Environment Protection Authority

Dangerous goods tank vehicle inspection manual

V3.0 – November 2023

Published by:
NSW Environment Protection Authority
6 Parramatta Square
10 Darcy Street, Parramatta NSW 2150
Locked Bag 5022, Parramatta NSW 2124

Phone: +61 2 9995 5000 (switchboard)
Phone: 131 555 (NSW only – environment information and publications requests)
Fax: +61 2 9995 5999
TTY users: phone 133 677, then ask
for 131 555
Speak and listen users:
phone 1300 555 727, then ask for 131 555

Email: info@epa.nsw.gov.au
Website: www.epa.nsw.gov.au

Report pollution and environmental incidents
Environment Line: 131 555 (NSW only) or info@epa.nsw.gov.au
See also www.epa.nsw.gov.au

ISBN 978 1 925790 62 7
EPA 2018P1065
First published 2018
Updated November 2023

Contents

1. Introduction

Scope

This inspection manual is provided to give guidance to people inspecting road tank vehicles and prime movers intended to transport liquid dangerous goods (DG) in tanks.

Tank vehicles for class 2 gases

Tank vehicles that are designed and approved for the transport of class 2 gases are not covered in detail in this manual, although they are still subject to the inspection and maintenance requirements of Australian Standard (AS) 2809. People inspecting and maintaining vehicles for class 2 gases may still find the information and guidance in this manual useful, especially where it relates to the vehicle itself and its equipment.

This manual does not include inspection and maintenance requirements for pressure vessels. Pressure vessels require additional inspections according to the requirements of AS 1210 and AS 3788.

Tank vehicles constructed of fibre-reinforced plastic (FRP)

This manual has mainly been written for vehicles constructed of metals (steel or aluminium). Many inspection items will also apply to fibre-reinforced plastic tank vehicles, but where necessary, extra specialist advice from the tank manufacturer may be necessary to make sure the vehicle remains compliant.

How to use the dangerous goods tank vehicle checklist

People inspecting vehicles and maintaining them should use the dangerous goods tank vehicle checklist (checklist) provided in this manual to make sure the vehicle is compliant with the requirements of the Dangerous Goods (Road and Rail Transport) Regulation 2022 (Dangerous Goods Regulations), the Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code) and AS 2809. This manual supports vehicle owners and people doing inspection and maintenance tasks to meet their duties under the Dangerous Goods Regulations.

Any identified non-compliances must be notified to the vehicle owner and must be rectified before the vehicle can be returned to dangerous goods service.

Basis

The requirements of the checklist are derived from the following:

- Dangerous Goods (Road and Rail Transport) Regulation 2022 (NSW)
- Australian Code for the Transport of Dangerous Goods by Road & Rail - edition 7.8 (the ADG Code)
- AS 2809.1:2023 – all classes in scope
- AS 2809.2:2023 – class 3 liquids (flammable liquids)
- AS 2809.4:2022 – division 6.1 (toxic liquids), class 8 (corrosive liquids), and division 5.1 ammonium nitrate emulsions, suspensions and gels
- AS 2809.5:2022 – bitumen-based products.

Unless otherwise indicated, references in this document are to the editions listed above. In this manual, the guidance notes and reasons for rejection provide an interpretation of the requirements in these documents. If in doubt, consult the clause references given in the checklist.

Satisfying the requirements described in these documents is needed to meet a minimum level of safety for the transportation of dangerous goods in tank vehicles. Alternative methods to those

recommended in this manual may be implemented if it can be shown to the satisfaction of the inspector and/or the competent authority that an equivalent or higher level of safety to that specified in the standards and the ADG Code can be met using those alternative methods.

The information in this manual reflects current practice in the design and construction of tank vehicles. As standards have evolved, some requirements may not apply to older vehicles.

Note that AS 2809.4 and AS 2809.5 generally refer back to AS 2809.2 for common requirements. As a result, a reference to AS 2809.2 may still be relevant for tank vehicles that are designed to AS 2809.4 or AS 2809.5.

Tanks approved under older regulations, codes or standards

This manual is written using the Dangerous Goods Regulations, ADG Code and relevant Australian standards in force at the time of writing.

Tanks designed and approved according to an earlier edition of the standards above, or under alternative criteria, may continue to be used according to their approval, but the inspection, maintenance and record keeping requirements of the latest published edition of AS 2809.1 apply (Ref: ADG Code section 6.10.2.3).

Meaning of instructions

In this manual, the term ‘shall’ indicates the feature or practice is a mandatory requirement. The term ‘should’ indicates the feature or practice is good practice and is suggested, but is not mandatory.

Applicable vehicles

The checklist has been written to guide the assessment of tank vehicles and tank trailers that are used for the transport of dangerous goods.

A **tank vehicle** is a vehicle that is used to transport dangerous goods (often referred to as ‘product’) either:

- in a tank that permanently forms a part of the vehicle, or
- in a demountable tank that is filled or emptied while on the vehicle.

The checklist may also be used to inspect vehicles used to carry a portable tank that is filled or emptied while on the vehicle. Nonetheless, it may be useful in assessing the configuration and the equipment used to transfer dangerous goods on vehicles that transport portable tanks.

Note: The truck fuel tanks are not in scope.

A **tank trailer** is a trailer that either:

- incorporates a tank, or
- has a tank permanently attached that is intended for transporting dangerous goods.

A fuel tank for an auxiliary engine is not in scope. A tank trailer can be either a semi-trailer or a free-standing trailer.

A dangerous goods prime mover is a prime mover configured and appointed to tow dangerous goods tank trailers (other than dog trailers and pig trailers).

Tank trailer vehicles should be inspected in combination with a towing vehicle (prime mover or rigid truck). This allows for inspection of safety features fitted to the vehicle combination as it is to be driven, including those fitted to the towing vehicle, such as the battery isolation switch.

Vehicle and cargo carrying component requirements

The checklist identifies whether a particular requirement applies to:

- the cargo carrying components (the tank, its shell and service equipment that handles the dangerous goods) or
- the vehicle used to transport the tank or
- both the cargo carrying components and the vehicle.

These divisions are provided for informative purposes only.

Inspection frequencies

Inspection frequencies are defined in section 3 of AS 2809.1:2023. For most of the items in checklist 1 of this manual, inspections need to be carried out at 3-month intervals. The checklist includes information on frequency where it is less often than three months.

During these inspections, if any modifications or changes are identified that deviate from the approval and the requirements of AS 2809, these will need to be rectified before the vehicle is returned to service, or a new approval may be required.

5-year inspection

Every five years a complete review of the vehicle is required to be completed against the requirements of AS 2809, the ADG Code and (if available) either tank and vehicle dossier or design approval.

This is a thorough inspection, and both checklist 1 and checklist 2 should be completed during this inspection. Any identified non-compliances to the standard and the approved design must be fixed before the tank is returned to service. If the vehicle cannot be made to comply with it's design approval, it will need a new design approval to be issued by a competent authority.

Required competencies for inspection and maintenance

Inspections, tests and subsequent maintenance that is required must be carried out by a suitably competent person. Some organisations may be able to do this in-house, while others may decide to outsource this to another party.

Items that apply to the vehicle and the cargo carrying components may require different competencies, and there may be further variations within those required competencies.

The inspection process may be performed by a team, however the overall process contained in the checklist must be overseen and signed off by a suitably qualified person.

Certain inspection and maintenance tasks, for example pressure vessel inspections, may require extra competencies.

Record keeping

When an inspection has been done, a record must be kept. This must include a record of who performed the inspection. The checklist in this manual may be used for this record keeping. AS 2809 includes record-keeping requirements for both inspections and maintenance, and a copy of inspection and maintenance records must be kept by the vehicle owner.

Design, use, inspection and maintenance records for dangerous goods vehicles must be kept while the vehicle is in service. If ownership of the vehicle changes, a copy of these records must be given to the new owner.

You may be required to provide these records to a competent authority.

Inspection safety

Tank vehicle inspections should only be carried out on vehicles that are empty, and where possible, should be freed from dangerous goods before inspecting.

Inspection of dangerous goods tank vehicles is a complex and potentially dangerous task. These vehicles transport chemicals that can cause damage to property or injuries and, potentially, fatalities. These risks are even bigger when working on cargo-carrying components, especially where access to these spaces is needed.

A safe system of work is essential, and policies and procedures may be required, including but not limited to policies and procedures addressing:

- confined space entry
- freeing tanks of residual dangerous goods (including vapours), and
- working at heights.

Repairs and modifications

Where repairs or modifications are required, these should be performed according to the tank design approval, and the latest approved editions of the relevant dangerous goods standards listed above. Where a repair or modification is different from the vehicle approval in a material way, a new vehicle approval may be needed before it can legally continue transporting dangerous goods.

Buying a used dangerous goods tank vehicle

If you are buying a used dangerous goods vehicle and plan to license the vehicle for transporting dangerous goods, you should ask the seller to do a dangerous goods tank vehicle inspection using this manual. This is to show the tank vehicle complies with the Dangerous Goods Regulations. This makes it less likely that there will be delays when licensing the vehicle to transport dangerous goods and will help make sure the vehicle is safe to use.

Other records that should be provided by the seller include:

- a copy of the dangerous goods tank vehicle approval letter
- a copy of all available inspection and maintenance records for the tank vehicle
- the most recent dangerous goods vehicle licence information for the vehicle, including the state or territory it was licenced in, and the licence number the vehicle was listed on.

Removing vehicles from dangerous goods service

If a vehicle doesn’t comply with the Dangerous Goods Regulations and is not going to be returned to dangerous goods service, notify the competent authority that licenses the vehicle to have it removed from the licence.

To prevent the vehicle being accidentally used for dangeorus goods service, the EPA recommends:

- the emergency information panels and/or their frames are removed, and
- the compliance plate is removed or defaced.

If a tank vehicle is not compliant with the Dangerous Goods Regulations and is being sold, it is essential that potential buyers are told about this as part of the sales process.

Notes on this update

This is a revised edition of the EPA's DGTVIM, intended to reflect updates to the ADG Code and Australian Standards since v2.0 was published in 2018.

This update includes:

- extra maintenance entries in AS 2809
- information on whether a requirement applies to the tank or the vehicle
- extra compliance requirements from the ADG Code that should be checked during a standard inspection
- details on inspecting vacuum tanks
- information on when modifications require a new or modified approval

Preventing fires – Truck Inspection Manual

Each year, more than 200 trucks catch fire in NSW with many of these fires being preventable. In many cases the potential causes of fires can be identified before a fire starts. In 2022, the EPA published *Preventing Fires – Truck Inspection Manual* to inform truck operators, mechanics and drivers how to identify potential fire risks.

