

# Vehicle Standards Guide 31 (VSG-31)

## Road trains - Trailer coupling requirements

Revised December 2021

This guide provides information for vehicle inspectors, Approved Vehicle Examiners and owners of heavy vehicles about coupling requirements on road train rated trailers.

### Background

Road trains are multi-vehicle combinations consisting of a Prime mover towing at least two trailers (and is not a B-double). Each prime mover and trailer used in a road train combination must be road train certified.

Certification as a road train trailer specifically requires that the couplings fitted meet the necessary requirements to be used in these larger combinations and the electrical system to be capable of passing an electrical signal the longer distance.

### Rear coupling requirements

For some time, industry has sought clarification from regulators about the requirement for road train trailers, dedicated for use as the last trailer in the combination, to have a tow coupling fitted at the rear of the unit.

The Federal Department of Infrastructure, Transport, Regional Development and Communications has recently determined (Circular 63/00-3-1) that a rear coupling is not mandatory on all road train trailers.

This determination impacts vehicle inspectors and AVE's.

Vehicle inspectors are advised that the absence of a rear coupling is not a reason for rejection. Also, AVE's are advised that a rear coupling is not mandatory when certifying a S11 modification.



**Figure 1: Road train trailers do not require a coupling fitted to the rear of the unit.**

### Non-standard coupling heights

Increasingly, operators are choosing to incorporate low loaders and drop deck trailers in these combinations. These trailers are characterised by having loading decks no more than 1m above the ground.

To accommodate trailers with a lower deck height, the height of the coupling must be reduced below the limits imposed by the *Heavy Vehicle (Vehicle Standards) National Regulation* (the National Regulation).

The *National Heavy Vehicle Standards (Road Train Tow Coupling and Pivot Point Position) Exemption Notice 2021 (No.1)*, allows for the tow coupling and drawbar pivot points on applicable vehicles to be mounted lower than the limits prescribed in regulation.

To operate under this exemption notice, the vehicle and the combination must meet certain requirements. These requirements include:

- the vehicle be an eligible vehicle
- is fitted with a vehicle label; and
- the drawbar, when in combination, is substantially level and is capable of at least  $\pm 15^\circ$  of vertical movement

**Note:** Operators are advised that by taking advantage of this exemption may lose some flexibility as trailers may not be compatible with every other trailer. For more information about matching standard and non-standard coupling heights, refer to Appendix A: Calculating coupling height.

### Eligible vehicles

Vehicles that can operate under this notice must be certified to operate in a road train combination and fitted with:

- a vehicle label that complies with the requirements of the notice; and
- an automatic pin coupling to the rear of the vehicle; or
- a drawbar-pivot point that is at a non-standard height

### Terms used

Some of the terms used in the notice are specific to the notice and may not be defined elsewhere.

An *automatic pin coupling* uses a vertical pin through a towing eye to attach a trailer fitted with a drawbar.

The *drawbar pivot point* is the point where the drawbar attaches to the trailer body and about which the drawbar moves up and down. Not all drawbars will have a drawbar pivot point, such as fixed drawbars.

The *length of drawbar* is the distance between the drawbar eye and the drawbar pivot point. It is important to note that this is different from the defined term 'drawbar length' which refers to the distance between the drawbar eye and the centre of the first axle group.

*Substantially level* means that when viewed from the side, the connected drawbar is no more than 5° uphill or downhill.

## Vehicle Label

Vehicles with a non-standard coupling height must be fitted a warning label to alert users.

The vehicle label must have a yellow background and have the relevant information printed in bold black letters no less than 10mm high. The label must state:

- the coupling height is reduced
- the height of the coupling
- the vertical articulation of the drawbar must not exceed  $\pm 5$  degrees when parked on level ground

An example vehicle label is shown in figure 2.

## Fitting the vehicle label

The vehicle label must be securely fixed directly adjacent to the coupling. Where the coupling height is reduced as result of a non-standard drawbar pivot point height, the label must be fixed directly adjacent to the drawbar eye.



Figure 2: Example vehicle label

## Substantially level

For the drawbar to be considered substantially level, it must sit within  $\pm 5^\circ$  of parallel to the ground when the unloaded combination is parked on a flat level surface.

