar providing it is properly secured to the rear of the towed vehicle.

## Steering

The safety of the vehicle combination's steering is vital. The A-frame towing system must provide safe and adequate steering control for the towed vehicle, and the overall combination.

The stability of the vehicle combination, the steerability of the towed vehicle and the tracking of the vehicle combination must be satisfactorily addressed.

The vehicle combination must be capable of turning within a 25m diameter circle, measured at the outer wheel track.

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When travelling in a straight line on a level, smooth surface the towed vehicle must track (follow) in the path of the towing vehicle without deviating off-line by more than 100mm.

It is recommended that the towball or hitch position on the towing vehicle is placed as close as possible to the rear axle. This will reduce the tendency of the towed vehicle to worsen the handling characteristics of the combination.

Please note that the steering wheel lock of the towed vehicle must be set in the unlocked position when the vehicle is under tow.

Reversing an A-frame coupled combination is not recommended, due to the lack of directional control over the towed vehicle

## Manufacturer's requirements

The vehicle manufacturer's recommendations must be complied with whilst carrying out A-frame towing. This applies equally to both the towing and towed vehicle.

Vehicle owners are advised to check with their manufacturer or dealer to determine whether their vehicles are suitable for A-frame towing.

Owner's manual advice for the towing of the vehicle should always be followed.

## Loads in towed vehicle

Carrying a load in the towed vehicle is permissible. However, when carrying such a load it is important to consider the following points:

The loaded mass of the towed vehicle must not exceed the capacity of any component in the combination.

The towed mass ratio of the combination must not be less than 3.5:1 when the towed vehicle is loaded.

Any load carried in the towed vehicle should be placed over or behind the rear axle. This will reduce the load on the front axle, reducing the tendency of the towed vehicle to worsen the handling characteristics of the combination. Ideally the mass supported by the front axle should be no more than 55% of the mass of the towed vehicle.



Figure 2: Attachment points for A-frame

## Other requirements

The overall length of the vehicle combination must not exceed 19.0 metres.

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The A-frame, and any attachment which would constitute a dangerous projection, must be removed from the towed vehicle before it is driven on public roads. Permanently attached forward facing projections are not acceptable.

Both the towing and the towed vehicle must be legally registered.

## Legal requirements

Both vehicles constituting the combination must meet registration requirements and be roadworthy.

The coupling and towbar must not obscure the number plate or lights on the rear of the towing vehicle when the towed vehicle is not attached.

Regulations prohibit towing more than one vehicle or trailer at once.

No person is permitted to travel in the towed vehicle.

When towing, the maximum speed at which you may tow is 100 kilometres per hour or the posted speed limit whichever is the lesser.

## Vehicle signs

If your combination (the towing vehicle together with the towed vehicle) is 7.5 metres long or longer, you may display the sign “DO NOT OVERTAKE TURNING VEHICLE” at the rear. This can be either a separate sign or incorporated on one of a pair of rear marking plates.

If this sign is attached to the rear of your combination, other vehicles must give way whilst your combination uses part or all of an adjacent second lane for turning. You will have the right of way to complete such turns.

It is offence not to display this sign on a vehicle (meaning the towing vehicle together with the towed vehicle) with a combined length of more than 7.5 metres long if lanes need to be straddled when turning.

It is an offence to display this sign on a combination (meaning the towing vehicle together with the towed vehicle) with a combined length less than 7.5 metres long. However, it is not illegal to use standard rear marking plates without the words ‘DO NOT OVERTAKE TURNING VEHICLE’ on such a vehicle.

## Towing vehicle

Your vehicle must be suitable and properly equipped for towing, with towbars and couplings properly designed and fitted.

Electrical sockets for trailer lights must be fitted to the towing vehicle, and where necessary, suitable brake connections.

Vehicles with automatic transmission may require extra transmission oil cooling.

Some vehicles may need strengthening, and/or special transmission and suspension options. A load distributing device may also be required. You should check the vehicle handbook or consult the manufacturer or the vehicle distributor regarding these requirements.

## Towbar

Your towbar must comply with Australian Design Rules, Standards and Regulations.





The capacity of your towbar and coupling must be at least equal to the total mass of the towed vehicle and the A-frame coupling. A towbar fitted to a vehicle built after January 1992 must be marked with its load capacity and either the vehicle model for which it is designed or the towbar manufacturer's part number.

The towbar must not protrude dangerously, or have sharp corners that could be a safety hazard when no trailer is fitted to your towing vehicle.

The towbar must be fitted with two attachments for connecting safety chains, one on either side of the coupling.

Towbar chain attachments must be able to withstand the rated load capacity of the towbar.

The safety chain attachments must be mounted adjacent to the tow coupling and arranged so as to maintain the direction of a trailer in the event of coupling failure or disconnection.

In the event of coupling failure or disconnection, the safety chain(s) should support the drawbar and prevent it dropping to the ground.

Towbars with a removable towing lug should be fitted with safety chain connections on the non-removable part of the towbar. If the chain connections are on the removable lug then the lug must be restrained by an additional chain to prevent disconnection from the towbar if the lug attachment fails.