Preventing Fires – Truck Inspection Manual can be downloaded from the EPA website.

2. Dangerous goods tank vehicle identification and checklist

Note: For a combination vehicle with more than one road tank vehicle, use a separate checklist for each tank vehicle and use the same job number for each vehicle in the combination. A separate checklist is not required for a DG prime mover.

Identification of the inspected vehicle		
Registration/fleet number of tank vehicle(s)		
Registration/fleet number of prime mover		
Vehicle Identification Number (VIN)		
Type of vehicle configuration as inspected		
Gross weight rating on the ADR compliance plate (GVM or ATM)	kg	
Is a roll stability system (RSS/ESC) installed?	☐ YES	☐ NO
If No, is ABS installed?	☐ YES	☐ NO

Operator details	
Tank owner/operator	
DG vehicle licence number	

Tank details						
Tank manufacturer						
Shell material						
Date of tank manufacture						
Classes/divisions of dangerous goods carried						
Tank vehicle ID number/tank serial number						
Dangerous goods design approval number						
Dangerous goods vehicle licence number						
Number of compartments						
Capacity of each compartment (L):	1	2	3	4	5	6
Total design approval weight or volume	kg (or L)					
Safe Load Program (SLP) number (if applicable)						

Inspection details	
Date of inspection	
Location of inspection	
Inspector	
Inspector's qualifications	
Signature	
Next inspection required before	

Checklist 1 Standard inspection checklist (inspection every three months unless indicated by †)

Item	Applies to	Description	Pass/fail or N/A*	If a rejection is rectified, give details of repair
1	Tank	AS 2809 compliance plate		
2	Tank	Hydrostatic test plate		
3	Vehicle	Stability angle marking		
4	Vehicle	Placards and emergency information panels (EIPs)		
5	Tank	Cleanliness		
6	Vehicle	Suitable and free of risk-creating defect		
7	Tank	External tank inspection		
8	Tank	Closures closed and secured		
9	Vehicle	Stability of disconnected trailers		
10	Vehicle	Demountable tank attachment to vehicle		
11	Tank	Vehicle attachments		
12	Vehicle	Cabin-to-tank clearance		
13	Vehicle	Rear-impact protection		
14	Vehicle	Guarding		
15	Vehicle	Tail shaft protection		
16	Tank	Enclosed air spaces		
17	Vehicle	Road clearance		
18	Vehicle	Shielding of hot components		
19	Vehicle	Brake interlock drive away protection (DAP)		
20	Tank	Valve operation marking		
21	Tank	Valves interlocked and protective caps on outlets		
22	Tank	Protection against pump seal failure		
23	Tank	Condition of pressure/vacuum vents (PVVs)		
24	Vehicle	Auxiliary engines		
25	Vehicle	Roll stability system (RSS)		
26	Vehicle	Battery protection		
27	Vehicle	Battery isolation switch		
28	Tank	Pneumatic emergency stop system		
29	Vehicle	Protection of wiring		
30	Vehicle	Vehicle roll-over device (ROD)		

Item	Applies to	Description	Pass/fail or N/A*	If a rejection is rectified, give details of repair
31	Vehicle	Stowage of hoses and other loose equipment		
32	Vehicle	Fire extinguishers		
33	Vehicle	Safety Equipment		
34	Vehicle	Emergency information holder (EIH)		
35	Tank	Loading protection		
36	Tank	Burner and flame tube inspection		
37†	Tank	Condition of transfer hoses		
38†	Tank	Earthing and bonding equipment		
39†	Tank	Bitumen tank vehicle annual inspection		
40†	Tank	Hatches, vents and valves testing and inspection		

*Select 'Pass', 'Fail' or 'NA'. For a failure, please note the *reason for rejection* reference (e.g. '30.1').
Note any failures on the diagrams provided.
"Applies to" column: Tank means the shell or cargo carrying components. This is indicative only.

Inspector's signature	
Date of inspection:	
Notes	

Checklist 2 5-yearly checklist and detailed AS 2809 compliance review for all tank vehicles

Note: complete **ALL** items in checklist 1 & 2, and review the vehicle to make sure it complies with AS 2809.

Item	Applies to	Description	Pass/fail or N/A*	If a rejection is rectified, give details of repair
41	Tank	Hydrostatic test		
42	Tank	Internal tank inspection		
43	Tank	No hoses between foot valve and first outside valve		
44	Tank	Coaming clearance for hatches and fittings		
45	Tank	Bitumen tank vehicle shell corrosion inspection		

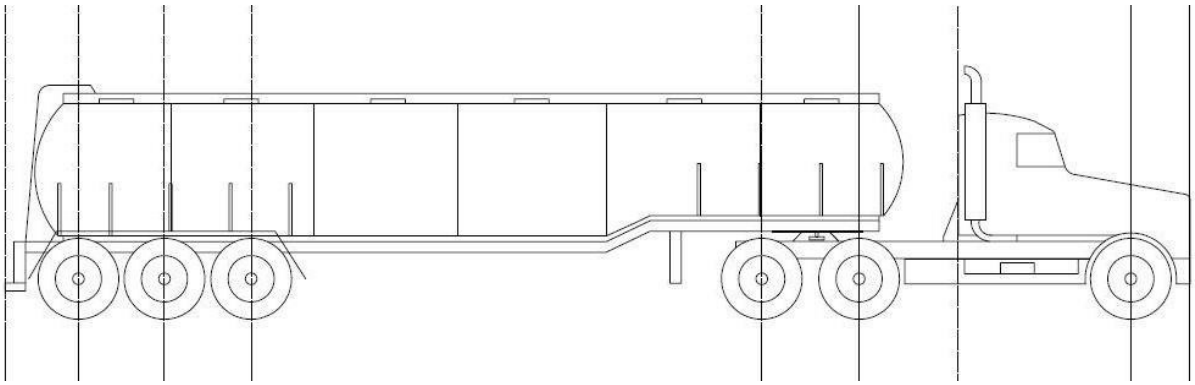
*Select 'Pass', 'Fail' or 'NA'. For a failure, please note the *reason for rejection* reference (e.g. '30.1').
Note any failures on the diagrams provided.
"Applies to" column: Tank means the shell or cargo carrying components. This is indicative only.

Inspector's signature	
Date of inspection:	
Notes	

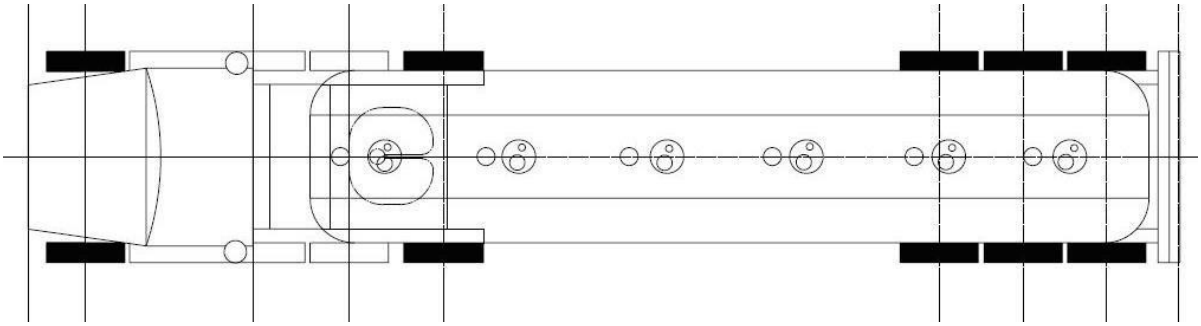
Inspector to draw/note any failures identified on the drawings below.

Prime mover and tank trailer (or dog trailer)

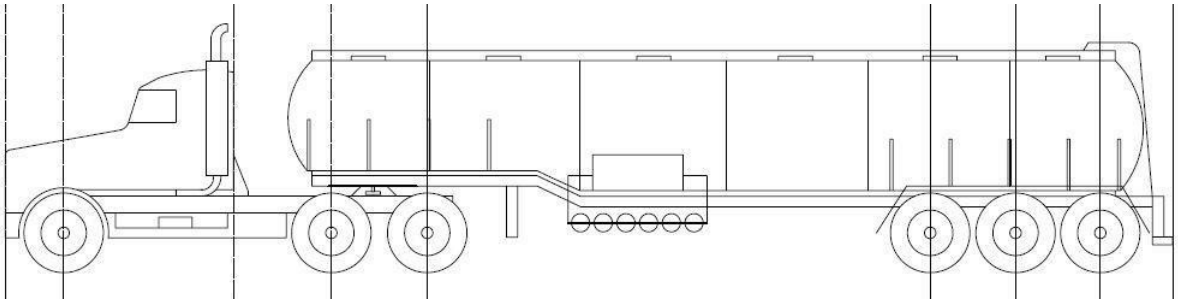
Driver's side:



Plan view:



Passenger's side:



Note defects that exist but do not constitute a fail. Also note and describe recently repaired or corrected elements. Attach another page to write the notes on, if necessary.

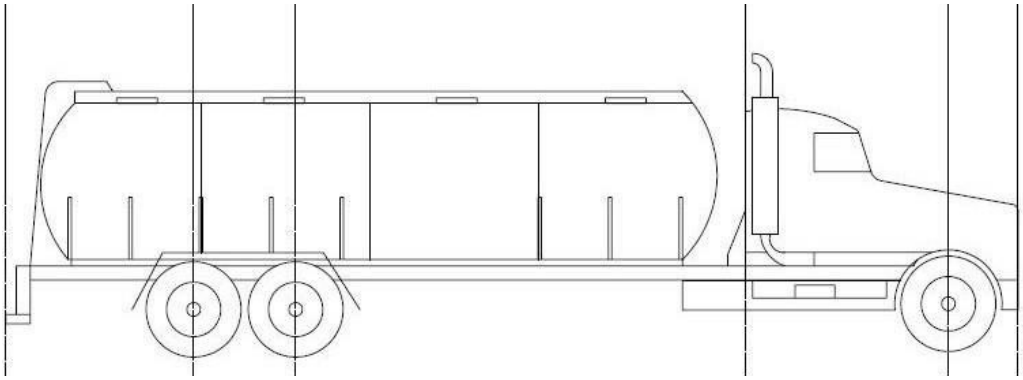
Notes:

Inspector's signature
Date of inspection:

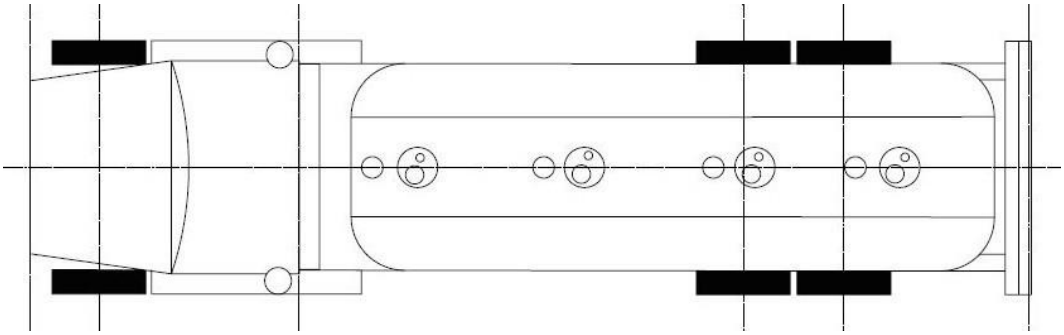
Inspector to draw/note any fails identified on the drawings below.

