
Australian Design Vehicle Library (AU_XXX.ATL)

The Australian vehicle library contains data on vehicles specified by Austroads and Standards Australia.

The Austroads design vehicle details are extracted from Austroads Publication No. AP-G34/06, "Austroads Design Vehicles and Turning Path Templates". (This supersedes Austroads Publication No. AP-34/95, "Design Vehicles and Turning Path Templates").

Australian Standards vehicles have been sourced as follows:

AS/NZS 2890.1:2004 – Parking facilities, Part 1: Off-street car parking

AS 2890.2-2002 – Parking facilities, Part 2: Off street commercial vehicle facilities

For further information on these vehicles and their use for design purposes, the user of this software is urged to consult the above publications directly.

Australian Design Vehicle Library: List of Vehicles

Vehicle	Type	Length (mm)	Width (mm)
<i>Austroads 1995 Vehicles</i>			
Design Car (5.0m)	Design	5000	1900
Service Vehicle (8.8m)	Design	8800	2500
Single Unit Truck/Bus (12.5m)	Design	12500	2500
Prime Mover & Semi-Trailer (19.0m)	Design	19000	2500
Long Rigid Bus (14.5m)	Restricted Access	14500	2500
Articulated Bus (19.0m)	Restricted Access	19000	2500
B-Double (25.0m)	Restricted Access	25000	2500
Prime Mover & Long Semi-Trailer (25.0m)	Restricted Access	25000	3000
Type 1 (Double) Road Train (36.0m)	Restricted Access	36000	2500
Type 2 (Triple) Road Train (53.0m)	Restricted Access	53000	2500
<i>Austroads 2006 Vehicles</i>			
Car/van vehicle (5.2 m)	Design	5200	1940
Service Vehicle (8.8 m)	Design	8800	2500
Single Unit Truck/Bus (12.5 m)	Design	12500	2500
Single Articulated (19.0 m)	Design	19000	2500
Long Single Articulated (25.0 m)	Restricted Access / Checking	25000	3000
Long Rigid Bus (14.5 m)	Restricted Access / Checking	14500	2500
Articulated Bus (19.0 m)	Restricted Access / Checking	19000	2500
B-Double (25.0 m)	Restricted Access / Checking	25000	2500
B-Double (26.0 m)	Restricted Access / Checking	26000	2500
A-Double (36.2 m)	Restricted Access /	36200	2500

Vehicle	Type	Length (mm)	Width (mm)
B-Triple (36.5 m)	Checking Restricted Access / Checking	36500	2500
A-Triple (53.4 m)	Restricted Access / Checking	53400	2500
<i>Standards Australia Vehicles</i>			
B85 Vehicle	AS 2890.1-2004	4910	1870
B99 Vehicle	AS 2890.1-2004	5200	1940
SRV – Small Rigid Vehicle	AS 2890.2-2002	6400	2330
MRV – Medium Rigid Vehicle	AS 2890.2-2002	8800	2500
HRV – Heavy Rigid Vehicle	AS 2890.2-2002	12500	2500
AV – Articulated Vehicle	AS 2890.2-2002	19000	2500

Australian Design Vehicle Library: Minimum Turning Circle Radii

Road and Intersection Design

Austrorads Publication No. AP-G34/06, "Australian Design Vehicles and Turning Path Templates" gives guidance on the minimum turning radii to use for road design purposes. It should be noted that these vary according to the design speed and the user is advised to consult this document for further guidance on this matter. For some vehicles, the tightest radii are only allowable at a mandatory stop.

Generally, the smallest radius that does not require a mandatory stop is given as the minimum radius for the library vehicles. However, for the convenience of users, as well as to highlight this, a separate version of each vehicle with a mandatory stop radius is included in the library, where the versions are identical to each other in all respects except for their turning ability.

In contrast with the 1995 version, we have not included a set of "Realistic Minimum Radius" vehicles in the 2006 Austrorads library, and suggest the use of the "Mandatory Stop" versions instead. However, we note two concerns with the published data in this regard:

- (i) A template is included on the Austrorads 2006 CD (although not listed in the document) for a 9m turn radius of the Single Unit Truck/Bus that we believe is not feasible. From the geometry of the vehicle, the maximum (inside) wheel turn angle required to achieve this turn is estimated to be 63.7 degrees which is regarded as considerably beyond the ability of vehicles of this type.
- (ii) A template is included on the CD (although not listed in the book) for a 9m turn radius of the Single articulated vehicle (19m). From the geometry of the prime-mover, a maximum (inside wheel) turn angle required to achieve this turn is estimated to be 47.4 degrees which is regarded as somewhat unconservative.

