Section T

Tow Trucks

Contents

Section T - Overview

1. Description

This section of Vehicle Standards Bulletin 6 (VSB6) relates to the design and construction of vehicles fitted with a *vehicle towing device* (tow trucks). It outlines the minimum design, installation and performance requirements for vehicles designed to tow another vehicle using a *vehicle towing device*. These include such designs as over and under lift trucks and tilt tray trucks.

➘ For the purpose of Section T, the term *tow truck* is limited to a heavy vehicle fitted with a *vehicle towing device*. A *vehicle towing device* is the equipment used to lift and carry, or tow, another vehicle, such as:

- under-lift
- over-lift
- tilt and slide tray for vehicle lifting; and
- a tray truck fitted with hydraulic ramps and winch which can be used to load vehicles.

This Section includes vehicles that have the same design characteristics but may be used by operators to carry equipment (scissor lifts, generators, etc). As these vehicles share the same areas of concern (hydraulic failure, stability, etc) and may be used as tow trucks at a later date, they must also be certified under Section T.

This section does not apply to vehicles with lifting systems intended for all-up operation (i.e., towing operation in which the removed vehicle is lifted and placed onto the tray of the tow truck), these must be installed and certified in accordance with VSB6 Section R - Vehicle Mounted Lifting Systems.

This section consists of the following modification codes:

T1	**Construction of tow trucks** • Construction/fitment of tow trucks according to a certified T2 design • Modification or replacement of tow truck components (other than lifting components) in accordance with a certified T2 design. • Replacement of alternative tow truck lifting components in accordance with a certified T2 design.
T2	**Design of tow trucks** • certification of a tow truck design • rating of lifting/towing components • testing/certifying of lifting of towing components.

2. Related Australian Design Rules

The Australian Design Rules (ADRs) relevant to this section include:

ADR No.	Title
13/..	Installation of Lighting and Light-signalling Devices on other than L-Group Vehicles
14/..	Rear Vision Mirrors
42/..	General Safety Requirements
43/..	Vehicle Configuration & Dimensions
62/..	Mechanical Connections Between Vehicles
92/..	External Projections

3. Record keeping

The person responsible for certifying the modification should:

- collate complete records, including drawings, calculations, test results and copies of the appropriate issue of Australian Standards and ADRs
- retain the records for a minimum of seven years after commissioning of the modified vehicle
- make the records available upon request for inspection by officers of the relevant federal, state or territory authority or heavy vehicle regulator.

Reports and checklists

The person responsible for certifying the modification must complete and record the following reports and checklists as applicable:

T1 Checklist	Construction of tow trucks
T2 Checklist	Design of tow trucks

Engineering analysis necessary in the course of designing a safe tow truck may be much more than what is specified in this section. The certifying approved vehicle examiner (AVE) is required to assess the design and the level of analysis required

4. Tow truck types

A tow truck is a vehicle designed and equipped with a vehicle towing device(s) used to lift and carry or tow vehicles. It also includes any such vehicle designed to have, temporarily or otherwise, a device or trailer to lift and carry other vehicles.

The term *vehicle towing device* may apply to equipment used by a tow truck, such as:

- under-lift
- over-lift
- tilt and slide tray for vehicle lifting; and

a tray truck fitted with hydraulic ramps and winch which can be used to load vehicles. It does not include tow couplings that are used for general towing. These must comply with ADR62/.., and their installation be certified under VSB6 Section P - Tow Couplings. Four types of commonly used tow trucks are described below. Each type can be combined in various ways but the vehicle must meet applicable standards, mass and dimension requirements.

Over-Lift type

A crane-type vehicle towing device that lifts the front or rear axles of the vehicle to be towed and secures it in position with a towing hitch. (see Figure 1)

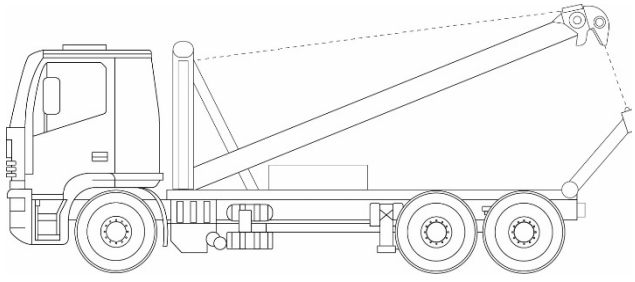


Figure 1 – Over-Lift Type Tow Truck

Under-Lift type

An arm-type towing device that extends underneath the towed vehicle and lifts one end of the towed vehicle by wheels, chassis or other suitable part. (see Figure 2)

