

Description of Truck Configurations

TECHNICAL ADVISORY PROCEDURE



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About this Technical Advisory Procedure (TAP):

This Technical Advisory Procedure is published by the Australian Trucking Association Ltd (ATA) to assist the road transport industry, authorities, and the public to accurately identify truck configurations and to achieve a better understanding of terminology. This TAP is not, nor is it intended to be, complete or without exceptions.

The Technical Advisory Procedure is a guide only, and its use is entirely voluntary. Recommendations or procedures may not be suitable for or applicable to all operators. Operators should consider their own circumstances, practices and procedures when using this Technical Advisory Procedure.

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Suggestions or comments about this Technical Advisory Procedure are welcome. Please write to the Industry Technical Council, Australian Trucking Association, Minter Ellison Building, 25 National Circuit, Forrest ACT 2603.

About the ATA Industry Technical Council:

The Industry Technical Council (ITC) is a standing committee of the Australian Trucking Association (ATA). The ITC's mission is to improve trucking equipment, its maintenance and maintenance management. The ITC was established in 1994.

As a group, the ITC provides the ATA with robust professional advice on technical matters to help underpin the ATA's evidence-based policymaking. It is concerned with lifting technical and maintenance standards, improving the operational safety of the heavy vehicle sector, and the development of guidelines and standards for technical matters.

ITC performs a unique service in the Australian trucking industry by bringing operators, suppliers, engineers and other specialists together in a long-term discussion forum. Its members provide expert and independent advice in the field to inform the work of the ITC. The outcomes from ITC benefit all ITC stakeholders and the heavy vehicle industry at large.

The ITC operates under the Australian Trucking Association's Council, which formulates industry policy for implementation by the organization.

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We welcome applications to join the ITC. For further information, please call the ATA on (02) 6253 6900 or email ata@truck.net.au or download information from the ATA website www.truck.net.au, follow the links under the members tab to join.

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1. INTRODUCTION

This Technical Advisory Procedure (TAP) provides operators and authorities with a consistent reference to configurations and their descriptions.

The ATA Industry Technical Council (ITC) has reviewed this TAP to include newer combinations, including some PBS configurations.

2. DEFINITIONS

Definitions and abbreviations as referenced may be viewed at the ATA-ITC Technical Dictionary: <https://www.truck.net.au/system/files/industry-resources/ATA%20ITC%20Technical%20Dictionary.pdf>

3. UNDERSTANDING THE CODING USED TO IDENTIFY A COMBINATION

The coding used to identify a combination provides descriptions of truck configurations. However, inconsistent use of combination codes creates confusion.

Under the Australian Design Rules:

- a motor vehicle must be supported by two (2) axle groups, one axle or axle group located towards the front, and one axle or axle group located towards the rear, of the vehicle.
- a semi-trailer must be supported by a towing vehicle and an axle or axle group towards the rear.
- a trailer, other than a semi-trailer, must be supported by either one axle group near the centre of the load space and the towing coupling or alternatively, two (2) axle groups, one axle or axle group towards the front, and one axle or axle group located towards the rear, of the trailer.

Configuration coding: the principles were developed in the mid-1980s and are based on an alpha prefix identifying the vehicle unit or units; followed by a numeral (or numerals) to represent the number of axle/s in each axle group.

This coding adopts the following convention:

A – articulated combination comprising a prime mover and a semi-trailer coupled by a fifth wheel

B – Prime mover and/or multiple semi-trailers coupled via a fifth wheel mounted on the towing vehicle

R – rigid truck

T – trailer unit consisting of a dog trailer (two (2) axle groups); pig trailer (one (1) axle group; or a converter dolly (one (1) axle group)

T^{RC} – trailer unit consisting of a dog trailer (two (2) axle groups); pig trailer (one (1) axle group; or a converter dolly (one (1) axle group); that is “roll-coupled” to the towing vehicle

n – refers to the number of axles in an axle group

The PBS scheme has introduced a new axle configuration referred to as a “split axle group”. This refers two axles or axle groups in close configuration and requires specific PBS approval.

Its introduction permits two adjacent axle groups to be considered as single axle group (subject to specific approval and conditions, including steerable axle/s) to a

maximum of four (4) axles that would otherwise form a non-complying axle group.

A split axle group will normally involve three or four axles, examples include: 1 + 2; 1 + 3; 2 + 2; 3 + 1; 2 + 1: 1 + 2 + 1.