Rigid tank vehicle

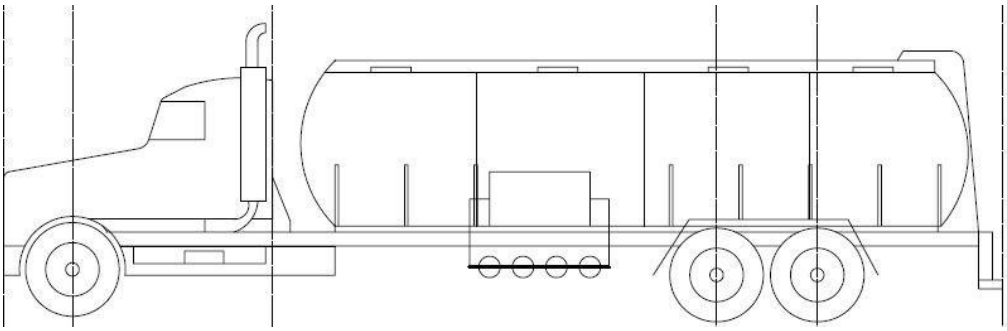
Driver's side:



Plan view:



Passenger's side:



Note defects that exist but do not constitute a fail. Also note and describe recently repaired or corrected elements. Attach another page to write the notes on, if necessary.

Notes:

Inspector's signature
Date of inspection:

3. Dangerous goods tank vehicle inspection guidance

3.1. AS 2809 compliance plate

Objective

To provide evidence that the tank vehicle has been designed and constructed according to AS 2809. The AS 2809 compliance plate must:

- be made of corrosion resistant metal
- be fitted in a conspicuous location
- include/display required information.

Application

All classes of dangerous goods.

Rigid tank vehicles. Tank trailers.

Legislative reference

ADG 7.8 clause 6.10.2.2. Marking (AS 2809 compliance plate)

Guidance

The tank is required to have an AS 2809 design approval.

The plate must be legible. If the plate is illegible or missing it must be replaced with a plate that has all the required information. It may be necessary to review the design approval to get this information. The manufacturer may be able to supply a replacement plate.

Required information

a. Name of the tank manufacturer
b. Tank manufacture date
c. Tank serial number
d. Maximum allowable working pressure for the tank
e. Test pressure
f. Metallurgical design temperature (if used for goods below –20°C or above 50°C)
g. Tank capacity
h. Maximum mass of dangerous goods that may be transported in the tank under the design approval
i. Maximum gross mass of the tank
j. Name of the competent authority that granted the approval and the approval number
k. Initial hydrostatic test date and subsequent test date(s) for the tank (the latter will be on a separate plate)
l. Name of the authority or organisation that witnessed the last hydrostatic test
m. If the design approval is based upon compliance with an Australian standard or other standard or code, the standard(s) or code(s) to which the tank has been designed must be identified.

Reasons for rejection

1. The AS 2809 design approval plate is missing.
2. The required information cannot be read.
3. The plate is not in a conspicuous location that is readily accessible for inspection.
4. There is reason to believe that the plate is not correct.

5. The plate is missing required information.

3.2. Hydrostatic test plate

Objective

To verify that hydrostatic test(s) have been done and their date(s) have been recorded.

There must be a plate showing the date of the last hydrostatic test and the name of the authority or organisation that witnessed that test.

Application

All classes of dangerous goods.

Note: tank vehicles for bitumen based products only require an initial hydrostatic test.

Rigid tank vehicles. Tank trailers.

Legislative reference

ADG 7.8 clause 6.10.2.2.3 (k). Hydrostatic test dates.

Guidance

The first hydrostatic test can be recorded on the AS 2809 compliance plate. Later tests must be evidenced by a test plate that reports the date of the test and the organisation that did the test.

Where a hydrostatic test is used for a hatch, vents and valves test, it must be recorded.

Multiple test dates can be recorded on one plate.

Reasons for rejection

1. A hydrostatic test is not recorded on a plate affixed to the tank vehicle.
2. Absence of a hydrostatic testing plate marked with the test date(s) and the witnessing organisation if subsequent hydrostatic tests have been done.
3. The hydrostatic test plate is illegible.

3.3. Stability angle marking

Objective

To verify that the vehicle complies with its design stability angle or static roll-over threshold calculation.

Application

All classes of dangerous goods.

Rigid tank vehicles. Tank trailers.

Legislative reference

AS 2809.1 section 2.1.2. Stability.

Guidance

A plate and marking is attached to allow compliance with the stability angle to be verified.

The plate includes guidance about determining whether a fully laden vehicle exceeds its stability angle or calculations. Stability angle must be determined on level ground and when the vehicle is fully laden.

The plate also includes information on tow coupling height.

Reasons for rejection

1. No stability plate is present.

   Note that this is a new requirement introduced in AS 2809.1:2023. Consider adding such a plate on older tank vehicles.
2. The plate or its markings are illegible.
3. The vehicle exceeds the stability height indicated on the plate. Minor exceedances are not an automatic failure, and may be investigated.

3.4. Placards and emergency information panels (EIPs)

Objective

To check that emergency information panels are attached to the tank vehicle and that the panels carry accurate information for the product(s) carried.

Application

All classes of dangerous goods.

Rigid tank vehicles. Tank trailers. DG prime movers.

Legislative reference

ADG 7.8, clause 5.3.1 and 5.3.6. Emergency information panel.

Guidance

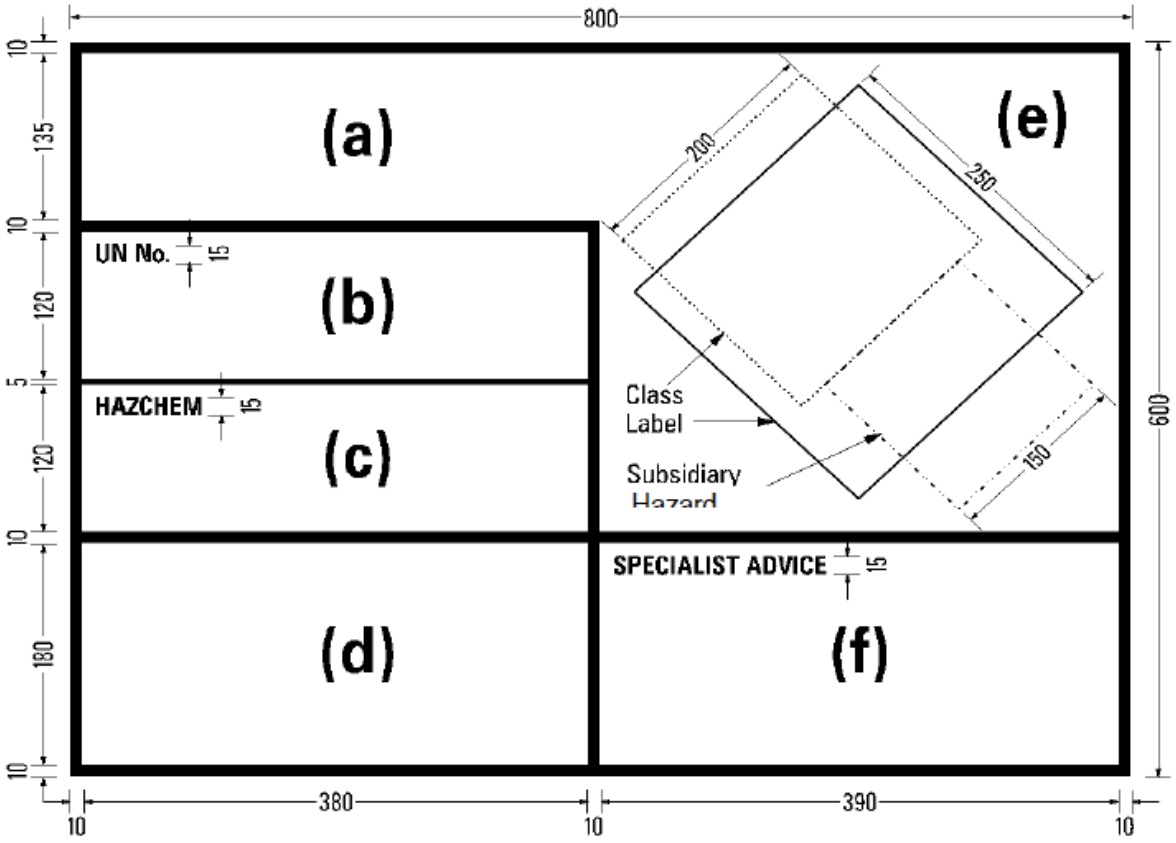
Dangerous goods tank vehicles are required to be placarded with emergency information panels as required by section 5.3 of the ADG Code. Figure 5.3.6(b) provides illustrations of EIP positions on vehicles, including combination vehicles.

Figure 5.3.2(a) from the ADG Code (see below) and section 5.3.1.3 define the information that is required to be included in an emergency information panel:

(a) The proper shipping name of the dangerous goods
(b) The UN number of the dangerous goods
(c) The Emergency Action Code (Hazchem code) for the dangerous goods
(d) The expression: “In emergency dial 000, POLICE or FIRE BRIGADE”
(e) The labels (placards) for the dangerous goods
(f) The name of the organisation providing the telephone advisory service, and the telephone number to call.

Figure 5.3.2(a): Format and Colour of Emergency Information Panel

Background: white
Lines and text: black
All measurements in millimetres



Emergency information panels shall be placed on both sides of a tank vehicle as close as practicable to the front of the tank. Another emergency information panel shall be placed at the rear of the vehicle (or combination). The lowest edge of each emergency information panel should be at least 1 metre from the ground.

However, if the tank vehicle design makes it not practicable for the emergency information panel to be located above 1 metre from the ground, the lowest edge of the emergency information panel may be placed lower, but shall not be less than 450 millimetres from the ground.

The emergency information panel should be vertical or as close to vertical as practicable (‘in a substantially vertical plane’).