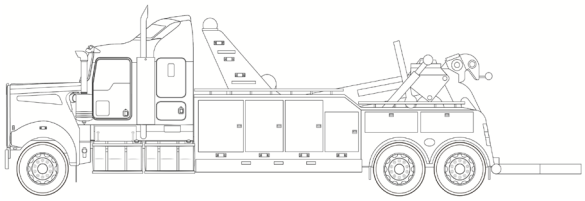


Figure 2 – Under-Lift Type Tow Truck

Tilt and Slide Tray type

Has a tray body that can be moved back and tilted so that the rear end of the tray rests on the ground. The towed vehicle is winched up onto the tray and secured. The tray is then raised onto the truck chassis for travel. (see Figure 3)

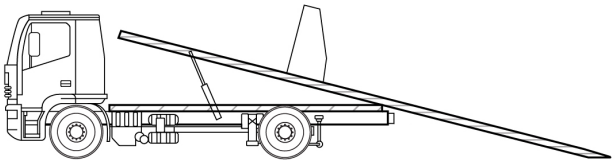


Figure 3 – Tilt and Slide Tray Type Tow Truck

Tilt and Slide Tray with under-lift

Has a tray body that can be moved back and tilted so that the rear end of the tray rests on the ground along with an arm-type towing device that extends underneath a towed vehicle. (see Figure 4)

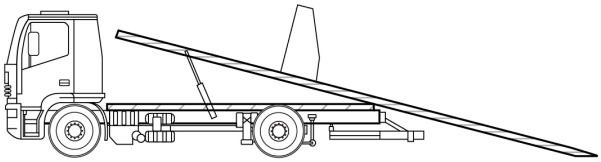


Figure 4 – Tilt and Slide Tray Type Tow Truck

5. Tow truck classes

Tow trucks are categorised into 1 of the 4 classes outlined below and must meet all requirements appropriate to that class.

These classes may be further categorised by different state and territory transport authorities.

Class:	must:
1	• have a load capacity of not less than 1.2 tonnes • be equipped with a vehicle towing device with a safe working load of not less than one tonne • be limited to the lifting and carrying or towing of vehicles with a gross mass not exceeding 2 tonnes
2	• have a load capacity of not less than 3 tonnes • be equipped with a vehicle towing device with a safe working load of not less than 2.5 tonnes • be limited to the lifting and carrying or towing of vehicles with a gross mass up to 5 tonnes.
3	• have a minimum Gross Combination Mass (GCM) rating of 18 tonnes • be equipped with a vehicle towing device with a safe working load of not less than 5 tonnes • be limited to the lifting and carrying or towing of motor vehicles with a gross mass not exceeding 12 tonnes.
4	• have a minimum GCM rating of 25 tonnes • must be equipped with at least the following: • tandem rear axle group • a vehicle towing device of safe working load not less than 5 tonnes • a power operated winch • air brake facilities for connecting to towed vehicles.

Some jurisdictions may require additional markings to be displayed on the vehicle. Please consult with your local jurisdiction to determine if any additional markings are required.

6. Design requirements

Advanced braking systems

Advanced braking systems are an important safety feature fitted to many new vehicles.

Advanced braking systems are programmed by the vehicle manufacturer and are specific to the vehicle to which they are fitted. Changes made to the vehicle, such as engine, tyre size, steering control, suspension characteristics, vehicle mass and its distribution, may impact the performance of the advanced braking system.

Exercise extra caution when modifying vehicles fitted with advanced braking systems. Electric braking systems may be known as:

- electronic stability control (ESC)
- electronic stability program (ESP)
- vehicle stability control (VSC)
- dynamic stability control (DSC)
- vehicle stability assist (VSA)
- roll stability control (RSC)
- roll control system (RCS)
- electronic braking system (EBS)
- trailer electronic braking system (TEBS).

Advanced braking systems and their components may be easily damaged by common modification, maintenance and servicing techniques, such as the use of rattle guns within one metre of the sensors. When undertaking any work on a vehicle fitted with an advanced braking system, ensure all modifiers are familiar with these systems and the precautions that must be taken.

Ensure that before undertaking any modification on a vehicle that is fitted with an advanced braking system the modifier and AVE consult with the vehicle manufacturer to determine the impact on the system.

ADR dimension limits

Ensure all dimensions of a vehicle, including internal (where applicable) and external, are in accordance with the limits specified by the applicable heavy vehicle regulations.

Some allowances may be made to be exceeded dimensions under certain circumstances through notices or permits. Consult with the relevant heavy vehicle regulator for further advice.

