

# Heavy trailers and combination vehicles

(full, semi, simple, pole, A- and B-train)

This factsheet describes the legal requirements in the Land Transport Rule: Vehicle Dimensions and Mass 2016 relating to the dimension and mass limits for heavy trailers (Classes TC (3.5 to 10.0 tonnes) and TD (over 10 tonnes), and heavy-vehicle combinations. Please refer to factsheet 13 for general dimension and mass limits and towing requirements.

## What are the general specifications for heavy trailers?

### Width

The maximum allowable width (including the load) for full, semi, simple, pole, A- and B-train trailers is 2.55 metres (excluding side marker lights, direction indicators and the bulge towards the bottom of the tyre). The only extra width allowed is:

- 240 millimetres each side for collapsible mirrors, and 1.49m when measured from the vehicle's longitudinal centre line
- the bulge towards the bottom of a tyre
- central tyre inflation system hoses that extend not more than 75mm beyond the outside of the tyre on the drive axles
- hubodometer assemblies that extend not more than 50mm provided it is fitted to a non-lifting, non-steering axle whose outer casings are of a light colour, provided the hubodometer is fitted on the axle that causes the least overwidth
- cameras or close-proximity monitoring systems mounted on the side exterior of a vehicle that extends not more than 70mm from the side wall of the vehicle
- devices for improving the aerodynamic performance of a vehicle that extend not more than 25mm from either side of a vehicle.

### Height

The maximum allowable height (including the load) is 4.3 metres.

The height of the body or load of class TD trailers (those with a gross vehicle mass exceeding 10 tonnes) may be restricted by stability requirements – particularly the need for the vehicle to have a minimum static roll threshold (SRT) – see factsheet 13c *Static roll thresholds*, for more.

All vehicles must be loaded in a safe manner, with a height appropriate for the type of load.

### Ground clearance

Except when loading or unloading the vehicle, the minimum ground clearance for heavy trailers (ie those with a gross vehicle mass over 3.5 tonnes) is 100 millimetres. The ground clearance also has to be at least six percent of the distance from the nearest axle to the point where the ground clearance is measured.

## Projecting loads

A load is allowed to project outside of the sides of a trailer, as long as the maximum allowable dimensions are not exceeded. See factsheet 13 *Vehicle dimensions and mass* for information about the maximum projections allowed and the hazard warning devices you need to attach to projecting loads.

## Load sharing

All axle sets in a heavy trailer must have a suspension system that provides effective damping and shares the load between the wheels of the set. No tyre should carry a mass more than 10 percent greater than the mass it would carry:

- if all the tyres in the set were the same width and the load was shared equally between the tyres, or
- if a tandem axle set contained a twin-tyred axle and a large single-tyred axle ('super single') and was built to divide the load between the tyres in the set in either the 60 percent twin/40 percent large single ratio or 55 percent twin/45 percent large single ratio. (A vehicle with these axle sets must have an indelible plate fixed to it by the manufacturer – for more information see the Vehicle Dimensions and Mass Rule on our website: [www.nzta.govt.nz/resources/rules/](http://www.nzta.govt.nz/resources/rules/).)

## Retractable axles – heavy trailers

Heavy trailers may have retractable axles in the drive axle or rear axle set if:

- the retractable axle has an automated control to ensure that the axles that remain on the ground stay within the appropriate legal mass limits and manufacturer's limits
- forward distance and rear overhang limits are complied with both when the axle is on the ground and when it is retracted (Note that the position of the rear axis may change depending on whether the axle is retracted or in contact with the ground.)
- such retractable axles are certified for compliance with the requirements in both the bullet points above
- the vehicle must meet road user charge (RUC) requirements.

## Rear steering axles – heavy trailers

Heavy full trailers, heavy simple trailers and heavy pole trailers must not have rear steering axles.

Heavy semi-trailers that aren't part of an A-train or B-train may have a tandem axle set or tri-axle set with one steering axle.

A quad-axle set must have a rear steering axle that must be able to turn in both directions through an angle of at least 15 degrees.