To check this, ensure the combination is:

- parked on a flat, level surface,
- unloaded,
- the drawbar is  $\pm 5^\circ$  parallel to the ground.

## Drawbar angle may be measured or calculated

The drawbar angle can be measured using an inclinometer, a device designed for measuring angles and can be purchased for a minimal cost.

Alternatively, the angle of the drawbar can be calculated using the difference in coupling heights and the length of drawbar. For more information on this method refer to Appendix A.

## Vertical movement of drawbar

Vertical movement of the drawbar is required when the combination is travelling. Insufficient vertical movement of the drawbar can result in binding of the coupling with the receiver and cause damage, or failure of the drawbar, coupling or other components

To limit this, the National Regulation requires a minimum of 15° of movement in the coupling both upwards and downwards while travelling.

Automatic pin couplings used in road train combinations are required to be constructed with a minimum of  $\pm 20^\circ$  vertical movement from horizontal (as set by Australian Standard 2213).

Where the combination meets the requirement for the drawbar to be substantially level, the drawbar will continue to meet the requirement for  $\pm 15^\circ$  of vertical movement.

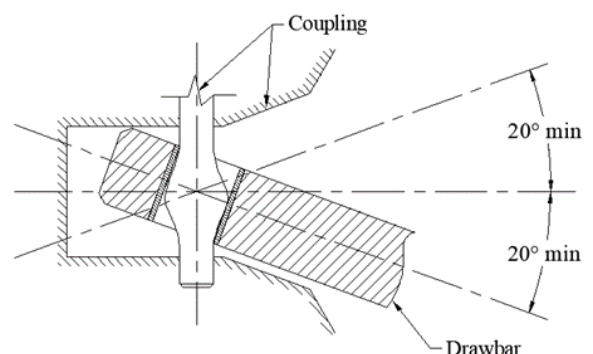
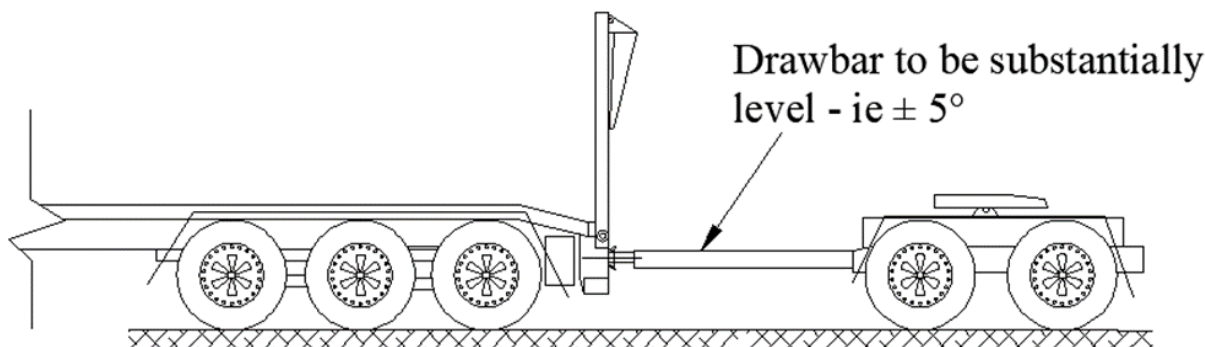


Figure 3: Standard coupling with  $\pm 20^\circ$  to the horizontal



### Requirements of modified vehicle

Modifications to tow couplings fitted to a vehicle must be carried out in accordance with the requirements detailed in *Section P: Tow couplings* of the *National Code of Practice Vehicle Standards Bulletin (VSB 6) – Heavy Vehicle Modifications*.

**Note:** Modified vehicles must continue to comply with all other parts of ADR63/00 and the National Regulation.

### Vehicle markings and modifications

A trailer originally built as suitable for use in a road train must comply with the requirements detailed in *Australian Design Rule 63 Trailers Designed for Use in Road Trains (ADR 63/..)*. ADR63/.. compliant trailers must show the words 'ROAD TRAIN TRAILER' on the vehicle plate.