- The installation of a body or body equipment that exceeds the dimension limits is not to be certified under this Section of VSB6. However, where a valid dimension exemption has been issued and the vehicle complies with the exemption, the modification may be certified in accordance with VSB6 Section T.

Modification Code T1- Construction of tow trucks

1. Scope

Modifications covered under this code:

Covered

- Construction of tow trucks conforming in accordance with a certified T2 design
- Modification of tow truck components (other than lifting components) in accordance with a certified T2 design
- Replacement of alternative tow truck lifting components in accordance with a certified T2 design

Not covered

- Cutting, extending or reinforcing the chassis (see VSB6 Section H – Chassis)
- Construction of tow trucks that do not conform to a certified T2 design
- Repositioning or adding any vehicle components that do not conform with a certified T2 design
- Modifications or structural repairs to lifting components
- Replacement of alternative tow truck lifting components not in accordance with a certified T2 design

2. Related standards

Modified vehicles must comply with all ADRs, Australian standards, acts and regulations. Below are some, but not all of the areas that may be affected by the modifications in this code and require certification testing or evidence to demonstrate compliance.

The certifier must ensure that the modified vehicle continues to comply with all affected Australian Design Rules.

This…	Must comply with…
Rear axle/s installation	VSB6 Modification Code D1
Wheelbase extension outside OEM options	VSB6 Modification Code H1
Wheelbase reduction outside OEM options	VSB6 Modification Code H2
Wheelbase alteration within OEM options	VSB6 Modification Code H3
Chassis frame alteration	VSB6 Modification Code H4
Remounting of body	VSB6 Modification Code J1
Tow couplings	VSB6 Modification Code P1
Truck loading cranes*	VSB6 Modification Code R1
Lights	ADR 13/..
Mudguards	ADR 42/..
Vehicle dimensions	ADR 43/
Exhaust repositioning	ADR 42/.. VSB6 Modification Code A4
Tow trucks	AS 5400 Tow Trucks – Tilt, Slide and Under-lift Vehicles AS 1418 Cranes, Hoists and Winches (as applicable) AS 1418.1 Cranes General Requirements AS 1418.2 Cranes (including hoists and winches) Serial hoists and winches AS 1418.5 Cranes, hoists and winches - Mobile cranes AS 1418.11 Cranes, hoists and winches - Vehicle-loading cranes

* A truck loading crane is a unit that lifts an object completely off the ground.

- Some of the afore mentioned standards require tow trucks to be fitted with:
  - warning lights and/or audible alarms,
  - a fire extinguisher; and
  - a broom, shovel, etc (typically required by jurisdictional regulations for licensed tow trucks).
- As this modification code relates to vehicles designed, but not operated as a tow truck, and the equipment is basic to install, these items are not required for cirtification under Section T.
- It will be the responsibility of the vehicle operator to ensure this equipment is fitted when required by a law.

3. Certification procedure

The certification procedure for this modification code is as follows:

1.	Modifier	Determine if the tow truck design complies with a design certification issued under VSB6 Modification Code T2. • If **yes**, perform modification in accordance with T2 certified design instructions and requirements; proceed to step 3. • If **no**, proceed to step 2.
2.	Modifier	Contact accredited T2 AVE to: • supply a T2 certified design; or • inspect the existing tow truck design to ensure it meet T2 requirements and issue a T2 certified design. Refer to T2 certification procedure. Return to step 1.
3.	Modifier	Consult with an accredited T1 AVE for guidance on how to perform the modifications.
4.	Modifier	Perform modifications in accordance with AVE advice, the T2 certification and this code.
5.	Modifier	Organise approval inspection by an accredited T1 AVE.
6.	T1 AVE	Perform inspection, complete T1 checklist and determine if compliance has been achieved. • If **yes**, proceed to step 7. • If **no**, do not proceed, advise modifier rework is required to ensure compliance. Return to step 3.
7.	T1 AVE	Issue modification certificate, affix modification plate, and submit paperwork as required by the relevant AVE registration scheme.

4. Compliance requirements

Required:

Ensure the following when constructing a tow truck:

- The modification is certified by an AVE in accordance with VSB6 Modification Code T1.
- The T1 accredited AVE inspecting and certifying the construction obtains, uses and retains the T2 certificate and checklist.
- The certification verifies that all components meet the requirements for the class of tow truck and that the completed vehicle meets VSB6 Modification Code T2 requirements.
- If a component previously fitted and certified to a vehicle is being used as part of the tow truck design, it must be re-certified by the AVE certifying the tow truck. (e.g., a tow truck

manufacturer may use a vehicle lift crane certified by an AVE to meet VSB6 Section R Vehicle Mounted Lifting Systems).
- The tilting mechanism or body of the tilt tray tow truck is in accordance with VSB6 Modification Code J1.
- The registered operator of the tow truck retains a copy of the T1 and T2 certificates.