A quad-axle set must be certified by a heavy vehicle certifying engineer or other vehicle inspector or inspecting organisation specifically approved by the NZ Transport Agency, to confirm that the steering axle meets the above requirement.

## Stability of heavy trailers

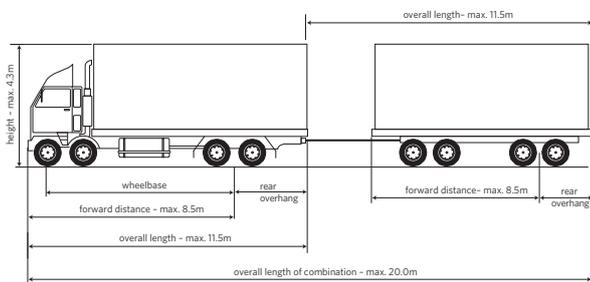
Class TD trailers must have an SRT when laden of at least 0.35g (where 'g' is the acceleration due to gravity). SRT measures the stability of the vehicle. Class TD trailers with a body height or load height over 2.8 metres above ground must be certified that they have an SRT of at least 0.35g. (See factsheet 13e *Static roll thresholds*.)

## Full trailers

**Note:** The axle set requirements described here apply to heavy trailers. They don't apply to light trailers (with a gross vehicle mass up to 3.5 tonnes).

A full trailer has two axle sets, one of which is connected to the towing vehicle by a drawbar which steers the front axle set. A heavy full trailer must have a front axle set consisting of either:

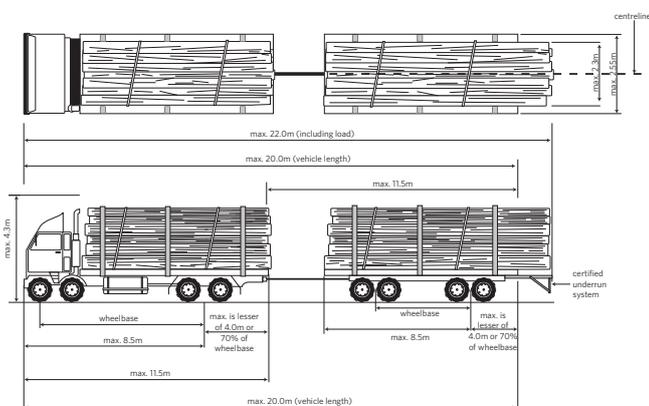
- a single axle set, or
- a tandem axle set
- a tri-axle set.



To improve the stability of logging trucks, an exemption is available to allow them to have two metres of log overhang past the 20 metres overall vehicle length, so that the load height would be reduced thus improving stability. This resulted in a reduction of roll-over accidents.

This overhang 'as of right' with two conditions:

1. The load overhang cannot be the full width of the vehicle. This is to aid on-road fit during cornering.
2. A certified rear underrun system must be fitted to reduce the risk to other motorists.



## Rear underrun requirements

If the load overhang is within 1.15 metres of the centreline of the vehicle (up to 2.3 metres wide) it can overhang two metres up to a maximum overall length of 22 metres. A towing vehicle and full trailer combination with an overall length of more than 21 metres and a height of any substantive overhang above the ground greater than 0.55 metres must be fitted with an adjustable or removable rear underrun protection device that meets the technical requirements of UN/ECE Regulation 58: Uniform provisions concerning the approval of: I. Rear underrun protective devices (RUPDs), II. Vehicles with regard to the installation of an RUPD of an approved type, III. Vehicles with regard to their rear underrun protection (RUP). A rear underrun protection device fitted to this vehicle must be certified for compliance by a vehicle inspector or inspecting organisation.

## Additional definitions and limits

A drawbar on a full trailer can only have one operating position and cannot be extendable unless it complies with one of the following:

- It may be retractable only to facilitate the through loading or unloading of livestock or goods, provided that the drawbar has only one set of holes for locking pins and these holes are positioned so the drawbar is fully extended when locked.