The front of the towing vehicle or rigid vehicle shall be securely fitted either with:

- placards appropriate for the dangerous goods being transported, or
- a frame that allows placards to be secured, or a “flippable” placard holder.

Reasons for rejection

1. There is no space for the installation of an emergency information panel (800 millimetres wide x 600 millimetres high) on both sides and at the rear of the tank vehicle (or combination).
2. The emergency information panels and placards (class labels) are illegible, misleading, obscured, damaged or discoloured.

3. The affixed emergency information panels do not have the required information as required in section 5.3.1.3 of the ADG Code.
4. The emergency information panels, or their text do not meet the size requirements of the ADG Code.
5. The emergency information panels are not in a substantially vertical plane (panel is greater than 45 degrees from vertical).
6. The front placard is illegible, misleading, obscured, damaged, faded or discoloured.

Note: If the placard holder is a flippable placard holder, check all placards that may be used with the vehicle to ensure they are in good condition.

3.5. Cleanliness

Objective

To make sure the vehicle is presented in a condition that is safe for the inspector to inspect and that any evidence of product residue on the outside of the vehicle is investigated thoroughly.

Application

All classes of dangerous goods.

Rigid tank vehicles. Tank trailers.

Legislative reference

ADG 7.8 clause 4.4.1 (c).

Vehicle must be clean (free from dangerous goods residues on the outside of the tank).

Guidance

Evidence of product residue or contamination on the exterior of the tank or on the vehicle below the tank must be investigated. This contamination may indicate that cracks exist in the tank structure or there is leakage from valves.

Dust seen adhering to surfaces near closures and valves suggests that the seals might be weeping. If so, the integrity of the seals must be determined. This includes the seals where the foot valves are located in the bottom of the compartment.

Reasons for rejection

1. There are residues of dangerous goods on the outside, whether or not they can be wiped off.
2. There are residues (including dust sticking to product) on the bottom of the barrel that are traceable to a closure.
3. There are residues (including dust sticking to product) around hatches, valves and vents on top of the barrel.
4. There are residues (including dust sticking to product) near welds or at changes of shape.

3.6. Suitable and free of risk-creating defect

Objective

The inspector must do a general external visual inspection of the vehicle. The inspector must be satisfied that no safety critical defects were noted with the general vehicle/tank vehicle equipment.

Application

All classes of dangerous goods.

Rigid tank vehicles. Tank trailers. DG prime movers.

Legislative reference

ADG 7.8 clause 4.4.1 (a) and (b). Suitable and free of a defect that could create a risk in the transport of dangerous goods.

ADG 7.8 clause 4.4.2.3. The vehicle must be suitable for the properties of the goods being transported and conform to the relevant parts of AS 2809.

Guidance

The truck, trailer and tank vehicle must not show a serious defect that could reasonably cause a loss of vehicle control or develop into a failure resulting in a leak or spill. The condition of the vehicle is to be determined by visual inspection.

Reasons for rejection

1. There is a serious brake defect.
2. There is a serious steering defect.
3. There is structural cracking.
4. Tyres are unroadworthy.
5. Suspension bushes are worn out.
6. Suspension airbags are leaking.
7. There is another defect that would render the vehicle unsafe.
8. Fifth wheel / tow eye couplings are not in good working order

3.7. External tank inspection

Objective

The tank condition must not present a risk of leak or spillage.

The shell, all cargo carrying components and structural equipment must be free of leaks, cracks, defective welding, serious impact damage and structural corrosion.

Visually check the barrel and all attachments. Locations for particular attention are:

- over the rear suspension and the area above the skid plate
- at the outrigger to barrel attachments
- beneath the tank in the region of the outriggers
- where the front and rear bulkheads meet the sub-frame
- at changes of section or shape
- at mounting points where demountable tanks are mounted to a chassis rail
- fatigue/stress points identified by the tank manufacturer
- at the bottom outlet or flange
- the coaming rails

Items of relevance include:

- scrapes or scratches on the tank surface that are more than 1 millimetre into the thickness of the shell (so as to pose a risk of developing into fatigue cracks or ruptures)
- structural cracks in mounting plates or in sub-frame/chassis rail members
- heat damage to the tank shell
- dents extending over broad areas

- creases at the end of dents
- tank damage that has been repaired with body filler for which no photographic evidence exists of the condition of the tank skin/ribs before being covered.

Application

All classes of dangerous goods.

Rigid tank vehicles. Tank trailers.

Legislative reference

ADG 7.8 clause 4.4.2.4.1(b). Tank vehicle is not leaking, defective or damaged.

AS 2809.2 clause 2.2.17. Welding.

Guidance

Leaks

Obvious leaks and weeping product must be considered a failure and be investigated. Evidence of residues, such as road grime accumulating on residues are also a failure and must be investigated.

In some cases, the slight release of vapour may cause a product film to form, and dust can attach to this film. This may not be considered a leak, but the viabiltiy of the seal should be investigated.

Special attention for leaks and build up of grime on residues needs to be taken at:

- the drain holes between bulkhead air spaces,
- at the base of outriggers, and
- around the foot valves and delivery pipework.

Accumulation of product in a sight glass at the delivery outlet of an empty compartment can be evidence of a leaking foot valve. The foot valve should be checked for integrity.

Defective welding

Welding must be failed if the repair weld is not substantially similar in quality to the adjacent original equipment weld. Poor-quality welding that is irregular in width and shows undercutting or craters is unacceptable.

If the assessor doubts the quality of welding, an engineer experienced in tank vehicle manufacture (or a suitability qualified welding inspector) should be engaged to assess the welds with reference to the following:

- Aluminium (barrels or structural elements) must be checked and compared to category B, Table 6 in AS 1665.
- Steel (barrels or structural elements) must be compared to AS 1554.1, AS 1554.4 or AS 1554.5 as relevant; or AS 1665.

Impact damage

Non-superficial impact damage or scratches must be referred to the tank vehicle manufacturer for advice on whether or not repair is required. The referral and response should be documented.

Serious dents

Serious dents are deformations of the tank shell material that:

- crosses compartment ends
- show stretching or thinning of the shell material
- have creases at the ends of the dent, or

- show any signs of damage to, or impact on, barrel welds.

Deep scratches

Deep scratches are those where the depth of the scratch is greater than 1 millimetre below the shell surface (not including scratch lip). It is unacceptable to fill deep scratches with body filler. If the scratch is more than 1 millimetre it shall be referred to an experienced engineer or manufacturer for assessment.

Dents covered over with body filler (bog)

Use of filler to repair tank dents does not constitute failure. However, the condition of the tank behind the filler must be investigated. Unless already proven, the external body filler shall be removed to verify there are not deep scratches in the surface of the tank. Keep a record of this check to ensure that inspectors know about it in future inspections.

An internal examination is also needed to determine whether the tank skin is creased across the dent line or whether there are skin or weld cracks. If the internal inspection reveals creases or cracks, it shall be referred to an experienced engineer or manufacturer for assessment.

Heat damage

Any aluminium tank vehicle that has been subjected to heating (such as radiant heat from an adjacent fire) must be referred to the manufacturer for assessment.

Structural corrosion

Corrosion is defined as structural corrosion, not superficial corrosion. Structural corrosion that has reduced the shell thickness by 1 millimetre or more is unacceptable.

Corrosion of structural elements that has resulted in loss of more than 2 millimetres of metal is unacceptable. If the corrosion is more than 1 millimetre and less than 2 millimetres it shall be referred to an experienced engineer or manufacturer for assessment.

Cracks

The tank shell must be free of cracks. In particular, welds (and the heat-affected zone on either side of the weld) must not show longitudinal cracks.

Cracks in structural members are unacceptable. Cracks are likely to develop into failures with age and vibration in service. Look for weld cracks within the steel and adjacent to the weld in aluminium.

Multiple repairs at the same location

Evidence of multiple repairs at the same location in the tank shell or in a structural element indicates a design failure or many ineffective repairs. Repairs should address the weakness and provide reinforcement or load spreading. Therefore, multiple repairs made without structural redesign are unacceptable. The tank and/or vehicle manufacturer must be consulted. If this is not possible, get the opinion of a qualified engineer who is experienced with tank vehicle manufacture and repair.

Scrapes, dents and creases

Damage to the tank skin that has removed more than 1 millimetre of material is considered a risk for future failure. Dents associated with creases across the dent line are unacceptable because the creases represent a weak line in the tank skin. There is a risk of cracks developing at the ends of a crease.

Therefore, creases across the dent line are unacceptable.

Dents or creases in thermal jackets do not constitute failure. An internal inspection or removal of lagging for inspection may be needed to determine whether there's been unacceptable damage to the tank skin.

If there is evidence from an internal inspection (such as an internal protruding deformation line) that a deep crack has been filled with body filler, then metallurgical examination is required to determine how severe the scrape is.

General

A manufacturer's written declaration that a defect does not warrant further repair will override an inspection fail.

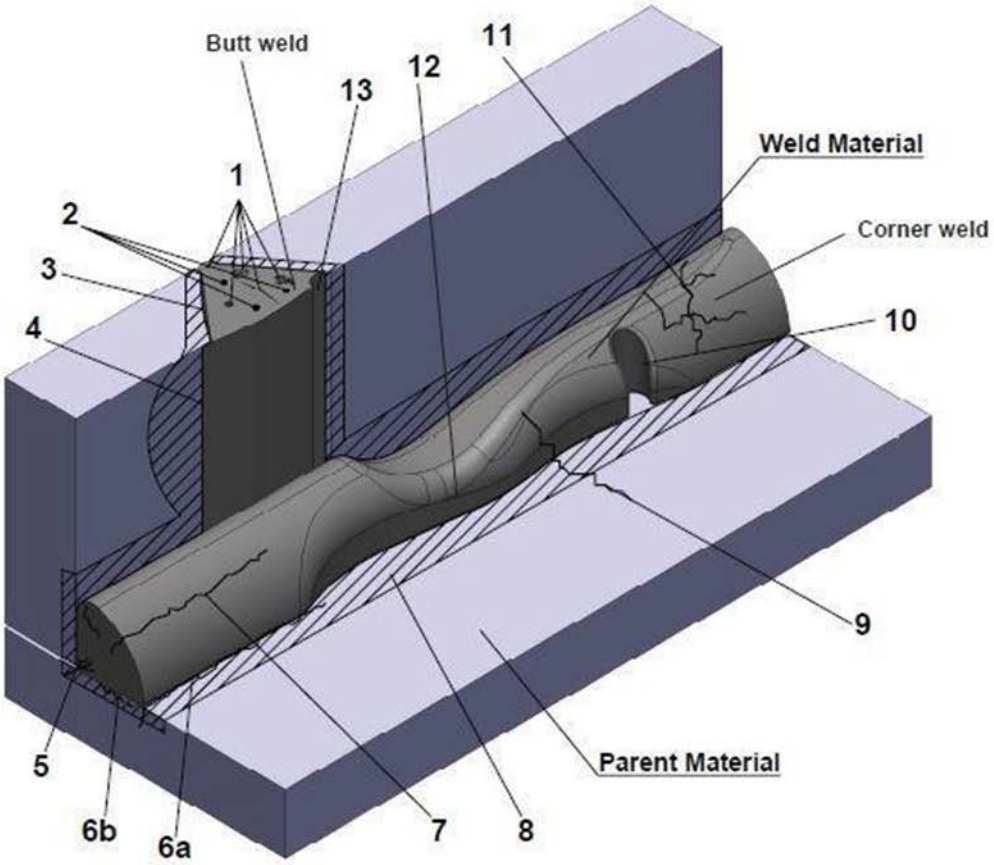
Cracks, corrosion or impact damage that are in non-structural and non-safety-critical parts that could not result in loss of containment, or affect vehicle safety, do not constitute a defect. However, they should be noted on the tank vehicle drawings that accompany the checklist.

