



Department of
Transport



A-Frame Towing

Requirements for Towing Vehicles Using an A-Frame

Introduction

A-frame towing is the towing of a vehicle which has the front wheels on the road and is connected to the towbar of the towing vehicle by a triangular shaped frame commonly known as an A-frame.

The Australian Road Rules state:

Section 294(1) *The driver of a motor vehicle must not tow another motor vehicle unless:*

(a) either:

(i) the driver can control the movement of the towed vehicle; or

(ii) 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

(b) it is safe to tow the vehicle.

Seek advice from a recognised automotive consultant or a professional chartered engineer to ensure that the A-frame device meets the technical requirements of this document.

It is recommended a copy of this document is carried in the vehicle along with any reports, approvals or other documentation at all times.

An A-frame attachment is considered a modification and requires the approval of the CEO of the Department of Transport (DoT) prior to use.

You must submit an A-frame Towing Application (E182) form to DoT for approval to tow a motor vehicle using an A-frame.

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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 Gross Vehicle Mass (GVM) of the towed vehicle;
- allow sufficient angular movement between the towing and towed vehicles;
- be secured to a substantial part of the towed vehicle such as the sub-frame or chassis.;
- not be connected to the towed vehicle's bumper, suspension or steering components 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 vehicle owner for privately constructed devices;
- be marked with the VIN/chassis numbers of both the towing vehicle and the towed vehicle; and
- maintain a space between the combination not exceeding 2 metres.



Figure 1. example of correct connection



Figure 2. space required between combination

Chain Requirements

Towed vehicles with a GVM of up to 3500 kg.

Towed Vehicles with a GVM of up to 3500 kg must be equipped with safety chains complying with AS 4177.4-1994 or later and be the appropriate size for the towed vehicle GVM as detailed in Table 1.

Table 1

| Towed Vehicle GVM in kg | Nominal Material Size in mm | Applicable Australian Standard |
|-------------------------|-----------------------------|--------------------------------|
| 0 to 1000 | 6.3 | AS 4177.4 - 1994 |
| Up to 1600 | 8.0 | AS 4177.4 - 1994 |
| Up to 2500 | 10.0 | AS 4177.4 - 1994 |
| Up to 3500 | 13.0 | AS 4177.4 - 1994 |

The number of chains required depends on the towed vehicle's GVM:

- Towed vehicles with a GVM up to 2500 kg must have at least one safety chain.
- Towed vehicles with a GVM over 2500 kg must have two safety chains.

For towed vehicles with a GVM up to 3500 kg, safety chains may be replaced by safety cables with a certified load capacity not less than that of chains complying with Australian Standard – 1994 Safety Chains up to 3500 kg.



Figure 3. safety chains



Figure 4. safety cables

Towed vehicles with a GVM over 3500 kg.

Towed Vehicles with a GVM over 3500 kg must have two chains made from steel of a minimum 800 Mpa breaking stress and conforming to the mechanical proper ties of Grade T chain as specified in AS 2321-1979 or later.

The size of chain must be as follows:

- Towed vehicles with a GVM over 3500 and up to 4300 kg must have chains of at least 7.1mm in size.
- Towed vehicles with a GVM over 4300 and up to 7500 kg must have chains of at least 9.5mm in size.
- 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 (unrated snap hooks and quick links are not accepted) must be equal to or larger than that specified in Table 2.

Table 2 Short-Link chain for Lifting purposes (non-calibrated)

| Towed Vehicle GVM in kg | Nominal Material Size in mm | Applicable Australian Standard |
|--------------------------|-----------------------------|--------------------------------|
| 0 to 4300 | 7.1 | AS 2321 - 1979 |
| Over 4300 and up to 7500 | 9.5 | AS 2321 - 1979 |

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).

$$\text{TMR} = 1: \frac{\text{Tare mass of towing vehicle}}{\text{Laden mass of towed vehicle}}$$

Towing Capacity of Towing Vehicle

Where the vehicle used for towing has a GVM less than 4500 kg, the towing limits specified by the vehicle manufacturer must not be exceeded. Most manufacturers specify towing limits for their vehicles in the vehicle handbook.

Towed vehicles weighing more than 750 kg must be braked.

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

As a safety precaution, the combination must have a towed mass ratio of at least 1 : 3.5 for safe handling and braking.

Braking Requirements

The vehicles in the combination must have a braking performance of at least that detailed in Table 3.

Table 3

| Vehicle combination gross mass | Stopping distance when brakes applied at 35 km/h | Average deceleration rate from any legal speed | Peak deceleration rate from any legal speed |
|--------------------------------|--|--|---|
| Under 2.5 tonnes | 12.5 m | 3.8 m/s ² | 5.8 m/s ² |
| 2.5 tonnes or over | 16.5 m | 2.8 m/s ² | 4.4 m/s ² |

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

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;
- one number plate lamp at the rear of the towed vehicle to illuminate the plate; and
- two tail lamps showing red light to the rear.