OR

- If the trailer is used to transport logs, the drawbar may have up to three fixed positions and one sliding position, provided that the drawbar has:
  - » one sliding position for long logs, and
  - » one or two fixed positions for short logs, and
  - » a fixed position for storage of the drawbar when it is out of use while the trailer is being transported on a rigid vehicle or another trailer.

**Note:** When fully extended, the drawbar dimension must be such that the length of the trailer does not exceed 11.5 metres and the total length of the combination vehicle does not exceed 20 metres.

A *drawbeam* must not be sliding or adjustable.

For a full trailer, the maximum *forward distance* (the distance from the rear axis to front of the trailer (excluding the drawbar and front axle set) or its load, whichever is foremost) is 8.5 metres. For full trailers, *front overhang* means the distance from the centre of the turntable that connects the front axle set to the chassis of the trailer, to the foremost point of the vehicle (including its load, but excluding the drawbar). The maximum is 2.04 metres radius arc ahead of the turntable centre.

The maximum *gross mass* of a rigid vehicle and one full trailer in combination is 39 tonnes, unless the towing vehicle has:

- a twin-steer axle set or a wheelbase of at least 4.25 metres and
- at least two motor driven axles in the rear set of the truck.

In addition to these two conditions, the maximum gross mass of the heavy full trailer vehicle combination must not exceed 42 tonnes, unless:

- the towing vehicle has a twin-steer axle set or a tri-axle set, or
- the trailer has two tandem axle sets or the trailer has five axles.

For full trailers, inter-vehicle spacing means the distance between the towing vehicle (excluding the tow coupling shroud) and the trailer (excluding the drawbar but including the load).

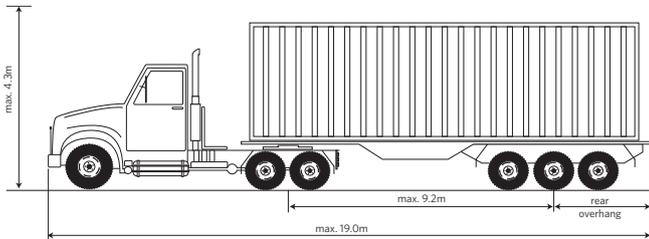
The maximum is four metres. Full trailers also have a minimum requirement. The minimum inter-vehicle spacing is the greater of one metre or half the width of the foremost point of the trailer (including the load but excluding the drawbar).

The maximum *rear overhang* (the distance from the rear axis to the rear of the vehicle or its load, whichever is greater) for a heavy full trailer is four metres or 50 percent of the wheelbase, whichever is less. The maximum for a light full trailer is four metres.

For a rigid vehicle towing a heavy full trailer, the *tow coupling position* must not be further behind the rear axis of the towing vehicle than a distance equal to 45 percent of the wheelbase of the rigid vehicle. (The wheelbase is measured from the rear axis of the rigid vehicle to the foremost axle of that vehicle.)

The wheelbase of a full trailer is the distance from the rear axis of the trailer to the centre of the front axle set of the trailer.

## What are the limits for semi-trailers?



A semi-trailer has one axle set, attached to the towing vehicle at one of these tow coupling positions:

- at or forward of the rearmost axle of the towing vehicle (for rigid vehicles with one axle in their rear axle set or where another trailer is the towing vehicle), or
- not more than 300 millimetres behind the rear axis of the towing vehicle (for rigid vehicles with two or more axles in their rear set).

**Note:** Trailers attached to the towing vehicle behind the above positions are considered simple trailers (including Stinger Steer vehicles).

The *gross mass* of a semi-trailer (including its load) is the mass transferred to the ground through the axle(s) of that trailer. Any transferred weight from a following attached trailer is to be included in the calculation of gross mass of the first trailer. A heavy semi-trailer must have a *rear axle set* consisting of either:

- a single axle set, or
- a tandem axle set, or
- a tri-axle set, or
- a quad axle set, provided the rearmost axle is a steering axle, and the semi-trailer does not form part of an A-train or B-train combination.

The maximum *overall length* for a truck and semi-trailer combination (including load, but excluding collapsible mirrors) is 19 metres. Quad semi-trailers with two rear steering axles are limited to 18 metres (and must also be first registered before 1 February 2017 - ie no more of these vehicles will be allowed).