5. Installation requirements

When installing a lifting device(s) designed for towing or transport of vehicles, the following conditions apply:

Required:

- Ensure the vehicle towing device(s) being installed is rated by the manufacturer for the application and that it complies with *AS 1418 Cranes, Hoists and Winches and/or AS 5400 Tow trucks – Tilt, Slide and Under-lift Vehicles*, whichever is applicable.
- Ensure the vehicle towing device(s) being installed has compatible lifting and carrying capacities.
- Ensure all modifications, installations and mountings are in accordance with the design specifications provided by the T2 AVE.
- Ensure the modified vehicle complies with all regulations concerning mass, dimensions, general safety (specifically ADR 42/.., 92/..) and vehicle towing device requirements.
- If the vehicle towing device(s) installation involves modifications covered by other sections of VSB6, these modifications must be performed and certified in accordance with those sections.

Recommended:

- While vehicles with a GVM exceeding 12 tonnes must be fitted with rear marker plates or conspicuity markings, it is recommended that all tilt trays, regardless of GVM, are fitted with retroreflective markings. If fitted, the retroreflectors must either meet:
  - VSB12 Rear Marking Plates; or
  - ADR 13/.. Conspicuity markings.

T1 Checklist — Construction of tow trucks (example)

T1 Checklist — Construction of tow trucks

This checklist is for use by authorised vehicle examiners (AVEs) to assess and certify construction of a tow truck.

Vehicle and modifier details

Vehicle make:	Vehicle model:	Month and year of manufacture:
VIN (if applicable):	**Vehicle chassis no. (if applicable):**	**Vehicle modifier (company name):**

Advanced braking systems

Braking systems	Check Yes, No, N/A as applicable:	Yes	No	N/A
1	Is the advanced braking system (where fitted) un-affected or re-certified after the vehicle modification?	☐	☐	☐

Modification details

Modification criteria	Check Yes or No as applicable:	Yes	No
1	Has the modification been performed in accordance with the manufacturer's guidelines?	☐	☐

Crane construction details

Crane hydraulics	Check Yes, No, N/A as applicable:	Yes	No	N/A
1	Are all hydraulic hoses secure and clear of all moving components?	☐	☐	☐
2	Do all hydraulic hoses have satisfactory ground clearance?	☐	☐	☐
Crane mounting	**Check Yes, No, N/A as applicable:**	**Yes**	**No**	**N/A**
3	Is the mounting method of the vehicle towing system in accordance with the T2 approved design?	☐	☐	☐
4	Is the mounting method approved by the crane manufacturer or, alternatively, is it certified by the T2 approved design?	☐	☐	☐
5	Is the crane mounted on an appropriately designed sub-frame?	☐	☐	☐
6	Does all welding conform to all relevant Australian Standards?	☐	☐	☐
7	Are all mounting bolts correctly tightened?	☐	☐	☐

Crane specifications			
8	**Make of crane:**	**Serial no.:**	**SWL as per '7. Testing requirements':**
	Model no.:	**Capacity:**	

Crane compliance	Check Yes, No, N/A as applicable:	Yes	No	N/A
9	Is the quality of the work to an accepted industry standard?	☐	☐	☐
10	Does the crane meet the requirements of Australian Design Rule (ADR) 44/02 for this class of tow truck?	☐	☐	☐
11	Is the crane manufactured by an approved manufacturer or has the construction been supervised and approved by an AVE?	☐	☐	☐

Winch construction details

Winch hydraulics	Check Yes, No, N/A as applicable:	Yes	No	N/A
1	Are all hydraulic hoses secure and clear of all moving components?	☐	☐	☐
2	Do all hydraulic hoses have satisfactory ground clearance?	☐	☐	☐
Winch mounting	**Check Yes, No, N/A as applicable:**	**Yes**	**No**	**N/A**
3	Is the mounting method of the vehicle towing system in accordance with the T2 approved design?	☐	☐	☐
4	Is the mounting method approved by the winch manufacturer or, alternatively, is it certified by the T2 approved design?	☐	☐	☐
5	Is the winch mounted on an appropriately designed sub-frame?	☐	☐	☐
6	Does all welding conform to all relevant Australian Standards?	☐	☐	☐
7	Are all mounting bolts correctly tightened?	☐	☐	☐

Vehicle chassis no./VIN:	Date:	Signed:

T1 Checklist — Construction of tow trucks

This checklist is for use by authorised vehicle examiners (AVEs) to assess and certify construction of a tow truck.

