



Testing the limits

I am frequently asked to list the dimension and axle-mass limits that apply to heavy-vehicles in Australia. However, the regulations are complex because of the special cases that have been accepted by regulators for different types of vehicles and different sorts of applications. These limits have developed

over a long period to achieve productivity improvements. As a consequence, Australia has a very effective road transport industry. Here's an overview outlining what the market looks like at the moment.

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Dimensions

Quantity	Measurement	National	Comments
Width	With mirrors folded in and excluding marker light lenses and curtain-side buckles.	ADR 43: 2.5m; special cranes: 3.5m. Low loader trailers with 8 tyres on each axle: 2.7m. PBS vehicles can be approved with widths > 2.5m; however, road access will be restricted.	Europe: 2.55m. Special vehicles – 2.6 m. US: 2.6 m (102").
Rear overhang - motor vehicle	Centre of the rear group to the end.	General (ADR 43): lesser of 0.6 x wb or 3700mm. Special (NHVR): lesser of 0.9 x wb or 4000mm. Overhang is measured from the centre line of the rear axle group (6x4 or 8x4)	Europe: 60 per cent of the wheelbase. US: State dependent.
Forward projection - motor vehicle	Headlights to the vertical line through the extremity of the projection.	NHVR: Special purpose vehicles – 1.2 m in front of the headlights. Cranes: 3.5 m in front of the centre of the steering wheel.	
Total length of a motor vehicle	Front bumper to rear bumper.	ADR 43: 12.5 m for a single vehicle. NHVR: Generally 12.5m, except for a bus (14.5m) and a car-carrier (25m). 18m for an articulated bus.	Europe: 12m
Total length of an articulated vehicle involving one trailer	Front bumper to rear bumper.	ADR 43: 19m. PBS: 20m for a blueprint semi-trailer.	Europe: 16.5m. US: Load sace of truck and trailer may each be 8.53m.
Total length of a B-double	Front bumper to rear bumper. Front wall of front trailer to rear wall of rear trailer.	NHVR: 25m or 26m with front under-run bar + cabin strength. NHVR: 18.8m	
Total length of a roadtrain	Front bumper to rear bumper.	NHVR: Double roadtrain 34.5m, triple roadtrain 53.3 m	
Height	Ground to highest point.	General (ADR 43): 4.3m. Livestock trailer (ADR 43): 4.6 m	Europe: 4m. US: up to 14.6' (4.42m)
Distance between twin-steer axles	Distance between front steering-axle centrelines.	ADR: 1-2m	Europe: none
Ground clearance	Ground to lowest point between axle groups.	ADR 43: 33.33mm x distance between consecutive axles.	
Turning circle of a motor vehicle	Tyre track circle. Wall-to-wall turning circle.	ADR 43: 25m. Articulated bus must turn within an inner radius of 5.3m and outer radius of 12m.	Europe: Wall-to-wall - outer radius 12.5 m. Inner radius 5.3m
Rear overhang of a trailer	S = distance from the kingpin to the centre of the rear axle group.	ADR 43 (semi-trailer): lesser of 0.6 x S or 3700mm; for other trailers: lesser of forward load space of 3.7m	
Forward projection semi-trailer	King pin to front corner.	ADR 43: 1.9m	Europe: 2.04m
Total length (not semi-trailer)	Front bumper to rear bumper.	ADR 43: 12.5m (including drawbar if applicable)	Europe: trailer length including drawbar: 12m
Total length of a semi-trailer	Kingpin to centre of rear axle group. Kingpin to the rear bumper. Total length.	ADR 43: 9.5m; NHVR: 9.9m for a refrigerated van. ADR 43: 12.3m; NHVR: 13.6 m for a refrigeration van. NHVR (Special): 14.63; Special refrigerated van: 14.9m. Low-loader with 8 tyres on an axle: 19m	Europe: 12.0m* USA: 14.63m
Maximum drawbar length	Coupling to centre line of the first axle.	ADR 43 (Pig trailer): 8.5m; other than pig trailer: 5m. NHVR: At least 3m on a roadtrain with length > 19m.	
Maximum length of a dog trailer	Tow eye centre to rear bumper.	NHVR: 12.3m including the drawbar.	
Centre of Mass height / rollover threshold	Height above the ground of the sprung mass including the load	No ADR requirement. Desirable practice is to keep below 2.6m when the trailer has airbag suspension.	Not regulated in Europe or the US.
Minimum engine power	Net engine power	Nil	Europe: 5 kW / tonne.