For a semi-trailer, *forward distance* means the distance from the rear axis to the centre of the kingpin. The maximum is 9.2 metres.

The maximum *rear overhang* for a heavy semi-trailer is 4.3 metres or 50 percent of the forward distance, whichever is less. The maximum for a light semi-trailer is four metres.

For semi-trailers, *front overhang* means the distance from the centre of the kingpin to the foremost point of the vehicle (including its load). The maximum is 2.04 metres radius arc ahead of the kingpin.

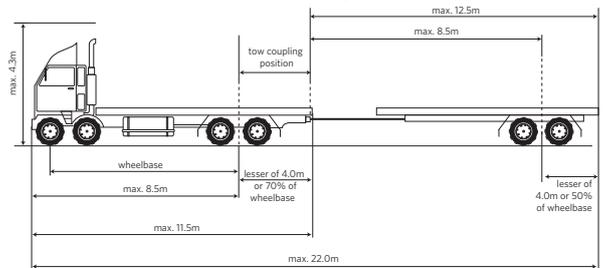
The maximum *gross mass* of a rigid vehicle and one semi-trailer is 39 tonnes, unless it has at least two motor driven axles in the rear set of the rigid vehicle.

### Note: Prohibited tow coupling position

Heavy semi or heavy simple trailers have a prohibited tow coupling position. Tow couplings for towing heavy semi or heavy simple trailers may not be fitted to rigid vehicles between the following positions:

- for a rigid vehicle with one rear axle, from the rear axle to a point 700 millimetres behind that axle
- for a rigid vehicle with two or three rear axles, from 300 millimetres to 700 millimetres behind the rear axis of the rigid vehicle.

## What are the limits for simple trailers?



A simple trailer is, therefore, attached to the towing vehicle at a position well behind the position specified for a semi-trailer. Stinger Steer Transporters are simple trailer combination vehicles. The gross mass of a simple trailer (including its load) is the mass transferred to the ground through the axle(s) of that trailer. Any transferred weight from a following trailer must be included in the calculation of gross mass of the first trailer. The gross mass of a combined rigid vehicle and one simple trailer must not exceed 36 tonnes (except may be 40,000kg if it has an HPMV permit and an approved towing connection - see section 4.3(9) of the Rule).

A heavy simple trailer must have an axle set consisting of either:

- a single axle set, or
- a tandem axle set, or
- a tri-axle set.

The maximum *overall length* for a simple trailer (including drawbar and load) is 12.5 metres. The maximum overall length for a rigid vehicle and simple trailer combination (including load, but excluding collapsible mirrors) is 22 metres.

For a simple trailer, *forward distance* means the distance from the rear axis to the centre of the point of attachment of the towing vehicle. The maximum is 8.5 metres.

*Rear overhang* means the distance from the rear axis to the rear of the vehicle or its load, whichever is greater. The maximum rear overhang for a heavy simple trailer is four metres or 50 percent of the forward distance, whichever is less.

For a light simple trailer, the maximum rear overhang is four metres.

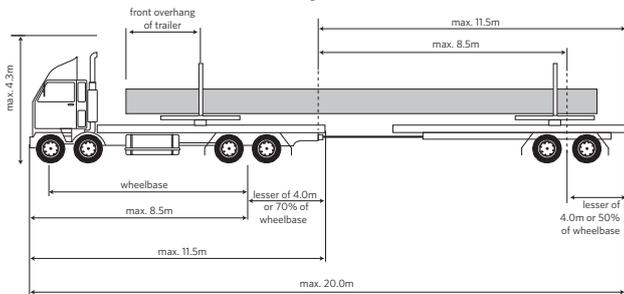
For simple trailers, *front overhang* means the distance from the centre of the tow coupling to the foremost point of the vehicle (including its load). The maximum is 2.04 metres radius arc ahead of the tow coupling.