Reasons for rejection

1. The DG product has leaks, drips or runs.
2. There is a crack in a structural member or a part that could create a hazard if it fails and the failure could happen over time.
3. There is a structural weld with poor penetration, holes, porosity, built-up welding, undercutting or cracks.
4. There is impact damage to tank vehicle shell across compartment ends, with shell stretching, or with creased ends.
5. There are cuts, scrapes or surface tears where there is material loss with a depth of more than 1 millimetre.
6. Deep scratches, creased ends or cracks are hidden by body filler.
7. There is corrosion of structural components that results in pitting or surface loss of more than 2 millimetres.

   Note: Corrosion levels of more than 1 millimetre must be referred to an experienced structural engineer or to the tank manufacturer for assessment and, if necessary, repair/refurbishment.
8. There is corrosion of the tank shell where there is material loss of 1 millimetre or greater
9. Cracks are in or adjacent to the barrel.
10. There are cracks in hatches, valve bodies, metal pipes and tubes that contain product.
11. There is corrosion of hatches, valve bodies and tubes that has removed more than 1 millimetre depth of metal.
12. There is evidence of multiple repairs in metals at the same location.

Guide to welding defects



1. Fine/Coarse Cluster Porosity/blow holes & hollow root beads:
Craters, cavities, wormholes, pores into the weld. These are the result of gas inclusion when the weld solidifies. It is caused by poor gas settings, water on parts, contamination...

2. Slag Inclusions:
foreign materials such as slag or pieces of tungsten (TIG welding). Inclusions can be due to repeat welds that cover surface contamination from the first weld.

3. Lack of fusion:
the weld does not extend into the base metal by a distance comparable to the width of the weld. This is due to poor welder settings/ incorrect filler rod.

4. Overlap and Overwelding:
the long-side of a joint weld need be no longer than the thickness of the thinner material being welded. Overwelding, which is making the weld too thick, can results in distortion and a large HAZ.

5. Root Crack:
These are generaly due to hydrogen embritllement and poor welder settings at the commencement of welding.

6. HAZ Cracking:
Usually longitudinal cracks in the Heat Affected Zone (HAZ). The result of excessive heat input, hydrogen embrittlement, residual stress in material. HAZ cracking can often occur when the parent material is cooled down quickly. Preheating helps avoid HAZ Cracking.

a) Toe Cracking
b) Underbead Cracking

7. Longitudinal Crack:
These are cracks that run the length of the weld bead. They are usually caused by high transverse shrinkage. Preheating the part helps.

8. Heat Affected Zone (HAZ):
The parent material region surrounding the weld experiences material property changes due to heating when welding. The intensity and duration of the heat will change the properties of the material. Strength can be reduced in high strength alloy steels.

9. Transverse Crack:
Cracks across the weld are due to longitudnal shrinkage stresses acting on a low ductile weld material.

10. Crater:
These occur due to gas porosity and shrinkage during weld pool solidification.

11. Radiating Crack:
These are cracks originating from a common point. These can occur due to excessive heating, cooling and residual stresses within the weld material.

12. Inconsistent welding:
Inconsistent weld profile due to poor welding technique.

13. Undercut:
The weld reduces the thickness of the base metal and draws it into the weld. It creates a drain-like impression. Such imperfections are the result of poor welder settings. poor fitting metal parts can also lead to undercutting.

Note:
Joint types are described as: Butt, Lap Corner, Edge, Puddle, Tacking, T-joints, Bevell groove, V- groove.

3.8. Closures closed and secured

Objective

To make sure vibration or movement during travel does not result in the opening of a valve or loss of a cap or cover, and thereby create a risk of the loss of product.

Application

All classes of dangerous goods.

Rigid tank vehicles. Tank trailers.

Legislative reference

ADG 7.8 clause 4.4.2.4.2. Closures closed and secured.

AS 2809.4 clause 2.3.1.

Guidance

ADG 7.8 requires that closures are kept closed and secured. This is necessary to provide a high degree of protection against the closure coming open under normal conditions or adverse circumstances, such as impact with animals or road debris.

Check for the following features:

- A product containment valve must have a catch, spring or locking mechanism to secure it.
- Caps on tank closures located on the top of a tank shall have a locking (security) feature, such as a split pin, cable tie, spring clip or equivalently effective securing feature.
- In tank vehicles not fitted with a compartment foot valve, a quick-acting shut-off valve must be fitted to, or immediately adjacent to, the outlet/outlet flange.
- In tank vehicles fitted with manual internal valve actuators (such as manual top operators), these devices must be closed when inspected.

  Note: report any findings of open top operators to vehicle owners/operators for training of tanker staff.

Cam lock arms can be secured using spring clips, padlocks, polyamide (cable) ties or some other reliable method.

Note: Dust caps on dry break couplings (such as API valves) do not need a secondary locking (securing) feature.

Reasons for rejection

1. Valves do not have a locking mechanism and/or caps do not have a securing mechanism.
2. Securing mechanisms are damaged, inoperable or ineffective.
3. AS 2809.4 only: For compartments that do not contain an internal shut-off valve (foot valve), the shut-off valves are not mounted directly to, or immediately adjacent to, the outlet flange on the bottom of the compartment.

3.9. Stability of disconnected trailers

Objective

To make sure the tank trailer can be safely separated from the prime mover.

Application

All classes of dangerous goods.

Tank vehicle trailers.

Legislative reference

AS 2809.1 clause 2.7. Stability of disconnected trailers.

Guidance

Semi-trailers must be fitted with landing legs or support points that are:

- securely attached
- strong enough for the load
- free from impact and mounting damage
- operable.

If the landing legs are not fitted the semi-trailer must have provision in the structure for external support.

Trailers (that are not semi-trailers) must be remain stable when unattached.

Reasons for rejection

1. Landing legs are bent.
2. Landing legs exhibit structural cracks.
3. The landing leg triangulation bar is significantly bent so that stabilisation strength is substantially reduced.
4. A foot is bent so that it cannot rotate or take a horizontal orientation.
5. The leg deployment mechanism is inoperable or unreliable.
6. The structural support platform that the legs are attached to is cracked.
7. The structural support platform without landing legs is cracked or bent.
8. The trailer is unstable when standing unattached.

3.10. Demountable tank attachment to vehicle

Objective

To make sure the tank remains securely attached on tank vehicle where the tank is separate from the vehicle chassis (a demountable tank).

Application

All classes of dangerous goods.

Rigid tank vehicles. Tank trailers.

Legislative reference

AS 2809.2 clause 2.2. Tank design and construction.

Guidance

The means of attachment of a demountable tank to a road vehicle (mounting brackets, pins, bolts, etc.) must be structurally sound and free of any defect except for cosmetic damage/surface imperfection.

Inspect the attachments and mounts for cracks, twists, bends or loose/broken bolts.

Mild steel attachment hardware is unacceptable. Attachment hardware shall meet or exceed the National HV Modification Code – VSB 6 Code J1.

Nuts on structural bolts should have a means of retention to make sure they do not work loose. Acceptable means include spring washers, polyamide insert nuts (nyloc), split pins, double nuts and cone nuts.

Repair to attachment brackets is acceptable if professionally conducted and of a quality that results in similar strength to the original design.

Compliance with the manufacturer's specification overrides any reason for rejection.

Reasons for rejection

1. Cracks exist in structural members and/or welds.
2. Structural bolts, pins, clamps, springs, etc. are missing, cracked, worn, rusted (> 1 millimetre rust depth) or loose.
3. Attachment brackets or fixture components are loose.
4. Attachment hardware is not in accordance with VSB6 J1.
5. Nuts on a structural bolt have no means of retention other than a metal thread.

Note: Compliance with the manufacturer's specification overrides reasons for rejection.

3.11. Vehicle attachments

Objective

To make sure attachments to the tank vehicle cannot cause structural damage to the tank if left unsecured or projecting.

Application

All classes of dangerous goods.

Rigid tank vehicles. Tank trailers.

Legislative reference.

AS 2809.2 clause 2.2.15. Component attachment.

AS 2809.4, clause 3.3.9.

Guidance

Any attachment that could cause structural damage to the tank if not securely stowed in the designed position shall be interlocked with the vehicle braking system throguh the drive away protection system.

The attachment of a component to the tank shall be on a mounting pad welded onto a pad on the tank. The metal thickness of the pad shall be no thicker than the shell material and the pad shall extend at least 25 millimetres beyond the perimeter of the component and be shaped to avoid stress concentrations. Drainage or tell-tale holes must be provided.

Reasons for rejection

1. The above-tank handrail system can be extended without the parking brakes being applied.
2. Any other attachment that could cause structural damage to the tank when extended does not engage the parking brakes.
3. Components that are attached to the tank are mounted directly and are not attached to a mounting pad that is no thicker than the shell material.
4. The pad mentioned in item 3 is not continuously welded to the tank unless a gap for drainage is provided.

5. The component attachment creates pockets that collect liquid and could promote corrosion if liquid were to collect in the pocket and no tell-tale hole is provided. Tell-tale holes must be plugged if not on a lower surface

3.12. Cabin-to-tank clearance

Objective

To make sure the clearance between the tank and the cabin is large enough to avoid a mechanical clash under adverse circumstances.

Application

All classes of dangerous goods.

Rigid tank vehicles. Tank semi-trailers. DG prime movers.

Legislative reference

AS 2809.1, clause 2.1.5. Cabin-to-tank clearance

ADR 43/04 clause 6.2.1.2.1

Guidance

Minimum safe distances shall be measured and verified.

For rigid vehicles, the clearance between the back of the cabin and the closest point of the tank shall be no less than 75 millimetres.

