

# “A” Frame Towing

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## Introduction

"A" frame towing refers to towing a motor vehicle with all its 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.

This publication explains how to undertake "A" frame towing of a motor vehicle with a Gross Vehicle Mass (GVM) of up to 4.5 tonne in Queensland in a manner that is safe and meets the Queensland Road Rules requirements.

Persons wishing to undertake "A" frame towing should seek advice from an Approved Person Engineer to ensure that the "A" frame device that is intended for use meets the standards set out further in this guide.

A list of Approved Person Engineers is available from the TMR Call Centre on (13 23 80).

## Towed Mass Ratio

The simplest form of "A" frame towing involves towing another vehicle without applying its service brakes. To provide for adequate levels of vehicle stability, handling and braking performance, it is necessary to maintain a towed mass ratio of 3.5 the laden mass of the towed vehicle compared to the towing vehicle.

In cases where the towing vehicle has an unladen mass of less than 3.5 times the laden mass of the towed vehicle, the brakes on the towed vehicle must be used.

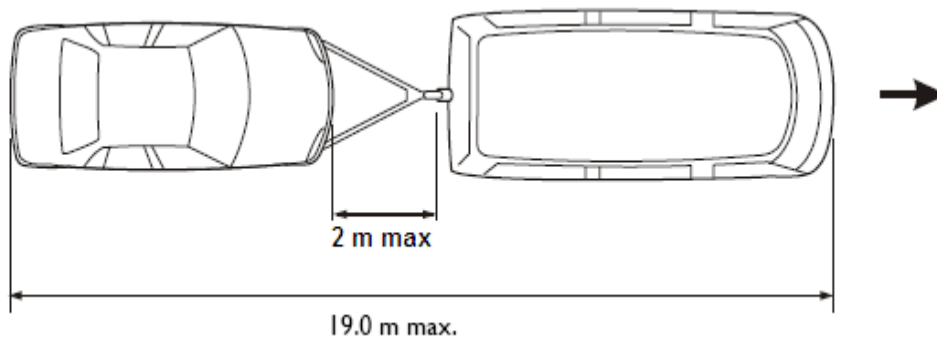


## Coupling Design

### The "A" frame coupling must:

- be designed and constructed with sufficient strength and must comply with the Australian Design Rule 62 "Mechanical connections between vehicles", relevant to the laden mass of the towed vehicle;
- permit an adequate amount of angular movement between the towing and towed vehicles to cater for road undulations and curves;
- 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 "A" frame manufacturer's name or trademark and the rated capacity;
- maintain a space between the combination not exceeding 2 metres (may be extended to a maximum of 4 metres if certain requirements of the *Transport Operations (Road Use Management—Road Rules) Regulation 2009* are met).

- The overall length of the vehicle combination is not to exceed 19 metres.



**The “A” frame must be equipped with safety chains/cables as detailed below:**

- To tow vehicles with a GVM up to 2.5 tonnes, the A-frame shall be equipped with at least one safety chain (of size detailed in Table 1) complying with AS 4177.4-2004 “Caravan and light trailer towing components Part 4: Safety chains up to 3500kg capacity”, or as amended.
- To tow vehicles with a GVM over 2.5 tonnes, the “A” frame shall be equipped with two safety chains (of size detailed in Table 1) complying with AS 4177.4-2004 or as amended.

**Table 1**

Towed Vehicle Gross Vehicle Mass in kg	Nominal Material Size in mm	Chain markings
0 to 1000	6.3	4177-10
Up to 1600	8.0	4177-16
Up to 2500	10.0	4177-25
Up to 3500	13.0	4177-35

- To tow vehicles with a GVM between 3.5 and 4.3 tonnes the A-frame requires chains of at least 7.1mm in size, with a minimum chain breaking load of 6.4 tonnes. The chain must be steel of a minimum 800 MPa breaking stress and conforming to the mechanical properties of Grade T chain as specified in AS 2321-2006 ‘Short- Link chain for lifting purposes’ (refer Table 2).
- To tow vehicles with a GVM over 4.3 and up to 7.5 tonnes the “A” frame shall have chains of at least 9.5mm in size, with a minimum chain breaking load of 11.6 tonnes. The chain must be made from steel of a minimum 800 Mpa breaking stress and conforming to the mechanical properties of Grade T chain as specified in AS 2321-2006 ‘Short-Link chain for Lifting purposes’ (refer Table 2).
- Safety cables (fitted in lieu of safety chains) must comply with and be certified to AS 3569 “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**

<b>Towed Vehicle Gross Vehicle Mass in KG</b>	<b>Nominal Material Size in mm</b>	<b>Applicable Australian Standard</b>
3500 to 4300	7.1	AS 2321-2006
Over 4300 & up to 7500	9.5	AS 2321-2001
Over 7500 & up to 13500	12.7	AS 2321-2006
Over 13500 & up to 21500	15.9	AS 2321-2006
Over 21500 and up to 30000	19.0	AS 2321-2006
Over 30000	22.0	AS 2321-2006

**Note:**

In the event of coupling failure or disconnection, the safety chain(s) or cables should be fitted in such a way as to support the drawbar and prevent it dropping to the ground.