For a rigid vehicle towing a heavy simple trailer the tow coupling position must be at least 700 millimetres behind the rear axis of the rigid vehicle and not more than a distance equal to 50 percent of the wheelbase of that vehicle. The wheelbase is measured from the rear axis of the rigid vehicle to the foremost axle of that vehicle.

**Note:** For Stinger Steer Transporters, 'tow coupling' includes an articulated fifth wheel attachment with kingpin, or a ball attachment.

For simple trailers, **inter-vehicle spacing** means the distance between the towing vehicle (excluding the tow coupling shroud) and the trailer (excluding the drawbar but including the load). The maximum is four metres. There is no minimum spacing for simple trailers. The trailer (or its load) may overhang the towing vehicle.

### What are the limits for pole trailers?



A pole trailer is a trailer that is attached to a towing vehicle by a telescoping or sliding pole, and is designed to support a common long load spanning between the trailer and the towing vehicle.

The maximum *overall length* for a pole trailer is 11.5 metres (drawbar fully extended, but excluding the load). The maximum overall length for a rigid vehicle and pole trailer combination (including load, but excluding collapsible mirrors) is 20 metres.

*Front overhang*, for pole trailers, means the distance from the centre of the turntable on the towing vehicle to the foremost point of the load. The maximum allowed is 24 metres radius arc ahead of the turntable centre on the towing vehicle (ie the load on the trailer may hang forward of the turntable centre on the towing vehicle by this distance).

The maximum gross mass of a rigid vehicle and pole trailer combination is 39 tonnes unless the towing vehicle has at least two motor-driven axles in its rear axle set.

### Pole trailers with one axle set

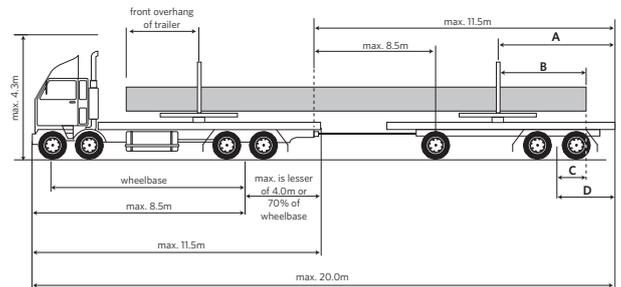
If a heavy pole trailer has one axle set, this must consist of either:

- a single axle set, or
- a tandem axle set, or
- a tri-axle set.

For a pole trailer with one axle set, *forward distance* means the distance (excluding load) from the rear axis of the trailer to the centre of the point of attachment on the towing vehicle. The maximum is 8.5 metres, measured with the drawbar at full extension.

*Rear overhang* means the distance from the rear axis or the centre of the bolster to the rear of the vehicle or its load, whichever is greater. The maximum rear overhang for a heavy pole trailer with one axle set is the lesser of four metres or 50 percent of the forward distance of that trailer. The maximum for a light pole trailer with one axle set is four metres.

### Pole trailers with two axle sets



A heavy pole trailer with two axle sets must have a front axle set consisting of either:

- a single axle set, or
- a tandem axle set.

It must have a rear axle set consisting of either:

- a single axle set, or
- a tandem axle set, or
- a tri-axle set (which is only permitted if the front axle set is a tandem axle set).

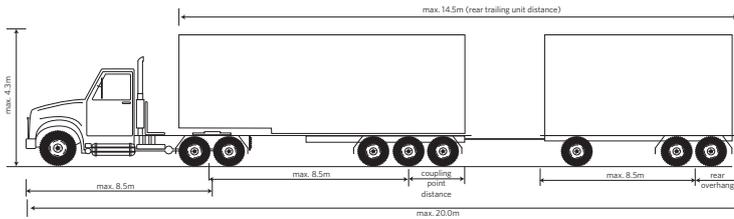
For a pole trailer with two axle sets, *forward distance* means the distance (excluding load) from the front axis of the trailer to the centre of the point of attachment on the towing vehicle. The maximum is 8.5 metres, measured with the drawbar at full extension.