For articulated combinations, the front swing shall be measured to verify that the clearance complies with the relevant Australian design rules (ADRs) for the vehicles in the combination.

Reasons for rejection

1. The clearance between tank and cabin is less than 75 millimetres.
2. For a semi-trailer tank vehicle, the distance between the kingpin and a front corner of the semi-trailer is more than 1900 millimetres or the front swing distance doesn’t comply with Australian design rules.

3.13. Rear-impact protection

Objective

To make sure the product containing elements of the tank are properly protected from damage by a rear impact.

Application

All classes of dangerous goods.

Rigid tank vehicles. Tank trailers.

Legislative reference

AS 2809.1 clause 2.1.6. Rear-impact protection.

Guidance

The rear of the tank vehicle must be fitted with a substantial bumper and/or barrier system with an impact surface that is the full width of the vehicle.

The bumper must be attached to the sub-frame of the road tank vehicle or the vehicle chassis and must not be attached directly to the tank.

The impact face of the bumper bar must have a clearance of greater than 150 millimetres measured from the tank or any component or fitting that contains product.

If the rear tyres are more than 600 millimetres from the rear bumper impact surface, or the clearance under the bumper is more than 600 millimetres, the bumper must be fitted with underrun protection.

The rear bumper must be solidly fitted and in sound condition. Where the bumper shows evidence of a collision, it must be assessed to make sure it continues to provide an appropraite level of protection.

Reasons for rejection

1. The bumper is not solidly attached and in sound condition.
2. The clearance between the impact surface of the bumper and the rearmost vertical projection of the tank is less than 150 millimetres.
3. The width of the impact surface is less than the width of the vehicle.
4. The bumper is not attached to the vehicle chassis or sub-frame.
5. The closest distance between a rear tyre and the impact surface of the bumper is more than 600 millimetres and the lower height of the bumper exceeds 600 millimetres, and no underrun protection is provided.

3.14. Guarding

Objective

To make sure people operating power-driven rotating machinery are protected from contact with rotating parts.

Application

All classes of dangerous goods.

Rigid tank vehicles. Tank trailers. DG prime movers.

Legislative reference

AS 2809.1 clause 2.1.7. Guarding.

Guidance

Guarding requirements apply to driven shafts that are connected to motors and pumps. The exposure exists only when the vehicle is stationary.

Guarding is required to protect the operator or bystanders against accidental contact with rotating shafts connected to motors and pumps. The inspection should take account of the possibility that a person might contact the shaft under normal conditions.

Reasons for rejection

1. Moving parts of a motor or pump are unguarded in a readily accessible location.
2. The guarding is unlikely to prevent accidental contact by an operator.

3.15. Tail shaft protection

Objective

To make sure a failure of a tail shaft does not damage the tank, pipes or cargo-carrying components.

Application

All classes of dangerous goods.

Rigid tank vehicles.

Legislative reference

AS 2809.1 clause 2.1.8. Tail shafts.

Guidance

This is about protection against the risk that a tail shaft failure could puncture the tank or damage cargo carrying components. The exposure only exists when the vehicle is moving.

While this is not mandatory for DG prime movers, having tail shaft protection on prime movers carrying dangerous goods is recommended.

Tail shafts can fail at universal joints, centre-bearing assemblies, cast-off fasteners or, more rarely, due to fatigue failure of the tail shaft tube. There is a risk that one end of the tail shaft tube might strike the ground and potentially ricochet or be forced into the tank. This risk exists on all powered vehicles that have a tail shaft. The risk zone is mainly between the chassis rails of the vehicle.

Protection is required against a tail shaft failure causing a metal part to strike the tank. The protection can take the form of factory chassis cross-members, fifth-wheel mounting plates, suspension brackets, structural elements, etc.

Protection is required to prevent the front of a disconnected tail shaft from striking the ground, such as a U-shaped restraint (catcher bracket) at the front of each tail shaft section.

If there is a clear path between the tail shaft and the tank on the connected vehicle, specific protection is required. Possible protections are:

- metal plates above universal joints
- metal walkway plates that fill in between the chassis rails.

Reasons for rejection

1. Protection is not provided to prevent a failed tail shaft from damaging the vehicle, its tank or other cargo-carrying component.
2. Nothing to stop the front of the tail shaft from striking the ground if it fails.

3.16. Enclosed air spaces

Objective

To make sure product leakage from enclosed air spaces can be detected.

Application

All classes of dangerous goods.

Rigid tank vehicles. Tank trailers.

Legislative reference

AS 2809.2 clause 2.2.14. Enclosed air spaces.

AS 2809.4 clause 3.3. Drains fitted with vents

Guidance

Where an enclosed air space exists between adjacent compartments, the upper and lower ports must be inspected.

The upper port is required to be plugged so that liquid cannot run into the air space.

Where enclosed spaces are used to transfer vapour, all openings are required to be plugged.

The bottom port is required to be open so that leakage into the air space from a compartment will be able to escape. For division 6.1 and class 8 liquids, the bottom opening must be fitted with a valve that can be shut off.

Each bottom port must be inspected for product leakage as part of the tank vehicle external inspections.

Mounting pads that create an enclosed air space must be inspected for product leakage or evidence of corrosion.

Reasons for rejection

1. Top vent holes do not contain a screw-in plug.
2. Openings in vapour transfer spaces are not plugged.
3. There is evidence of product residue in or adjacent to a bottom vent hole or mounting pad drain.
4. Bottom vent holes are plugged or blocked with solid debris.
5. Bottom vent holes are not fitted with a shut-off valve (division 6.1 and class 8 tank vehicles).

3.17. Road clearance

Objective

To make sure any product containing component of the tank vehicle has enough clearances from the roadway to minimise the risk of damage.

Application

All classes of dangerous goods.

Rigid tank vehicles. Tank trailers.

Legislative reference

AS 2809.1 clause 2.1.4. Road clearance.

Guidance

Road clearances shall be measured underneath the tank vehicle at its lowest component. Minimum clearances must be verified.

The ground clearance of tank elements must be at least 250 millimetres within 1 metre of an axle and at least 350 millimetres elsewhere.

Tank filling and discharge connections that are rigidly connected to a tank must not be lower than 40 millimetres below the centre plane of the tank vehicle’s wheels.

Reasons for rejection

1. A component containing product or for transferring product is less than 250 millimetres from the ground within 1 metre of any axle or less than 350 millimetres for any other location when measured on an unladen vehicle.
2. Rigidly attached tank filling and discharge connections extend lower than 40 millimetres below the plane height through the centreline of the axles on the tank vehicle.

3.18. Shielding of hot components

Objective

To make sure hot components[1] are shielded to protect against contact with spilled product.

Application

Class 3 liquids.

Prime movers. Rigid tank vehicles.

Legislative reference

AS 2809.2 clause 1.6.1. Spillage control

AS 2809.2 clause 1.6.2. Road tank vehicle propulsion or auxiliary engine exhaust.

Guidance

All hot engine components and engine exhausts must be shielded where there is a possibility of flammable liquid coming into contact with the hot component. The shielding must not be less than:

- 50 millimetres away from the hot part; and
- 75 millimetres from any cargo carrying component

Note: These distances can be reduced to 25 millimetres, provided the total distance between the hot component and the cargo carrying component must not be less than 125 millimetres

There are extra requirements for the shielding of the propulsion engine exhaust. Any vertical propulsion engine exhaust must extend beyond the top of the cabin and must be shielded. The shielding must:

- begin not less than 200 millimetres from the bottom of the outlet opening (at the top of the exhaust)
- extend above the top of the cabin
- be sealed at the top
- have any perforations in the shielding facing away from the tank.

Note: AS 2809 specifies the propulsion engine exhaust shield ‘shall extend as nearly as practicable to the full height of the pipe’. After consultation with industry, a maximum of 200 millimetres below the bottom of the opening was chosen as a measurable way of verifying ‘as nearly as practicable’. This distance allows for the bending of the pipe near the opening.

If an existing rigid tank vehicle/prime mover has a shielding gap slightly more than 200 millimetres, this should be noted and not failed. Any new or replacement fitment of exhaust shielding must not have a gap of more than 200 millimetres.

[1] Hot components are defined as being hotter than 20°C below the autoignition temperature of the cargo, or 180°C (whichever is lower). One accepted method for determining if a component is hot is provided in the Truck Industry Council’s Hot Component Testing Method (https://www.truck-industry-council.org/downloads).

Reasons for rejection

1. Exhaust shielding is less than 50 millimetres from the exhaust.
2. Exhaust shielding is less than 75 millimetres from any product containing component.
3. The propulsion engine exhaust shielding begins at greater than 200 millimetres from the bottom of the outlet opening. (See note above.)
4. The vertical propulsion engine exhaust does not extend above the top of the cabin.
5. The vertical propulsion engine exhaust is not sealed at the top.
6. The propulsion engine exhaust has perforations facing the tank.

3.19. Brake interlock drive away protection (DAP)

Objective

To make sure the tank vehicle is immobilised when cargo transfer is being done.

Application

All classes of dangerous goods.

Rigid tank vehicles. Tank trailers.

Legislative reference

ADG 7.8 clause 10.2.3.1. Transfer from a vehicle.

AS 2809.1, clause 2.5. Brake interlock drive away protection.

Guidance

Drive away protection is not met by the standard vehicle park brake and its control in the cabin because the drive away protection must be engaged with the operation of product delivery features.

There are risks associated with the vehicle moving while the product transfer is being done and a risk of structural damage if the vehicle were to drive off with delivery hoses attached or other equipment that projects outside the normal on-road envelope. The vehicle must be fitted with a means of making sure these risks are addressed. The drive away protection system must not be able to be released until the vehicle is properly configured for on-road use.

A drive away protection bar that covers the product outlets makes sure these risks are controlled. If the vehicle is not fitted with such a bar then another means of controlling these risks shall be provided.

Any tank vehicle not fitted with a ‘no-air-in-motion system’ shall have some other means or feature that protects against the drive away protection operating when the vehicle is being normally driven.

Note: Section 10.2.3.7 of the ADG Code permits bitumen to be transferred to road making plant whilst in motion and the cabins are occupied. The drive away protection system must operate normally otherwise.

Reasons for rejection

1. A drive away protection system is not fitted.
2. Product transfer can occur without engaging the drive away protection system.
3. Bitumen tank vehicles – product transfer can happen without engaging the drive away protection, and the vehicle is not connected to road making plant.
4. When active, the drive away protection does not cause the park brakes on the tank vehicle to be applied.

5. Where a ‘no-air-in-motion system’ is not fitted, the drive away protection control has no effective locking mechanism.
6. If fitted, the ‘no-air-in-motion system’ is inoperative.
7. The drive away protection system is able to be released while the vehicle is not properly configured for on road use.