Projection of loads beyond the vehicle.	Measured from the vehicle extremity.	NHVR: 1.2 m in front of the headlights. 1.2m beyond the rear of a vehicle. 0.15 m beyond the side of the vehicle.	Europe: Width - up to 2.9 m total width. Length - up to 1.5m behind the rear line of the vehicle.
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*Removable structures including shipping containers are included when measurements are made. Tolerances are applied to dimension measurements. Dimension violations are classified as Minor, Substantial or Severe according to a classification issued by the NHVR.

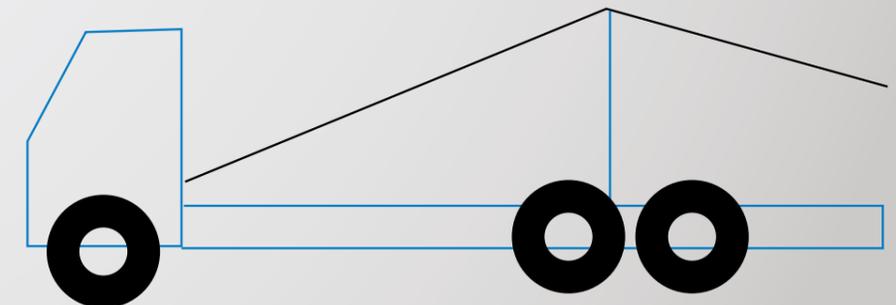
Mass Limits

Quantity	National	Comments
Retractable axles	ADR 43: retractable axles must be down when the weight on the axle group exceeds the prescribed transition masses in Table 1. See ADR 43/04 Cl 9.	Retractable axle transition mass is the only axle mass that is regulated by the ADRs.
Maximum weight on a single steering axle	NHVR GML* prime mover: 6.5t (tyre width > 295mm); 6.7t (tyre width > 375mm); any other vehicle: 6t.	Europe: No more than 30 per cent of the total mass. If the vehicle is an articulated vehicle, then no more than 20 per cent of the gross weight. USA: 20,000 lb (9,071 kg).
Maximum weight on a single non-steering axle with single tyres.	NHVR GML*: 6.0t (tyre width < 375mm); 6.7t (tyre width 375mm – 450 mm) 7.0t (tyre width > 450 mm).	
Maximum weight on a single non-steering axle with dual tyres.	NHVR GML*: 9.0t; or 10.0t (accredited buses) 8.5t (pig trailer).	Europe: non-driven 10t; driven 11.5t. USA: 34,000 lb (18,144 kg).
Maximum weight on a tandem axle group with single tyres	NHVR GML* (CML add 0.5t; HML 14.0t): 11.0t (tyre width < 375mm); 13.3t (tyre width 375mm – 450 mm); 14.0t (tyre width > 450 mm)	Europe: 18t (axle spacing in the range 1.3m – 1.8m). With RFS: 19t. USA: 34,000 lb (15,422 kg) irrespective of tyres. QLD: CML limits are higher and based on GVM.
Maximum weight on a tandem axle group with dual tyres	NHVR GML*: 16.5t CML = 17.0; HML = 17.0t; Pig trailer: 15t, CML & HML are not applicable.	Europe: 18t (axle spacing in the range 1.3m – 1.8m). With RFS 19t. USA: 34,000 lb (15,422 kg) irrespective of tyres. Queensland: CML limits are higher and are based upon vehicle GVM.
Maximum weight on a tri-axle group with dual tyres except for a pig-trailer	NHVR GML*: 20.0t (tyre width > 375mm or with dual tyres); CML limit = 21.0t; HML limit = 22.5t; 18t (single tyre width > 375mm or with dual tyres on a Pig trailer) CML and HML are not applicable	Europe: 24t axle spacing in the range 1.3m – 1.4m) Queensland: CML limits are higher and are based upon vehicle GVM.
Weight on the drive-group of a combination vehicle.		Europe: 25 per cent of the total laden weight of the vehicle or combination.
Twin steer group	NHVR: 10.0 t or 11.0t with load-sharing suspension	

*GML = General mass Limits. CML = Concessional Mass Limits, which apply to accredited operators. HML = Higher mass Limits, which apply to accredited operators and to axle groups with road-friendly suspensions (RFS). RFSs are not mandated by the ADRs. For a list of RFS see www.infrastructure.gov.au/roads/vehicle_regulation/suspension.aspx

MORE

Mass limits per axle are also applied depending upon axle spacing and the responsibility is ultimately with the operator. It is possible to calculate the maximum weight that can be placed at each point of the load-space and meet the maximum axle weight limits. The image on the right shows the calculation for a rigid truck. This takes account of the different weights that can exist on axles in the rear-axle group.



The maximum centre-of-mass weight that can be legally put onto a vehicle is limited by the axle weight limits. The maximum weight point is usually just forward of the rear-group centre-line