**Towbar**

The towbar on the towing vehicle must comply with Australian Design Rule 62, and the relevant standards and regulations. Capacity of the towbar and the coupling must match or exceed 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 the A-frame is not attached.

The towbar must be fitted with two attachments for connecting safety chains, one on each 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.

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.

## Towing Capacity of Towing Vehicle

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, coupling and tow-ball.

## Braking Requirements

The requirement for a 3.5:1 towed mass ratio is intended to give the combination adequate braking without the need for the brakes on the towed vehicle to be operated.

As a minimum, the vehicle combination must have the braking performance in Table 3.

**Table 3**

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

The parking brake of the towing vehicle must be able to hold the combination stationary on a 12% gradient, when the combination is on a dry, smooth road surface, free from loose material.

## Lighting Requirements

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

- two amber turn signal lamps
- two red stop lamps
- one white reverse lamps
- one registration plate lamp at the rear of the towed vehicle to illuminate the registration plate
- two red rear position (tail) lamps

These lamps may be the towed vehicle’s own lights or as an alternative be arranged on a portable light bar providing it is properly secured to the rear of the towed vehicle.

## Steering Requirements

The vehicle combination must be capable of turning within a 25m 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 any more than 100mm.

It is recommended that the tow-ball or hitch position on the towing vehicle is located as close as practicable to the rear axle. This will reduce any adverse effects of the towed vehicle on the handling characteristics of the combination.

## Vehicle and Towing Components Manufacturer's Requirements

Vehicle owners are advised to check with the manufacturer/dealer of the towed vehicle to determine whether it is suitable for "A"-frame towing. Advice given in the "Owner's Manual" for the towing of the vehicle should always be followed.

## Loads in Towed Vehicle

Carrying a load in the towed vehicle is not prohibited. However, it is important to consider the following points:

- The loaded mass of the towed vehicle must not exceed its GVM and the capacity of the mechanical connection, including A-frame, coupling and the towbar.
- The laden mass of the towed vehicle must not exceed the limit set by the 3.5 ratio mentioned previously.
- Any load carried in the towed vehicle should be placed as low as possible and placed toward the rear of the vehicle. Loading toward the rear will reduce the load on the front axle, reducing the tendency of the towed vehicle to worsen the handling characteristics of the combination.

## Other Requirements

- The overall length of the vehicle combination must not exceed 19 metres.
- Any attachments to the towed vehicle which would constitute a dangerous projection, must be removed from the towed vehicle before it is towed on public roads.
- The fitting of A-frame attachments on towed vehicle should not adversely affect its ADR compliance, especially occupant protection standards such as ADR 69 and ADR 73. Particular attention should also be paid to any effect on the crush zone and the vehicle's ANCAP safety rating, if available.
- In Queensland (as in most other jurisdictions) both the towing and the towed vehicle must be legally registered.
- For the purpose of A-frame towing, towing more than one vehicle or an additional trailer is prohibited.
- No person must ride in the A-frame towed vehicle.

## "VEHICLE UNDER TOW" Sign

It is not a requirement to display any sign indicating a vehicle is under tow. However, drivers may do so if they wish.

## Turning Vehicle Sign



If the length of the vehicle combination is 7.5 metres or longer, you may have the sign "Do not overtake turning vehicle" displayed at the rear of the combination. This can be either a separate sign or the words can be incorporated on either the left hand marking plate only, or both left and right plates.

*The Transport Operations (Road Use Management—Road Rules) Regulation 2009 Part 11 Keeping left, overtaking and other driving rules, section 143 states:*

## Passing or overtaking a vehicle displaying a do not overtake turning vehicle sign

- (1) A driver must not drive past, or overtake, to the left of a vehicle displaying a do not overtake turning vehicle sign if the vehicle is turning left and is giving a left change of direction signal, unless it is safe to do so.
- (2) A driver must not drive past, or overtake, to the right of a vehicle displaying a do not overtake turning vehicle sign if the vehicle is turning right, or making a U-turn from the centre of the road, and is giving a right change of direction signal, unless it is safe to do so.

Note: A person must not display a DO NOT OVERTAKE TURNING VEHICLE sign if the vehicle's length (together with any load or projection) is less than 7.5m.

## Related documents and links

Vehicle Standard Bulletin - Building Small Trailers (VSB1) is available on the Department of Infrastructure and Transport website ([www.infrastructure.gov.au](http://www.infrastructure.gov.au))

Australian Design Rules are available on the Department of Infrastructure and Transport website ([www.infrastructure.gov.au](http://www.infrastructure.gov.au))

Standard AS 4177 can be accessed through the Standards Australia website ([www.standards.org.au](http://www.standards.org.au))

Vehicle Standard Bulletin - Rear Marking Plates (VSB 12) - Issued by the Western Australian Government / Vehicle Safety Branch is available on the Department of Infrastructure and Transport website ([www.infrastructure.gov.au](http://www.infrastructure.gov.au))

Load Restraint Guide is available on the National Transport Commission website (<http://www.ntc.gov.au>)