Axle group examples:

- **A123** Articulated combination: prime mover 1 front axle and 2 rear axles, semi-trailer with 3 axles
- **R12T22** Rigid truck 1 front axle and 2 rear axles; towing a dog trailer with 2 front axles and 2 rear axles
- **B1233** B-double prime mover 1 front axle and 2 rear axles; towing two (2) semi-trailers each with 3 axles
- **A12(1+2)** Articulated combination: prime mover 1 front axle and 2 rear axles, and a semi-trailer consisting of a split axle group of one (1) axle and two (2) axles
- **A123T2B33** AB-triple - articulated combination: prime mover 1 front axle and 2 rear axles, semi-trailer with 3 axles; towing converter dolly with 2 axles; towing two (2) semi-trailers each with 3 axles
- **A123T^{RC}2B333** ABB-quad - articulated combination: prime mover 1 front axle and 2 rear axles, semi-trailer with 3 axles; towing a roll-coupled converter dolly with 2 axles; towing three (3) semi-trailers each with 3 axles

A configuration A12(1+3) refers to a 7-axle articulated vehicle (requiring PBS approval) with a single steer axle, tandem drive axles (prime mover) and a semi-trailer that includes two (2) split axle groups - the first axle group being one axle and the second axle group being 3 axles.

A modular combination is a multi-vehicle combination that consists of more than two (2) vehicle units, where each individual vehicle unit complies with the relevant ADRs and AVSRs and sub-combinations are complying vehicle combinations.

(eg: the prime mover and any two trailers of a B-triple can be assembled to form a complying B-double). The sub-combinations of a modular combination (when laden to legal operating axle group mass limits) continue to comply to legal axle group mass limits.

4. UNDERSTANDING THE GENERIC CONFIGURATION DESCRIPTION

Introduction to some references:

A-type COUPLING: a drawbar-based coupling type. This coupling type does not typically transfer roll, nor load between the vehicle units.

B-type COUPLING: a fifth wheel connection coupling. This coupling type transfers roll and load between the vehicle units.

DOG Trailer: a trailer (including a trailer consisting of a semi-trailer and converter dolly) with:

- (a) one axle group at the front that is steered by connection to the towing vehicle by a drawbar
- (b) one axle group at the rear.

Example Configurations

Single Trailer:

- Rigid truck and pig trailer (typically an A-coupling)
- Rigid truck and dog trailer (typically an A-coupling)
- Prime mover and semi-trailer (B-coupling)

Two trailers

- B-double (prime mover towing two semi-trailers - B-couplings)
- A-double (prime mover and semi-trailer towing a dog trailer) Type I road train
- Rigid truck towing two dog trailers

Three trailers

- A-triple (prime mover and semi-trailer towing two dog trailers) Type II road train
- B-triple (prime mover towing three semi-trailers - B-couplings)
- AB-triple (prime mover and semi-trailer towing a converter dolly and two semi-trailers)

Four Trailers

- A-quad (prime mover and semi-trailer towing three dog trailers)
- B-quad (prime mover towing four semi-trailer – B-couplings)
- ABB-quad (prime mover and semi-trailer towing a converter dolly and three semi-trailers)
- AAB-quad (prime mover and semi-trailer towing a dog trailer towing a converter dolly and two semi-trailers)
- BAB-quad (B-double towing a converter dolly and two semi-trailers)

The following combination vehicle is commonly referred to as a **BAB quad** (refer ATA-ITC Technical Dictionary).



B-double (B): plus, A-coupling to converter dolly (A): plus, B-double trailers (B) = BAB Quad (B1233T2B33)

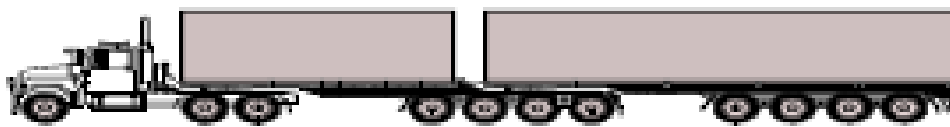
These same vehicle units could also be assembled to form an ABB Quad.



Articulated vehicle (A) plus converter dolly (T) plus B-triple trailers (BB) = ABB Quad (A123T2B333).

5. COVER IMAGES, CONFIGURATION CODES:

These images on the cover page represent two long combinations.