*Rear overhang* means the distance from the rear axis or the centre of the bolster to the rear of the vehicle or its load, whichever is greater. The maximum for a heavy pole trailer with two axle sets is the lesser of four metres or 50 percent of the wheelbase of the trailer, where the wheelbase is measured from the rear axis to the centre point of the front axle set. The maximum for a light pole trailer with two axle sets is four metres.

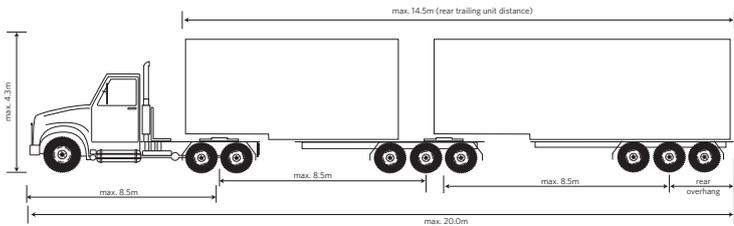
In the example drawing the rear overhang is A (centre of bolster to rear of vehicle) which is the greatest of A, B, C and D. This cannot exceed four metres or 50 percent of the wheelbase (whichever is less).

## What are the limits for a heavy vehicle towing two trailers?

### A-Train (rear full trailer)



### B-Train (rear semi trailer)



A heavy rigid vehicle towing two trailers must be:

- an A-train (a rigid vehicle connected to a semi-trailer that tows a full trailer), or
- a B-train (a rigid vehicle attached to two semi-trailers connected at two points of articulation, where the forward distance of the longer trailer divided by the forward distance of the shorter trailer does not exceed 1.4, or
- a heavy rigid vehicle followed by any combination of two trailers (not an A-train or a B-train), provided the trailer at the rear of the combination has a gross vehicle mass that isn't over 3.5 tonnes, and the gross mass of the combination is less than 20 tonnes.

### Overall length

For any combination of a rigid vehicle towing two trailers, the maximum allowable length (without collapsible mirrors) is 20 metres.

### Rear trailing unit distance

The rear trailing unit distance means the distance between the rigid vehicle's point of attachment on the first trailer and the rear of the combination, including its load. The maximum allowable is 14.5 metres, and this applies to all combinations of a rigid vehicle towing two trailers.

### Coupling point distance (for A-trains)

The coupling point distance for an A-train means the distance between the rear axis of the semi-trailer and the centre of the tow coupling connecting the full trailer to the semi-trailer. The maximum allowed is 30 percent of the forward distance of the semi-trailer.

### Articulated vehicle attachment point

The rearmost semi-trailer in a B-train must not be coupled further rearward than the rearmost axle of the lead semi-trailer.

### Forward distance

The maximum forward distance of rigid vehicles and trailers is 8.5 metres. Note that usually only one vehicle in a three-vehicle

combination will be able to have a maximum forward distance dimension without the maximum overall combination length (20 metres) being exceeded.

### Axle requirements

The rigid vehicle in an A-train must have at least two motor-driven axles in its rear axle set. A-trains and B-trains must not have retractable or rear steering axles.

### Gross mass limits

The combined gross mass of an A-train must not exceed 39 tonnes. The combined gross mass of a B-train must not exceed 39 tonnes, unless it has at least two motor driven axles in the rear axle set of the rigid vehicle.

The combined gross mass of any other combination of a rigid vehicle and two trailers must be less than 20 tonnes.

### Where can I find out more?

- Factsheet 13 *Vehicle dimensions and mass: guide to the factsheet 13 series*
- Factsheet 13a *Heavy rigid vehicles*
- Factsheet 13b *Light rigid vehicles*
- Factsheet 13d *Trailers: Light simple trailers*
- Factsheet 13e *Static roll thresholds*
- Factsheet 13f *Heavy buses*
- Factsheet 13g *High Productivity motor vehicles*
- Factsheet 13h *Specialist vehicles*
- Factsheet 53a *Overdimension vehicles and loads*
- Factsheet 53b *Overdimension roles and responsibilities*
- *Guide to safe loading and towing for light vehicles.*
- Land Transport Rule 41001: Vehicle Dimensions and Mass 2016.

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