These lamps may be arranged on a portable light bar if it is securely fastened to the rear of the towed vehicle or connected using the towed vehicles lights (where applicable).

Steering

The A-frame towing system must provide safe and adequate steering control for both vehicles whilst being towed in combination. The stability of the vehicle combination, the steer-ability of the towed vehicle and the tracking of the vehicle combination must be satisfactorily addressed.

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

Vehicle and Towing Componentry Manufacturer's Requirements

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

Vehicle owners should consult with their manufacturer/dealer to confirm if their towed vehicle is suitable for A-frame towing. Towing advice given in the vehicle owner's manual must always be followed.

Loads in Towed Vehicles

You may carry a load in the towed vehicle provided:

- The loaded mass of the towed vehicle does not exceed the capacity of any component in the combination (i.e. unbraked capacity of the tow vehicle, usually 750 kg).
- The Towed Mass Ratio of the combination must not be less than 1:3.5 when the towed vehicle is loaded.
- Any load carried in the towed vehicle should be placed as low and as centrally as possible. Large, heavy items (eg outboard motors) carried high up and behind the rear axle of the towed vehicle will adversely affect the handling of the combination and may result in unsafe towing.

Other Requirements

- The overall length of the vehicle combination must not exceed 19 metres.
- The A-frame, and any attachment which could constitute a dangerous projection, must be removed from the towed vehicle before it is driven on public roads.
- In most jurisdictions both the towing and the towed vehicle must be legally licensed. Owners are advised to check with their relevant authority to confirm if this requirement applies.

Contacting an automotive consultant to confirm that an A-frame towing vehicle combination and A-frame coupling apparatus meet the requirements of this document is recommended. A list of recognised consulting automotive consultants is available on the Departments website.



Figure 5. correct example of A-frame attachment

Legal Requirements

General

- Both vehicles in the combination must meet licensing requirements.
- 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.
- It is prohibited to tow more than one vehicle or trailer at a time.
- Nobody is allowed to ride in the towed vehicle.
- When towing, the maximum speed at which you may tow is 100 Kilometers per hour or the posted speed limit, whichever is the lesser.
- Following distances outside built-up areas:
 - On roads outside a built up area that are a single lane in the direction you are driving, if your vehicle is 7.5 metres long or longer (including any load), you must not follow closer than 200 metres to a vehicle in front of you.
 - Exceptions apply when overtaking another vehicle.
- Stopping on carriageways:
 - If your vehicle, including trailers and the load, is longer than 7.5 metres or has a total mass of more than 4.5 tonnes you must not:
 - Stop on a carriageway in a built up area for longer than one hour unless picking up or setting down goods; or
 - Stop on a carriageway outside a built up area except on a hard shoulder or in a truck bay or other area set aside for parking of goods vehicles.

“Do Not Overtake Turning Vehicle” Signs

- If the combination (the towing vehicle together with the towed vehicle) is 7.5 metres long or longer, you must 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 the combination, other vehicles must give way whilst the combination uses part or all of an adjacent second lane for turning. You have the right of way to complete such turns.
- It is an 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. It is not illegal to use standard rear marking plates without the words ‘DO NOT OVERTAKE A TURNING VEHICLE’ on such a vehicle.

Equipment

Towing Vehicle

- The 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. Check the vehicle handbook or consult the manufacturer or vehicle distributor regarding these requirements.

Towbar

The towbar must comply with all relevant Australian Design Rules, Standards and Regulations.

- The capacity of the 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 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 must be able to support the drawbar and prevent it dropping to the ground.
- Towbars with a removable towing lug must be fitted with safety chain connections on the non removable part of the towbar.
 - If the chain connections are on the removable lug, the lug must be restrained by an additional chain to prevent disconnection from the towbar if the lug attachment fails.

Driving Tips

General Advice

The following procedures will help reduce risks and improve towing safety.

- Remember to allow for the extra length of the towed vehicle and its tendency to 'cut in' on corners and curves.
- The extra weight of the combination requires greater stopping distance when braking.
- Brakes should not be applied more than very lightly when cornering or travelling around a curve, particularly when the road is wet or slippery.
- Reversing an A-frame coupled combination is not recommended due to lack of directional control over the towed vehicle.
- A towing vehicle's performance will be reduced by the mass of the towed vehicle.
- Accelerator, brake and steering must be operated smoothly when towing. Unnecessary steering wheel movement should be avoided as sway or "snaking" of the combination can result. If sway occurs, a steady speed or slight acceleration should be maintained if possible, until the sway ceases. The towing vehicle's brakes should only be applied as a last resort.