Existing trailers may be modified and certified as road train trailers. Modification must be done in accordance with Vehicle Standards Bulletin 6 (VSB6), Modification Code S11 — Road train trailer rating. Modified trailers must be fitted with a modification plate that contains the ATM/GTM and shows the words 'ROAD TRAIN TRAILER'

**Note:** Modifications to a trailer certified to ADR 63/.. to include a rear coupling, must be carried out and approved in accordance with the road train requirements detailed in VSB6 Section P – Tow couplings

### Warning Signs

Vehicles operating in a road train combination are required to display warning signs at the front and rear of the combination. More information about vehicle warning signs can be found in [VSG19](#).

### Chain of Responsibility

Under the Chain of Responsibility (CoR) laws, relevant parties in the transport supply chain have a duty to ensure the safety of their transport activities.

Parties in the chain have an obligation to eliminate or minimise potential harm or loss (risk) by doing all that is reasonably practicable in their business to ensure safety.

Implementing a system to ensure you are informed of changes to the vehicle safety standards and apply these to your business can support transport safety.

### Complying with the Heavy Vehicle National Law

The operator of a heavy vehicle must ensure their vehicle complies with the *Australian Design Rules (ADRs)* and the National Regulation. Using or permitting another person to use a defective heavy vehicle on a road is an offence.

A defective heavy vehicle is a vehicle that:

- does not comply with the heavy vehicle safety standards; or
- has a part that does not perform its intended function; or
- has deteriorated to an extent that it cannot be reasonably relied on to perform its intended function.

Penalties can include on-the-spot fines or prosecution. Formal warnings or a defect notice may also be issued. For more information see the Heavy vehicle defects— Compliance and enforcement bulletin at [www.nhvr.gov.au/ce-bulletins](http://www.nhvr.gov.au/ce-bulletins).

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#### VSG31 Revision history

First Published	December 2020
Revised	December 2021 Major review

## Appendix A: Calculating the drawbar angle

When the centre of the automatic pin coupling is the same height as the drawbar pivot point, the drawbar will sit level and parallel to the ground. As the difference between the height of each coupling increases, the angle of the drawbar will become steeper.

Combinations that include vehicles with non-standard coupling heights must check that the drawbar will be substantially level and therefore continue to meet the vertical movement requirements of the Regulations.

By using the difference in coupling heights and the length of the drawbar, operators can calculate the drawbar angle.

To assist operators to remain compliant without the need for multiple calculations, table 1 can be used as a quick reference. Table 1 shows the minimum length of drawbar required to meet the substantially level requirements. By measuring the difference in coupling heights, operators can use table 1 to determine the required length of drawbar.

If the length of drawbar is smaller than the number listed in table 1, the angle will be too steep and using a trailer with a longer drawbar may be required.

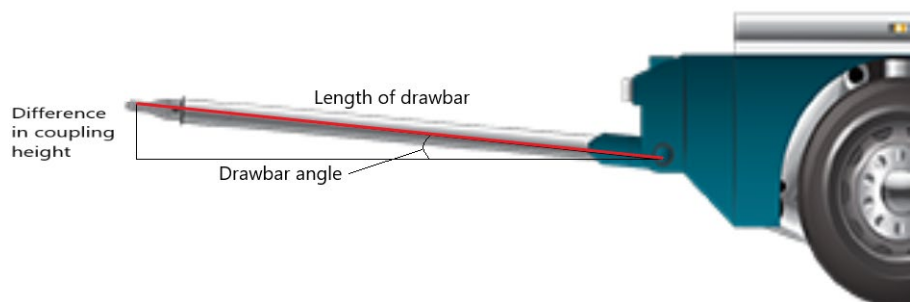


Figure 5: Using length of drawbar and difference in coupling height to calculate drawbar angle

### Step 1. Measure the height of the coupling or drawbar pivot point

The non-standard coupling should be fitted with a vehicle label that states the height of the coupling. Where a vehicle label has not been fitted, the coupling or pivot point height must be at a standard height, anywhere from 825mm to 950mm from the ground.

Measure the height of the coupling or pivot point that is not labelled while the vehicle is unloaded and parked on level ground. The difference between these two numbers is the difference in the coupling height.