Winch construction details (cont'd)

Winch specifications		
8	Make of winch:	Serial no.:
	Model no.:	Capacity:

Winch compliance	Check Yes or No as applicable:	Yes	No
9	Is the quality of the work to an accepted industry standard?	☐	☐
10	Does the winch meet the requirements of ADR 44/.. , AS 5400, Section T — Tow trucks and any other relevant sections of VSB6 for this class of tow truck?	☐	☐

Vehicle lift tray construction details

Lift tray hydraulics	Check Yes, No, N/A as applicable:	Yes	No	N/A
1	Are all hydraulic hoses secure and clear of all moving components?	☐	☐	☐
2	Do all hydraulic hoses have satisfactory ground clearance?	☐	☐	☐
Lift tray mounting	**Check Yes, No, N/A as applicable:**	**Yes**	**No**	**N/A**
3	Is the mounting method approved by the lift tray manufacturer or, alternatively, is it certified by the T2 approved design?	☐	☐	☐
4	Is the lift tray mounted on an appropriately designed sub-frame?	☐	☐	☐
5	Does all welding conform to all relevant Australian Standards?	☐	☐	☐
6	Are all mounting bolts correctly tightened?	☐	☐	☐
Lift tray compliance	**Check Yes or No as applicable:**	**Yes**	**No**	
7	Does the vehicle lift tray meet the requirements of ADR 44/.. , 5400, this Section T — Tow trucks and any other relevant sections of VSB6 for this class of tow truck?	☐	☐	
8	Is the quality of the work to an accepted industry standard?	☐	☐	

Tilt tray and slide — tray tow truck construction details

Tilt tray and slide hydraulics	Check Yes, No, N/A as applicable:	Yes	No	N/A
1	Are all hydraulic hoses secure and clear of all moving components?	☐	☐	☐
2	Do all hydraulic hoses have satisfactory ground clearance?	☐	☐	☐
Tilt tray and slide mounting	**Check Yes, No, N/A as applicable:**	**Yes**	**No**	**N/A**
3	Is the mounting method approved by the tilt tray manufacturer or, alternatively, is it certified by the T2 approved design?	☐	☐	☐
4	Is the sub-frame appropriate for the mounted tilt tray?	☐	☐	☐
5	Has the welding been performed by a suitably qualified tradesperson and to accepted industry standards?	☐	☐	☐
6	Are all mounting bolts correctly tightened?	☐	☐	☐
Tilt tray and slide compliance	**Check Yes or No as applicable:**	**Yes**	**No**	
7	Is the quality of the work to an accepted industry standard?	☐	☐	
8	Does the tilt tray and slide – tray tow truck meet the requirements of ADR 44/.. , AS 5400, this Section T — Tow trucks and any other relevant sections of VSB6 for this class of tow truck?	☐	☐	

Compliance

Modification	Check Yes or No as applicable:	Yes	No
1	Does the vehicle as a whole meet the requirements of ADR 44/.. , AS 5400, this Section T — Tow trucks and any other the relevant sections of VSB6 for this class of tow truck?	☐	☐
2	Have all of the modification details applicable to the modification been recorded in accordance with the record keeping requirements of VSB6?	☐	☐
3	Does this modification meet all the requirements of the manufacturer's guidelines / Modification Code T1?	☐	☐
4	Is the quality of work to an accepted industry standard?	☐	☐
5	Does the vehicle continue to comply with ADRs and heavy vehicle standards regulations affected by the modification?	☐	☐

Vehicle chassis no./VIN:	Date:	Signed:

T1 Checklist — Construction of tow trucks

↘ This checklist is for use by authorised vehicle examiners (AVEs) to assess and certify construction of a tow truck.

Authorisation

Other than modification criteria, if the answer to any relevant question is NO the modification is not acceptable.			
Comments:			
Examined by:	**Company (if applicable):**		**AVE no.:**
Signed:	**Modification certificate no.:**	**Modification plate no.:**	**Date:**

Vehicle chassis no./VIN:	Date:	Signed:

Modification Code T2 – Design of tow trucks

1. Scope

Modifications covered under this code:

Covered
• certifying of tow truck design • rating of vehicle lifting/towing components • testing and certifying of vehicle lifting/towing components
Not covered
• rating of any components beyond the manufacturer's specifications • construction and inspection of a tow truck (see VSB6 Modification Code T1-Construction of Tow Trucks)

2. Related standards

Modified vehicles must comply with all ADRs, Australian standards, acts and regulations. Below are some, but not all of the areas that may be affected by the modifications in this code and require certification testing or evidence to demonstrate compliance.