Off-Street Parking Facilities

Standards Australia gives guidance on minimum turning radii for off-street (parking facility) design purposes. For cars, AS/NZS 2890.1:2004 recommends different minimum radii for parking manoeuvres compared to those for design of circulating roadways, and both versions of the

vehicles are given in the library. For commercial vehicles, the minimum radii used are those specified in AS 2890.2-2002.

Previous (1995) Austroads Library

For the convenience of users, we have retained the superseded vehicle library based on the 1995 Austroads Publication No. AP-34/95, "Design Vehicles and Turning Path Templates". This publication differs from the 2006 Edition in that it provides guidance on "Absolute Minimum" radii and "Desirable Minimum" radii for use in designing roads and intersections rather than as described above.

The 1995 Austroads library included three versions of each of the Austroads vehicles, where the versions were identical to each other in all respects except for their turning ability. "Absolute Minimum Radius" and "Desirable Minimum Radius" versions were provided in accordance with the recommendations of the 1995 Austroads document for road design purposes.

However, since even the "Absolute Minimum" radii recommended by Austroads were considered to be conservative in several instances, we also included a third, "Realistic Minimum Turning Radius", version of the Austroads vehicles. For this "Realistic" set of vehicles, we relied on provisional (maximum steering angle) data for Austroads vehicles provided by VicRoads (see reference (iii) below), backed up by sample checks of manufacturer's data for typical vehicles of the classes included in the library.

Users should note that the "Realistic Minimum Turning Radius" versions of the Austroads vehicles were intended for use only in situations where the realistic, tightest turning performance of vehicles was of interest, such as in situations involving access to an already existing site.

Australian Design Vehicle Library: Lock to lock time

Lock to lock time is not a parameter that is easily obtainable from manufacturers, but it does affect the manoeuvrability of vehicles and so is important. In the absence of reliable data we have in most cases set the lock to lock time to a notional figure of either four or six seconds depending upon the size of vehicle. If you have a reliable source that suggests an alternative figure we recommend that you use that.

Australian Design Vehicle Library: Maximum Articulation Angles

The maximum articulation angles between trailers and either prime movers or other trailers represent realistic possible maxima and are not necessarily the recommended maximum articulation angles to be used in any particular design situation. The values given were based on provisional data for Austroads vehicles provided by VicRoads (See Reference (iii) below).

Australian Design Vehicle Library: Axle layouts & wheel sizes

All wheel sizes (diameter and width) are approximate values. These dimensions do not affect the turning characteristics or wheel tracking.

Note that, although the details of all axles and tyres are included in each vehicle's specification, AutoTrack's calculations are based on single

“effective” axles. The position of each effective axle is automatically calculated by AutoTrack as being at the centroid of an axle group, however, the user should note that this position may not give conservative swept paths due to the effects of road surface, tyre condition, vehicle loading and even driving technique. The user’s attention is drawn to the comments made under **Error! Reference source not found.** in the Theory section.

Australian Design Vehicle Library: Kingpin Offsets

In cases where a component is used such that it is not towing another component the kingpin position may be left as zero. If you use a component in a towing role you should check the kingpin (or towbar) location.

Australian Design Vehicle Library: Vertical Clearance

Both Austroads and Standards Australia give guidance of maximum height, vertical clearance and ground clearance. Both refer to Australian Design Rule 43 (see reference (vi) below) for ground clearance but it should be noted that Standards Australia has adapted this data, thus similar vehicles have different ground clearance profiles under the two standards.

Since, in each case, the ground clearance data appears rather different to a normal vehicle profile, separate vertical clearance checking models are provided showing the recommended ground clearance to be used for design purposes. Where headroom figures are provided that are different to the maximum heights of the vehicles, separate clearance lines are included in the models.

Australian Vehicle Library: References

- (i) *“Australian Design Vehicles and Turning Path Templates”*, Austroads Publication No. AP-G34/06 (2006).
- (ii) (Superseded). *“Design Vehicles and Turning Path Templates”*, Austroads Publication No. AP-34/95 (1995).
- (iii) *“Provisional vehicle details for Austroads vehicle Library”*, Private Communication to former Australasian distributor of AutoTrack, Finite Element Analysis (Australia) Pty Ltd, from Traffic and Road Use Management Department, VicRoads, 11 May 1994.
- (iv) *“AS/NZS 2890.1 – 2004, Parking Facilities, Part 1: Off-street car parking”*, Jointly published by Standards Australia and Standards New Zealand, 2004
- (v) *“AS 2890.2 – 2002, Parking facilities, Part 2: Off-street commercial vehicle facilities”*, Second edition, Standards Australia, Sydney NSW, October 2002.
- (vi) *“Australian Design Rule 43/04 – Vehicle Configuration and Dimensions”*, Federal Office of Road Safety, Australia, 1996.