3.20. Valve operation marking

Objective

To make sure the operation of a product valve is clearly marked and indicated so that an operator knows how to close the valve.

Application

All classes of dangerous goods.

Rigid tank vehicles. Tank trailers.

Legislative reference

AS 2809.1 clause 2.12.1. Markings – Remote valve operation.

Guidance

Remotely operated valves must be clearly marked so that an operator knows how to close the valve. The sign should be clean, unobscured and legible. This requirement does not apply to manual top operators.

Reason for rejection

A remotely operated valve control does not have a durable sign that is clearly marked and indicated to show how to close the valve.

3.21. Valves interlocked and protective caps on outlets

Objective

To make sure valves operate as required and are free from defects. To make sure dust caps cannot come off during travel and cause damage.

Application

All classes of dangerous goods.

Rigid tank vehicles. Tank trailers.

Legislative reference

AS 2809.2 clause 2.3. Compartment openings, valves and vents.

AS 2809.4 clause 2.3.1. Valves interlocked and protective caps on outlets.

Guidance

Internal valves should only be open when a control is operated. Where air pressure is used to control the internal valves, pressure should be used to open these valves.

Bottom-operated internal valves must be configured to respond to fire near the tank outlets and close the valves. This may include the use of polyamide tubing or fusible links that will fail if exposed to significant heat such as a fire.

Air operated internal valves must be fitted with a device for manual operation.

Product build-up (other than small amounts of residue from pipework) in a sight glass of an empty compartment likely indicates a leaking foot valve. If this is noticed there should be further investigation and possible removal (and refurbishment) of the foot valve.

If there are signs of bypassing, product delivery valves may need to be inspected for defects. Caps on liquid discharge openings must be restrained by a tether or chain.

Reasons for rejection

1. There is evidence that liquid is accumulating in the outlet valves (via accumulation in a sight glass) when the foot valves should be closed.
2. Vapour vents are not open when the drive away protection is active and/or do not close when the drive away protection is deactivated.
3. There are structural cracks in valve components or there are missing parts of a protective cap or valve.
4. A fire near the product outlets will not result in the internal valves closing through the failure of a fusible link or loss of air pressure.
5. For classes 5.1, 6.1 and 8 tank vehicles, there is no quick-acting shut-off valve with a manual override at each closure other than at a manhole or safety relief device.
6. Caps on a product discharge opening are not restrained.

3.22. Protection against pump seal failure

Objective

To make sure a failed pump seal does not result in the widespread spraying of product liquid that might endanger the health of people.

Application

Classes 6.1 and 8.

Rigid tank vehicles. Tank trailers.

Legislative reference

AS 2809.4 clause 3.7.2. Shielding of pump shafts.

Guidance

Pump drive shafts should have a suitable shield that prevents leaking product liquid being sprayed to locations where people could be present.

Reasons for rejection

1. The pump shaft does not have an effective shield that would prevent leaking product from the pump being sprayed into locations where people could be present.

3.23. Condition of pressure/vacuum vents (PVVs)

Objective

To make sure pressure/vacuum vents are operational.

Application

All classes of dangerous goods.

Rigid tank vehicles. Tank trailers.

Legislative reference

AS 2809.1 clause 3.3. Performance testing – Pressure/vacuum vent testing.

AS 2809.1 Appendix B. Testing of vents, hatches and other tank top fittings.

Guidance

Every 2.5 years pressure/vacuum vents must be removed, disassembled, cleaned and inspected. Seals and gaskets must be replaced with new parts.

The reassembled vents must be tested according to AS 2809.1 Appendix B.

Reasons for rejection

1. The pressure/vacuum vent is in an unserviceable condition.
2. No evidence is provided verifying that the pressure/vacuum vents have been completely refurbished within the last 2.5 years.

3.24. Auxiliary engines

Objective

To make sure auxiliary engines fitted to a tank vehicle cannot create a source of ignition of the product.

Application

Class 3 liquids.

Rigid tank vehicles. Tank trailers. DG prime movers.

Legislative reference

AS 2809.1 clause 2.3. Equipment for hazardous areas

AS 2809.1 clause 2.10.2. Auxiliary engines.

Guidance

Auxiliary engine air intakes must not be located within 1 metre of cargo tank openings, connection points or vents.

Spark ignition engines must not be used in Zones 1 and 2*. The risk of vapour being ignited by the ignition system is unacceptable.

An auxiliary compression ignition engine must not be installed in Zone 1 because the risk of ignition of vapours is too great. Such engines can be in Zone 2 if the exhaust is completely enveloped (shielded) inside Zone 2.

The exhaust must not discharge in Zones 1 and 2 because the exhaust temperature is likely to be higher than the auto-ignition temperature of product vapour.

Electric motors can be installed in Zones 1 and 2 if they have an adequate safety (Ex) rating. However, motors should not be installed in Zone 1 when they could be installed in Zone 2.

The procedure to identify zones is given in AS 60079.10.1.

As a general guide: Zone 1 extends 1.5 m vertically, 3 m horizontally and to the ground underneath an open outlet, vent or closure.

Zone 2 extends up to a height of 3 m and a radius of 6 m from an opening except that it does not extend in front of the rear of the cabin.

Reasons for rejection

1. A spark ignition engine is installed in a hazardous zone (i.e. in Zones 1 or 2).
2. The air intake for an auxiliary engine is within 1 metre of a cargo tank opening, connection point or vent.
3. The exhaust of a compression ignition engine is inside Zone 1.
4. The exhaust of a compression ignition engine is inside Zone 2 and it has no enveloping shield.
5. An electric motor is installed in Zone 1 when it could be installed in Zone 2.
6. An electric motor that is installed in Zones 1 or 2 does not have a suitable Ex rating.

3.25. Roll stability system (RSS)

Objective

To make sure a roll stability system (if installed) is correctly installed and operational.

Application

All classes of dangerous goods.

Rigid tank vehicles. Tank trailers. DG prime movers

All dangerous goods heavy vehicle tank trailers used in NSW.

Legislative reference

AS 2809.1 clause 2.1.3. Vehicle stability function.

Dangerous Goods (Road and Rail Transport) Regulation 2022 (NSW) – Part 6, Division 2

Guidance

Roll stability system is mandatory for tank trailers in NSW, including those designed to a standard earlier than AS 2809.1:2020. All dangerous goods heavy vehicle tank trailers used in NSW must be fitted with an operational roll stability system. An anti-lock braking system on its own is insufficient to meet this requirement.

A roll stability system is also commonly installed on tank vehicles that operate in other jurisdictions. If it is installed, then the following requirements shall be met.

The preferred means of assessing operation is a fault report for the roll stability system. A fault report should be obtained for the roll stability system to determine that the system is operating properly. Any faults during the inspection window should be investigated to determine why the system was not functioning properly.

The roll stability system controller must be set-up for the specific tank trailer characteristics. A record of the set-up on the trailer should be available in the form of an roll stability system data label on the trailer. If not, details of the set-up should be sought from the installer, and a new data label installed. The trailer VIN or registration number should be stated on the record.

Each trailer roll stability system incorporates a yaw acceleration sensor which is used to inform the roll stability system controller of the lateral acceleration. The existence of a yaw sensor is good evidence that the trailer has a roll stability system.

A roll stability system will usually have a seven-pin power connector. It is likely that an anti-lock braking system will have a five-pin connector that does not include the two controller area network communication wires. A five-pin plug will insert into a seven-pin connector and vice-versa.

Australian Design Rules 35/04 and 38/04 require that the electrical supply connector for an anti-lock braking system is a five-pin or seven-pin connector as per DIN standard 72570 or ISO/DIN 7836. In Australia multi-volt roll stability system are often used on trailers. Voltage can be either 12V or 24V. Sometimes an extra groove is added in Australia to allow 12V or 24V operation. Whilst this technically non-compliant, it creates no hazard.

The DG prime mover that is presented with the tank trailer must have an electrical cable with a DIN 72570 or ISO/DIN 7836 connected on a suitably long trailer roll stability system cable. A five-pin or seven-pin connector is acceptable.

The controller area network bus voltage (12V or 24V) must be the same as the supply voltage (12V or 24V). Otherwise the controller area network communication between the prime mover and the tank trailer could be ineffective.

Note: The roll stability system may also be referred to as electronic stability control (ESC), electronic braking system (EBS) or trailer electronic braking system (T-EBS).

Reasons for rejection

1. The ABS/EBS trailer warning light on the prime mover does not light when the ignition is first turned on.
2. The DG prime mover does not have a five-pin or seven-pin connector that is live when the ignition is on.
3. The trailer electrical cable and/or connector for the tank trailer roll stability systemis cut or cracked.
4. The five or seven pin roll stability system connector pair has corroded pins.
5. When the ignition key on the prime mover is turned on but the engine is not cranked:
   a. a modulation solenoid valve on the trailer does not ‘click’ when the system is powered on; or
   b. the ABS truck warning status light in the cabin does not light when the ignition is turned on and does not go off when the vehicle is driven above 15 km/h.
6. The controller area network bus voltage level is not the same as the supply voltage level.

Reference information for ABS/ESC/RSS connector pins

Connector pin number	Function	Minimum ratings
1	Positive solenoid supply	12V: 20A steady and 30A peak 24V: 10A steady and 15A peak
2	Positive for ECM (controller)	12V: 4A steady 24V: 2A steady
3	Negative for ECM	12V: 6A steady 24V: 3A steady
4	Negative solenoid supply	12V: 20A steady and 30A peak 24V: 10A steady and 15A peak
5	Antilock failure. Grounded in fault condition.	12V: 2A minimum. 24V: 1A minimum.
6	CAN bus signal (twisted pair with pin 7)	CAN voltage reference must be the same as the supply voltage.
7	CAN bus signal	

ABS and EBS connector pin functions. Source: ADR35/05 and ADR 38/05, Appendix 1

3.26. Battery protection

Objective

To make sure the battery is secured and that short-circuits are controlled.

Application

All classes of dangerous goods.

Rigid tank vehicles. DG prime movers.

Legislative reference

AS 2809.1 clause 2.1.10. Battery.

Guidance

If the vehicle rolls over, batteries shall be restrained by features that are effective.

Metal parts above the batteries shall be separated from the battery terminals by a robust electrical insulation. This will usually take the form of a plastic or rubber sheet that is attached to a metal top (if applicable) of the battery box.

The battery box must be ventilated to dissipate gases.

Battery cables should be restrained by insulated features that prevent cable movements and rubs on metal parts that could result in short-circuit. The positive and negative cables should be separated by insulated features so that cables cannot rub against each other.