The certifier must ensure that the modified vehicle continues to comply with all affected Australian Design Rules.

This…	Must comply with…
Rear axle/s installation	VSB6 Modification Code D1
Chassis frame alteration	VSB6 Modification Code H4
Wheelbase extension outside OEM options	VSB6 Modification Code H1
Wheelbase reduction outside OEM options	VSB6 Modification Code H2
Wheelbase alteration within OEM options	VSB6 Modification Code H3
Remounting of body	VSB6 Modification Code J1
Tow couplings	VSB6 Modification Code P1 ADR 62/..
Truck loading cranes	VSB6 Modification Code R1 AS 1418
Tow trucks	AS 5400 Tow Trucks – Tilt, Slide and Under-lift Vehicles AS 1418 Cranes, Hoists and Winches (as applicable) AS 1418.1 Cranes General Requirements AS 1418.2 Cranes (including hoists and winches) Serial hoists and winches AS 1418.5 Cranes, hoists and winches - Mobile cranes AS 1418.11 Cranes, hoists and winches - Vehicle-loading cranes

- Some of the afore mentioned standards require tow trucks to be fitted with:
  - warning lights and/or audible alarms,
  - a fire extinguisher; and
  - a broom, shovel, etc (typically required by jurisdictional regulations for licensed tow trucks).
- As this modification code relates to vehicles designed, but not operated as a tow truck, and the equipment is basic to install, these items are not required for cirtification under Section T.
- It will be the responsibility of the vehicle operator to ensure this equipment is fitted when required by a law.

3. Certification procedure

The certification procedure for this modification code is as follows:

1.	Modifier Contact appropriately qualified and accredited T2 AVE to design tow truck configuration and develop fitting instructions.
2.	T2 AVE Assess and provide design certification listing specifications, equipment, and installation instructions.
3.	Modifier Consult with an accredited T2 AVE for guidance on what modifications are required.
4.	Modifier Consult with an AVE who is accredited to certify each modification for guidance on how any modification is required to be performed. Follow the certification procedure in each applicable modification code. For example, where the chassis requires reinforcement, refer to an accredited H4 AVE and VSB6 Modification Code H4.
5.	Modifier Organise approval inspection by an accredited T1 AVE.
6.	T1 AVE Perform inspection, ensure all modifications and equipment have been certified (if applicable), complete T1 checklist and determine if compliance has been achieved. • If **yes**, proceed to step 7. • If **no**, do not proceed, advise modifier rework is required to ensure compliance. Return to step 4.
7.	T1 AVE Issue modification certificate, affix modification plate and submit paperwork as required by the relevant AVE registration scheme.

4. Compliance requirements

As there are no recognised international standards for towing equipment, imported equipment will not automatically correspond with relevant Australian regulations and standards and will need to be assessed, and possibly re-rated to meet Australian regulations and standards by a professional engineer registered with a professional engineer registration body.

The design certification requirements for tow trucks are as follows:

Required:

Ensure the following of any new or modified tow truck design:

- Any new designs or alterations to existing design certifications are in accordance with VSB6 Modification Code T2.
- Assess the design and the level of engineering required to ensure relevant engineering assessments or related designs are obtained.
- The documentation package for a T1 AVE includes:
  - the T2 certificate and checklist for retention and use by a T1 AVE

  - any requirements or instructions for mounting and installing tow truck equipment (such as cranes, winches and bodies)
  - Tow truck class specification
- Ensure the design meets the relevant Australian Standards
- If more than one make or model of a major component (i.e., vehicle towing device(s)) is used ensure the T2 certification lists all possible combinations and options of use.
- All calculations, test reports and other evidence to be retained for record keeping purposes.