B1244, **Quad/quad B-Double**, GCM (PBS Level 2B-HML) 77.5 tonnes



A123T2B33, **AB Triple**, GCM 99.5 tonnes

Articulated vehicle (A) plus converter dolly (T) plus B-double trailers (B) = AB Triple.

The configuration symbol above is of a three-axle prime mover, coupled to a triaxle semi-trailer (3) (A123); towing a tandem axle converter dolly (T2); coupled to a triaxle leading two triaxle semi-trailers (B33) – A123T2B33.

6. GROSS VEHICLE MASS (GVM) / GROSS COMBINATION MASS (GCM)

The Mass Limit/s (figures) as listed in the truck configuration tables (section 8 of this TAP) are based on the axle limits published in the National Heavy Vehicle Regulators General Mass Limits (GML) bulletin. A limited subset of the limits is listed in table 1 below.

Axle loading limits ¹ . (tonnes)	Typical limit	If the axle(s) is/are used within a pig trailer
Single steer axle	6.0 ²	
Twin steering axles with load sharing suspension ³	11.0	
Single axle ⁴	9.0	8.5
Dual axle group ⁴	16.5	15.0
Tri axle group ⁴	20.0	18.0
Quad axle group ⁴	20.0	Not available
Quad axle group ⁵	24.0	Not available

Table 1: Axle Loadings for GML

Table notes

1. The tabulated figures do not consider any other limitation, which may impact on the combination's mass limit/s.
2. 6.0 tonnes is the maximum steer axle mass limit under the Heavy Vehicle National Law (HVNL). However, a 6.5 tonnes limit is available to units with an engine complying with ADR80/01 (Euro IV emissions), ADR 84/00 front underrun protection device and the cab strength requirements of UN ECE R29. 6.0 tonne is the reference used for a steer axle in the section 8 table.
3. Non-load sharing (twin steer) suspensions are limited to 10.0 tonnes and have not been included.
4. All axles are assumed to have 4 tyres except for the steer axle(s).
5. The load limit for a quad axle group is 24 tonnes GML and up to 27 tonnes HML when operating in a PBS approved combination.

Certain configurations are legally limited to less than the sum of their axle groups.

- Under HVNL for GML, all trucks with a single trailer are limited to 43.0 tonnes GCM including the additional half tonne available for a complying steer axle. See note 2 above.
- A rigid truck towing a dog trailer, or a pig trailer are limited in that the mass of trailer shall not exceed the mass of the towing vehicle; except where notices specify otherwise. <https://www.nhvr.gov.au/files/201811-0944-info-sheet-national-class-3-truck-and-trailer-mass-exemption-notice-2018.pdf>
- A 7 axle (short, 19 m OAL) B-double is limited to a GCM of 50.5 tonnes (general access) or 55.5 tonnes (GML - restricted access).
- All combinations are required to comply with minimum axle spacing as necessary for the axle group masses.

Description of Mass Limit/s used in this TAP

The Mass Limit/s of a configuration is/are the sum of the individual axle groups at the statutory axle group load limits as defined in Table 1 above.

7. NOTES AND KEY FOR THE DESCRIPTION OF TRUCK CONFIGURATION DESCRIPTION USED IN SECTION 8 TABLE

Notes

- Modular combinations are designed so that when disassembled, each trailer or combination of trailers will also form a complying sub-combination.
- The table (section 8 of this TAP) is a general reference, being illustrative, and is not envisaged to be all encompassing of truck configurations driven on the road.
- The rigid truck or prime mover may have up to 5 axles or more, in a range of axle configurations, dog trailers may have up to 7 axles (or more), general semi-trailers may have up to 4 axles, pig trailers may have up to 3 axles, and dollies up to 4 axles.

Table key for section 8 of this TAP below




- T1 Mass Limit/s is/are limited to the sum of the axle groups or less, this may vary between the states and territories including steer axle mass concession and
- T2 Heavy Vehicle National Law (NHVL) limits the gross mass of a truck and single trailer (≤ 19 metres overall length) to 42.5 tonnes (GML). Combinations > 19 metres and/or > 42.5 tonnes operate under exemption and/or gazette notices
- T3 These configurations include at least one quad axle group. The mass limit/s as noted are based on 24 Tonnes GML and 27 tonnes HML for the quad group. Quad axle groups are limited to 20 tonnes unless specifically approved with PBS. Both GML and HML quad axle groups are restricted access.
- T4 A tridrive (or tridem) prime mover towing a single triaxle semi-trailer at 46.5 tonnes (GML), subject to access approval.