**Note:** Ensure that this measurement is not less than 600mm and not more than 950mm. Vehicles that measure outside these heights may require additional exemptions from the NHVR.

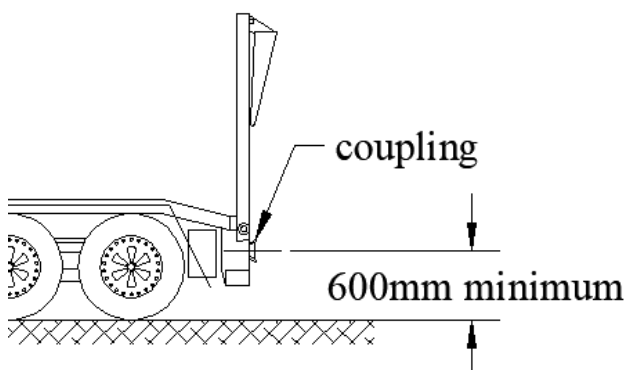


Figure 6: Coupling height of automatic pin coupling

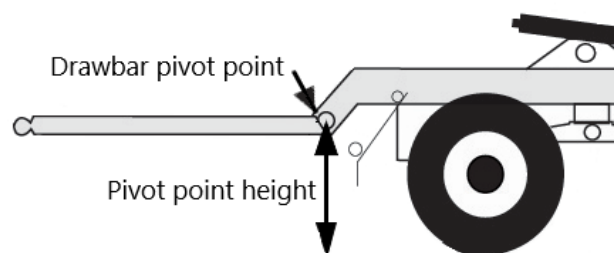


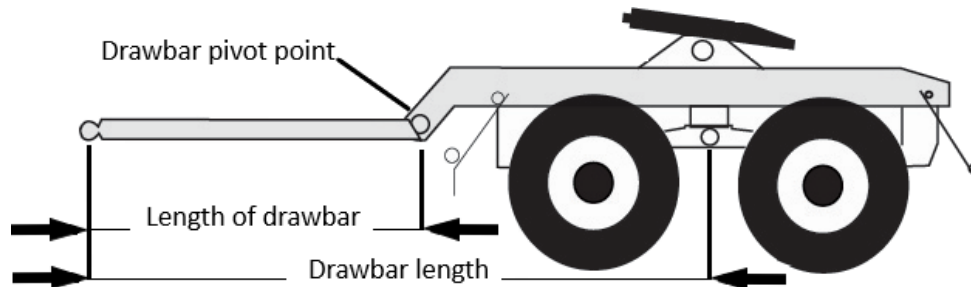
Figure 7: Drawbar pivot point height

**Note:** This measurement should be taken on millimetres and rounded up to the nearest number in column 1, of table 1.

### Step 2. Measure the length of drawbar

The length of the drawbar is measured from the centre of the drawbar pivot point to the centre of the drawbar eye. This is different to the existing measurement of ‘drawbar length’ which is defined as the distance between the coupling and the centreline of the leading axle group. Refer to figure 8 for more information.

**Note:** This measurement should be taken in meters and rounded to the nearest 2 decimal places.



**Figure 8:** Length of drawbar is different to drawbar length

**Note:** Trailers that are approved to operate in road train combinations are required to have a *drawbar length* between 3 and 5 metres

### Step 3. Check the angle

Table 1 has calculated the minimum length of drawbar required to ensure no more than 5° of angle. The below table may be used as a quick reference guide for ensuring the drawbar will remain substantially level.

1. Calculate the difference in coupling height and measure the length of the drawbar per step 1.
2. Ensure that the length of drawbar measured in step 2 is as long or longer than the minimum length listed in table 1.

**Table 1. Minimum length of drawbar by difference in coupling height.**

Difference in coupling height (mm)	Minimum length of drawbar* (m)
350	3.97
340	3.86
330	3.74
320	3.63
310	3.52
300	3.40
290	3.29
280	3.18
270	3.06
260	2.95
250	2.84
240	2.72
230	2.61
220	2.50
210	2.38
200	2.27
190	2.16
180	2.04

\* Length of drawbar is different to drawbar length

**Note:** Where the difference in coupling height or length of drawbar is outside the range displayed in Table 1, additional advice should be sought.