5. Design requirements

The equipment requirements for tow trucks are as follows:

Required:

- Ensure the vehicle towing device(s) has compatible lifting and carrying capacities and is stable for normal operation.
- Ensure the method for installing the vehicle towing device(s) complies with the manufacturer's recommendations or provides sufficient chassis reinforcement to maintain the lift induced load moment within the chassis frame design limits with a safety factor of not less than 3.
- All cranes, winches, vehicle towing device(s) and other lifting equipment that form part of the tow truck, are manufactured or modified to comply with relevant sections of:
  - AS 5400 Tow trucks—Tilt, Slide and Underlift Vehicles
  - AS 1418 Cranes, Hoists and Winches including AS 1418.5 Cranes, Hoists and Winches – Mobile cranes
- Provide a means of supporting the towed vehicle in its raised position while it being towed, supplementary to the primary vehicle towing device.
- Ensure all tow trucks are fitted with dual wheels on their rear axle group.
- Equip every tow truck with suitable spacer bars (where a sling type lift is fitted) and safety chains to enable the driver of the tow truck to have efficient control over the towed vehicle while it is being towed. Safety chains are not required where the vehicle has a rear wheel lift.
- Design any spacer bars to minimise damage to the towed vehicle that could be caused by the tow truck or its equipment.
- Any tow coupling, towbar, towbar attachment or vehicle structure used for general towing must meet the requirement of ADR 62/.. and be appropriately certified and rated.

↘ Some vehicle manufacturers provide specific instructions when modifying a vehicle to a tow truck. It is important to ensure these instructions are followed and all towing devices are compatible with the installation methods specified.

Design safety requirements

The design safety requirements for tow trucks are as follows:

Required:

- Ensure that all hydraulic systems prevent movement of loadbearing hydraulic cylinders in the event of hose rupture or pipe fracture.

Recommended:

- If the tilt tray is not fitted with a rear under lift, consideration should be given to mitigate rear underrun, such as minimising rear overhang, etc.

Safe Working Loads

Required:

- Calculate safe working loads (SWL) for towing for the vehicle using the method outlined below.

Calculations for determining safe working loads

As the vehicle lift is situated behind the rear axles, the tow truck's centre of gravity will move back considerably when a load is lifted. As modern tow trucks can have a lifting capacity in excess of what the truck is permitted to tow, perform the following calculations to determine safe working loads (SWL) for towing.

- The lifting point is the centre of where the vehicle towing device lifts the towed vehicle. In the case of wheel-lifts for example, it is the centre of the wheels lifted.
- The SWL calculated must be less than the maximum allowed by the crane/vehicle towing device manufacturer in that position but should not be less than minimum requirements for the relevant tow truck class.
- The tow truck should be capable of being controlled safely at low speed (10km/h) when the lifting gear is subject to a 25% overload.

Over-lifts

Calculate SWL for over-lifts using this formula:

$$SWL = \frac{0.6 \times T \times WB}{OH}$$

Where:

0.6 = a constant meaning 60% of T can be used as a counterweight
T = tare weight of front axle
WB = wheelbase of tow truck
OH = rear overhang measured from pivot point
F = SWL
(see Figure 5)

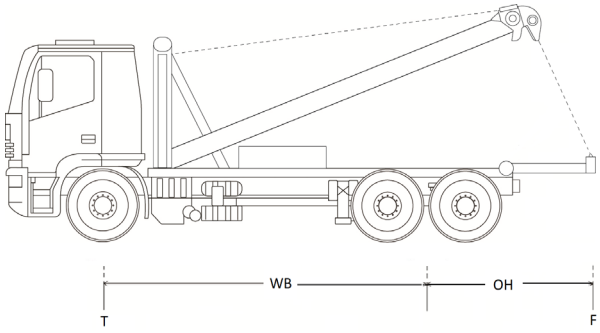


Figure 5 – Over-Lift Tow Truck Weight Distribution Calculation

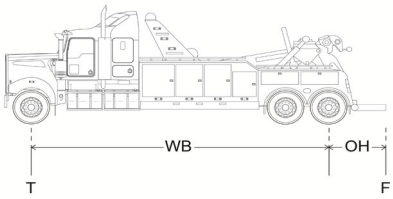
Under-lifts

Because under-lifts can carry their loads at different positions (see Figure 6), calculate SWL for under-lifts using the same formula for over-lifts for the worst-case loading:

$$SWL = \frac{0.6 \times T \times WB}{OH}$$

This is likely to be one or more of the following three positions:

1. With lifting boom fully retracted



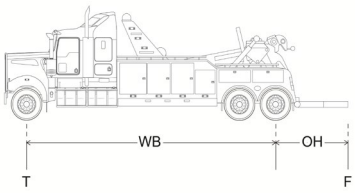
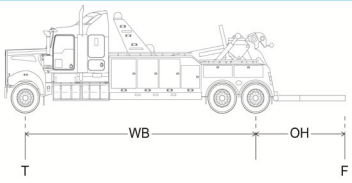
2. With lifting boom halfway between fully retracted and fully extended	
3. With lifting boom fully extended	

Figure 6 – Under-Lift Tow Truck Weight Distribution

Tilt Trays

Tilt trays carry their loads on the body like a typical freight carrying vehicle would. It is important to establish the vehicle's weight distribution and therefore the maximum payload that can be carried on the tray. When installing a tilt tray body refer to section J – Body Mounting and section H - Chassis for guidance.