Configuration Mass Limits: The combination mass included in Section 8 are those available at general mass limits exclusive of the steer axle mass concession.





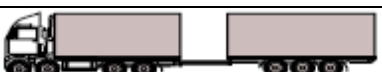
Concessional and Higher Mass Limits vary across Australia. The HVNL does not apply to Northern Territory and Western Australia. The single steer axle mass concession (of 0.5 tonnes) is conditional on the vehicle meeting specific criteria, further steer axle mass concessions are available through permit systems provided by the State or Territory. Operators need to consult the requirements for operating at CML or HML and any applicable axle group and combination mass limits.

8. DESCRIPTION OF TRUCK CONFIGURATION:

Rigid Trucks








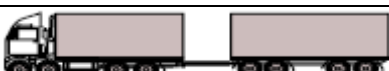
		Configuration Code	Mass Limit/s (tonnes)	Potentially a modular combination
2-axle rigid		R11	15.0	NA
3-axle rigid		R12	22.5	NA
4-axle rigid		R22	27.5	NA
5-axle rigid		R23	31.0	NA

Rigid truck and pig trailer combinations

Pig trailers have one axle or axle group in the centre of the trailer		Configuration Code	Mass Limit/s (tonnes)	Potentially a modular combination
2-axle rigid, 1-axle pig		R11T1	24.0	NA
2-axle rigid, 2-axle pig		R11T2	30.0	NA
3-axle rigid, 2-axle pig		R12T2	37.5	NA
3-axle rigid, 3-axle pig		R12T3	40.5	NA
4-axle rigid, 3-axle pig		R22T3	42.5 (45.5 ^{T1})	NA











Note: Twin steer mass shown for load-share at 11 tonnes.

Rigid truck and dog combinations







Dog trailers have an axle or axle group at each end of the trailer and may consist of a semi-trailer with a converter dolly as the forward axle group. However, typical of the following combinations, commonly refer to a rigid truck and dog, the forward axle group is fixed to the trailer.		Configuration Code	Mass Limit/s (tonnes)	Potentially a modular combination
2-axle rigid, 2-axle dog		R11T11	30.0	NA
3-axle rigid, 2-axle dog		R12T11	40.5	NA
3-axle rigid, 3-axle dog		R12T12	42.5 (48.0 ^{T1})	NA
3-axle rigid, 4-axle dog		R12T22	42.5 (55.5 ^{T1})	NA
3-axle rigid, 5-axle dog		R12T23	42.5 (59.0 ^{T1})	NA
3-axle rigid, 6-axle dog		R12T33	42.5 (62.5 ^{T1})	NA
4-axle rigid, 3-axle dog		R22T12	42.5 (53.0) ^{T1 T2}	NA
4-axle rigid, 4-axle dog		R22T22	42.5 (60.5) ^{T1 T2}	NA

Notes: Four and five axle dog trailers are commonly referred to as quad and quin dogs respectively. Whereas in multi trailer combinations, the words triple, quad and quin refer to the number of trailers in the combination.




Single articulated vehicles

Single articulated vehicles are prime movers coupled to a single semi-trailer		Configuration Code	Mass Limit/s (tonnes)	Potentially a modular combination
3-axle semi, single drive, single axle		A111	24.0	NA
4-axle semi, single drive, tandem axle		A112	31.5	NA
5-axle semi, single drive, triaxle		A113	35.0	NA
5-axle semi, tandem drive, tandem axle		A122	39.0	NA
6-axle semi, tandem drive, triaxle		A123	42.5	NA
7-axle semi, twin-steer, tandem drive, triaxle		A223	46.5 ^{MDL}	NA
6-axle semi, tandem drive, semi-trailer with two axle groups (2+1)		A12(2+1)	48.0 ^{PBS}	NA
7-axle semi, tandem drive, semi-trailer with two axle groups (1+3)		A12(1+3)	51.5 ^{PBS}	NA
7-axle semi, tandem drive, quad-axle		A124	42.5 ^{T1 T2} (46.5 ^{T3})	NA
7-axle semi, tri-drive, triaxle		A133	42.5 ^{T1 T2} (46.0 ^{T4})	NA