Where a tilt tray incorporates a vehicle under-lift, the lift must be tested in accordance with the relevant section above.

Tilt Tray with under-lift

As mentioned above tilt trays carry their loads on the body like a typical freight carrying vehicles. However, when fitted with an under-lift the mass on the rear axle can be increased significantly. When determining the SWL for a tilt tray fitted with an under-lift all loading scenarios. This will include determining the maximum payload using section J – Body Mounting and section H - Chassis as guidance while also incorporating the under-lift SWL method above.

Front axle unloading

As the vehicle lift is situated behind the rear axles, the tow truck's centre of gravity will move back considerably when a load is lifted. Modern tow trucks can have a lifting capacity in excess of what the truck is permitted to tow. As such, if the AVE is concerned that that the vehicle design may cause excessive unloading of the front axle it is recommend that *a* steer tyre friction demand *assessment* can be *made* in accordance with the *Performance Based Standards scheme – Standards and Vehicle Assessment Rules*.

➘ This recommendation does not mean that the vehicle should be assessed under the PBS scheme but simply that a steer tyre fiction demand assessment can be made to ensure the front axle is not unduly unloaded.

6. Testing requirements

Stability test

Required:

- Conduct stability tests for the class of tow truck being certified to establish that it can be controlled safely while towing.
- The SWL calculated must be less than or equal to the maximum allowed by the crane/vehicle towing device manufacturer in that position but should not be less than minimum requirements for the relevant tow truck class.
- Ensure a copy of the stability test results are retained with T2 certification records.
- Ensure that regardless of the calculated safe working loads (SWL) for the vehicle, it does not exceed any vehicle or component manufacturer's ratings whether laden or un-laden.
- Ensure the vehicle maintains sufficient front axle load to provide adequate steering control.
- Ensure the vehicle remains stable in both laden and unladen configurations.
- For slewing cranes, conduct tests as for the stability tests for truck mounted cranes (see VSB6 Section R — Vehicle mounted lifting systems)

7. Tow truck classes

Required:

- Determine the class of the tow truck based on section 4 of Section T Overview and include the result in the documentation package.

T2 Checklist — Design of tow trucks (example)

T2 Checklist — Design of tow trucks

This checklist is for use by authorised vehicle examiners (AVEs) to assess and certify design of a tow truck.

Vehicle and modifier details

Vehicle make:	Vehicle model:	Month and year of manufacture:
VIN (if applicable):	**Vehicle chassis no. (if applicable):**	**Vehicle modifier (company name):**

Advanced braking systems

Braking systems	Check Yes, No, N/A as applicable:	Yes	No	N/A
1	Is the advanced braking system (where fitted) un-affected or re-certified after the vehicle modification?	☐	☐	☐

Modification details

Modification criteria	Check Yes, No as applicable:	Yes	No
1	Has the modification been performed in accordance with the manufacturer's guidelines?	☐	☐

Installation details

Tow truck design	Check Yes, No, N/A as applicable:	Yes	No	N/A
1	Do all chosen components comply with the appropriate parts of AS 1418 – Cranes Hoists and Winches and AS 5400 Tow Trucks – Tilt, Slide and Under Lift Vehicles?	☐	☐	☐
2	Do chassis alterations required by the design comply with Section H — Chassis of VSB6?	☐	☐	☐
3	Do body mountings required by the design comply with Section J — Body mounting of VSB6?	☐	☐	☐
4	Do all components as designed have a loading of less than the manufacturer's ratings?	☐	☐	☐
5	Is a detailed tow truck design documentation package including a suitable checklist (for use by a T1 AVE) attached to this approval?	☐	☐	☐

Compliance

Modification	Check Yes or No as applicable:	Yes	No
1	Does this modification meet all the requirements of the manufacturer's guidelines / Modification Code T2?	☐	☐
2	Is the quality of work to an accepted industry standard?	☐	☐
3	Does the vehicle continue to comply with ADRs and heavy vehicle standards regulations affected by the modification?	☐	☐

Authorisation

Other than modification criteria, if the answer to any relevant question is NO the modification is not acceptable.			
Comments:			
Examined by:	**Company (if applicable):**		**AVE no.:**
Signed:	**Modification certificate no.:**	**Modification plate no.:**	**Date:**

Vehicle chassis no./VIN:	Date:	Signed:

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