B-Doubles

B-Doubles are prime mover coupled to 2 semi-trailers, connected by fifth wheel couplings.		Configuration Code	Mass Limit/s (tonnes)	Potentially a modular combination
B-double, tandem drive, tandem axle		B1222	55.5 (50.5 ^{T1})	M
B-double, tandem drive, tandem-tri axle		B1223	59.0	M
B-double, tandem drive, triaxle, tandem axle		B1232	59.0	M
B-double, tandem drive, triaxle		B1233	62.5	M
B-double, tandem drive, quad-triaxle		B1243	62.5 (73.0 ^{T3})	M
B-double, tandem drive, quad-quad		B1244	70.5 ^{PBS} (77.5 ^{T3})	-



B-Triples

B-Triples are prime mover coupled to 3 semi-trailers, connected by fifth wheel couplings.		Configuration Code	Mass Limit/s (tonnes)	Potentially a modular combination
B-triple, tandem drive, 3 tandem axle groups		B12222	72.0	M
B-triple, tandem drive, tri-tri-tandem axle		B12332	79.0	M
B-triple, tandem drive, triaxle		B12333	82.5	M

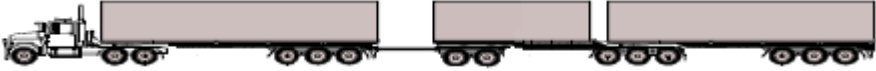






Conventional double road train: Type I road train or A-Double

A conventional double road train (type I road train or A double) is an articulated combination towing a dog trailer connected by an A-coupling.		Configuration Code	Mass Limit/s (tonnes)	Potentially a modular combination
Double road-train, tandem drive, triaxle, tandem dolly		A123T23	79.0	M
Double road-train, tandem drive, triaxle, tri-dolly		A123T33	82.5	-

Conventional triple road train: Type II road train or A-Triple

A conventional triple road train (type II road train or A-triple) is an articulated combination towing 2 dog trailers each connected by an A coupling.		Configuration Code	Mass Limit/s (tonnes)	Potentially a modular combination
Triple road-train, tandem drive, triaxle trailers and tandem converter dollies		A123T23T23	115.5	M
Triple road-train, tandem drive, triaxle trailers and triaxle dollies		A123T33T33	122.5	-

Modern road trains

Modern road trains are a variation of the traditional type I and II road trains. They may be modular and include both A and fifth wheel coupling(s).		Configuration code	GVM / GCM (tonnes)	Potentially a modular combination
AB-Triple				
AB-triple, tandem drive, triaxle, tandem dolly		A123T2B33	99.0	M
AB-triple, tandem drive, triaxle, tri-axle dolly		A123T3B33	102.5	-
AB-triple, tri-drive, triaxle, tandem dolly		A133T2B33	102.5	-
AB-triple, tandem drive, tri-quad-tri, tri-axle dolly		A124T3B43	110.5 ^{T3} (122.5 ^{T3})	-
AB-triple, tri-drive, tri-quad-tri, tri-axle dolly		A123T3B43	110.0 ^{T3} (123.5 ^{T3})	-
ABB Quad				
ABB quad, tandem drive, tandem dolly		A123T2B333	119.0 (130.5)	M
ABB quad, tandem drive, tandem dolly		A123T3B333	123.0 (136.0)	-

BAB Quad						
BAB-quad, tandem drive, triaxle, tandem dolly		B1233T2B33	119.0 (130.5)	M		
BAB-quad, tandem drive, triaxle, tri-dolly		B1233T3B33	122.5 (136.0)	-		
BAB-quad, tri-drive, triaxle, tandem dolly		B1333T2B33	122.5 (136.0)	-		
BAB-quad, tandem drive, quad-tri, tri-dolly		B1243T3B43	130.5 ^{T3} (145.0 ^{T3})	-		
BAB quad: Twin steer tri-drive, triaxle, tri-dolly		B2333T3B33	131.0 (146.0)	-		
AAB Quad						
AAB quad: Tandem drive, triaxle, tandem dollies		A123T23T2B33	135.5 (147.5)	-		
AAB quad: Twin steer tri-drive, triaxle, tri-dollies		A233T33T3B33	151.0 (168.5)	M		
BAA quad: Twin steer tri-drive, triaxle and triaxle dollies		B2333T33T33	151.0 (168.5)	-		

END