Reasons for rejection

1. Battery electrical connections are loose when moved by hand and cannot be tightened.
2. The battery does not have a secure, acid-resistant insulated cover.
3. Battery clamps cannot be tightened to prevent battery movement when pushed by hand.
4. There is not a minimum of 25 millimetres clearance between battery terminals and any conductive surface.
5. The battery box is fully sealed with no ventilation.
6. Battery terminals are not electrically insulated.

3.27. Battery isolation switch

Objective

To make sure the electrical system can be isolated in an emergency.

Application

All classes of dangerous goods.

Rigid tank vehicles. DG prime movers.

Legislative reference

AS 2809.1 clause 2.1.11. Battery isolation switch.

Guidance

The battery isolation switch shall shut down the engine and isolate all electrical power sources. However, if the vehicle is fitted with suitably protected permanently energised circuits these do not have to be isolated.

The battery isolation switch shall be clearly visible and labelled and a means of activation shall be located on the driver’s side of the truck towards the rear of the cabin. It must break all protected circuits within 10 seconds of activation.

Many vehicles are also fitted with a secondary control (trigger switch) or an in-cabin switch. If extra switches are fitted, they must be working, visible and labelled. The lettering shall be large enough to be easily seen.

Reasons for rejection

1. There is no isolation switch or control from the driver's side of the truck towards the rear of the cabin.
2. There is no label showing the following lettering: 'battery isolation switch'.
3. Secondary controls for the isolation switch are not working.
4. Secondary controls for the isolation switch are not clearly labelled.
5. The engine does not stop when any isolation switch control is operated.
6. All power sources are not isolated when any isolation switch control is operated (except for complying permanently energised circuits).
7. Terminals and cables are loose or uninsulated.
8. The battery isolation switch takes more than 10 seconds to break circuits it protects.

3.28. Pneumatic emergency stop system

Objective

To make sure pneumatic emergency stop buttons are present and functioning.

Application

All classes of dangerous goods.

Tank trailers. Rigid tank vehicles.

Legislative reference

AS 2809.1 clause 2.11.5. Pneumatic emergency stop

Guidance

Pneumatic systems to operate valves require at least two (2) emergency stop buttons to shut down the pneumatic system, as well as the engine shut down system.

One button shall be located within 1 metre of the outlets, and one shall be located more than 3 metres away. If access is required to the top of the tank during loading or unloading, a pneumatic emergency stop shall be provided on the top of the tank.

The buttons shall be red, shall be a latching type (or shall not automatically reset), and be labelled: 'emergency stop'.

Activating the buttons shall close all pneumatically operated valves, but shall not impede venting functions, and shall not impede driveaway protection.

Reasons for rejection

1. There is no pneumatic emergency stop control in the required locations.
2. There is no label showing the following lettering: 'emergency stop'.
3. The pneumatic system does not close all pneumatically operated valves when any emergency stop is operated.
4. The pneumatic emergency stop does not latch, or it automatically resets

3.29. Protection of wiring

Objective

To make sure electrical wiring is properly protected against impact, abrasion, and ingress of product.

To make sure the circuits other than the starter-motor and alternator supply cables have a manual reset circuit breaker or fuse protection against short-circuit.

To make sure the wiring is safe for use in locations where hazardous areas may be present.

Electrical failures such as short-circuits are common causes of fires in heavy vehicles, including tank vehicles. The EPA has published *Preventing Fires – Truck Inspection Manual* which explains to mechanics, fleet operators and drivers how to identify fire risks before a fire happens. The manual can be downloaded from the EPA website.

Application

All classes of dangerous goods.

Rigid tank vehicles. DG prime movers. Tank trailers.

Legislative reference

AS 2809.1 clause 2.2. Cabling and wiring.

Guidance

For class 3 liquids

Wiring must be protected by conduit or double insulation of a type illustrated in AS 2809.1 (Figure 2.2) from the rear of the cabin backwards.

Connectors and junction boxes must be sealed where wires enter. The sealing must be equivalent to that provided by an unsplit conduit. Therefore, the connector, junction box or light body entry point must have features that allow the cable entry point to be fully sealed against liquid ingress.

Where permanently energised circuits are present, they must be suitably selected and protected for use in the hazardous area they are installed in.

For classes 5.1, 6.1, 8 or 9 liquids

Electrical cables must be properly protected against vibration, impact, abrasion, corrosion and pull stresses at ends. Enclosing the cables in conduit is not mandatory. However, enclosure in a conduit to a standard that is suitable on a class 3 tank vehicle does meet the protection requirements required by AS 2809.4 cl 3.8 if the conduit material can resist attack by the product being carried.

Reasons for rejection

Class 3 tank vehicles:

1. Electrical wiring in Zones 1 and 2 is not enveloped by a sealed and durable conduit or a durable double-insulation or a junction box or a case.
2. Electrical connectors, if used, have no seals to prevent liquid ingress to the terminals.
3. Split polymer conduit is used on loose electrical wires.
4. Electrical wiring behind the truck cabin is exposed and protected by only one layer of insulation.
5. There is evidence that the insulation on electrical cables inside the conduit has been thinned by the product being transported.

6. There is evidence of damage or wear.
7. Wiring is not secured and protected from impact or abrasion.
8. Any trailer electrical connector has severely corroded pins. This includes loss of material and contamination by metal oxides on the mating surfaces.
9. Circuits other than the starter-motor and alternator cables are not protected by a fuse or circuit breaker.

Classes 5.1, 6.1, 8 or 9 tank vehicles:

10. Electrical terminals (live metal parts) are exposed and could be wetted by product under normal conditions.
11. There is evidence that the insulation on electrical cables has been thinned/attacked by the product being transported.
12. Any trailer electrical connector has severely corroded pins. Thin includes loss of material and contamination by metal oxides on the mating surfaces.
13. Cabling is stretched so that pull-out forces exist at terminal ends.
14. Cabling is draping so that road debris could catch the cable.

3.30. Vehicle roll-over device (ROD)

Objective

To make sure the battery isolation is triggered if the vehicle rolls over.

Application

All classes of dangerous goods.

Rigid tank vehicles. DG prime movers.

Legislative reference

AS 2809.1 clause 2.1.13. Vehicle roll-over device.

Guidance

A roll-over device is fitted to prime movers and rigid tank vehicles transporting flammable liquids and may be required to be fitted to other tank vehicles.

The roll-over device must operate the battery isolation switch when the vehicle is tilted at an angle of 45 degrees or more.

The roll-over device need not be located next to the battery isolation switch.

If fitted, the inspector shall test the roll-over device and verify that it activates the battery isolation switch. The test must be able to be done easily.

It is noted that some roll-over devices may be able to electronically simulate a roll-over situation (i.e. when the vehicle tilts at an angle greater than 45 degrees). If electronic simulation is relied upon this must be tested and the test switch or button must not directly engage the battery isolation switch.

Reasons for rejection

1. The vehicle is not fitted with a ROD when it should be.
2. The roll-over device does not trigger the battery isolation switch within three (3) seconds of the device being tilted at an angle greater than 45 degrees.
3. The roll-over device or its test function is not installed in a way that allows the vehicle operator to easily fulfil the requirements for regular testing.

3.31. Stowage of hoses and other loose equipment

Objective

To make sure hoses and other potentially loose equipment are properly restrained to prevent ejection from the vehicle or damage to the tank as the result of a road incident.

Application

All classes of dangerous goods.

Rigid tank vehicles. Tank trailers.

Legislative reference

AS 2809.1 clause 2.1.14. Stowage of hoses and other equipment.

Heavy Vehicle (Mass, Dimension and Loading) National Regulation. Schedule 7

Guidance

The restraints can be elastic straps that stretch between sides of the tray. The ends of the elastic (or spring) straps must be kept in a hole or mounting feature. Alternatively, the hose can be restrained by a post or a loop. A minimum of two restraints should be used per hose. Restraints can be shared between hoses.

Removable equipment such as fire extinguishers or wheel chocks must be restrained by features that can be locked into place. The locking feature should not open if it is upside-down.

Toolbox doors must have a mechanism capable of holding the door closed if the vehicle is upside-down.

Reasons for rejection

1. Hoses that sit in hose trays are not restrained.
2. Fire extinguishers are not restrained against movement if the vehicle were to roll over.
3. A toolbox does not have a securing mechanism.
4. Removable equipment is not effectively restrained.

3.32. Fire extinguishers

Objective

To verify that selection and maintenance of the fire extinguishers are compliant with the ADG Code.

Application

All classes of dangerous goods.

Rigid tank vehicles. Tank trailers. DG prime movers

Legislative reference

ADG 7.8 clause 12.1.2. Fire extinguishers.

AS 1851:2012. Routine service of fire protection systems and equipment

Guidance

- 1 x 10B dry powder located in or behind the cabin.

- The load area of each trailer or vehicle transporting class 3 shall have either:
  - 2 x 60B dry powder; OR
  - 1 x 80B dry powder + 1 x 20B foam
- The load area of each trailer or vehicle (other than class 3) shall have either:
  - 1 x 60B dry powder; OR
  - 2 x 30B dry powder.

Fire extinguishers shall be mounted in quick-release brackets and be readily accessible for use.

Fire extinguishers shall be serviced every six (6) months and must be tagged and records kept (see AS 1851:2012 for more details).

Where a fixed foam or water firefighting system is installed in place of portable fire extinguishers (see Note 4 to ADG Code Table 12.1), it should be serviced according to the relevant Australian standards.

If extinguishers are fitted with a pressure gauge, it should be checked to verify the extinguisher is properly charged.

Reasons for rejection

1. Missing fire extinguishers
2. Fire extinguisher pressure guage indicates undercharged
3. Fire extinguishers not able to be removed from bracket using unaided hand strength
4. Fire extinguisher service record tags missing

3.33. Safety Equipment

Objective

To verify that selection and maintenance of the vehicle's safety and personal protective equipment (PPE) is compliant.

Application

All classes of dangerous goods.

Rigid tank vehicles. Tank trailers. DG prime movers

Legislative reference

ADG 7.8 Chapter 12.1. Safety equipment for road vehicles.

Guidance

Three (3) portable warning devices (breakdown triangles) that comply with AS 3790; and are in good working order.

PPE as required by ADG Code Table 12.2 for the dangerous goods transported by the vehicle.

Note: If the vehicle is used to routinely transport placard loads of different classes or divisions of dangerous goods, check these items of PPE as part of the inspection.

The PPE must be clean, fit for purpose, and in good working order. Items must be accessible and ready for use in an emergency. In particular:

- Eye wash bottles must be filled and ready for use; and located in a prominent position where they can be reached when unable to clearly see;
- Powered devices (e.g. torches) must have batteries installed and must work when switched on;

- Escape breathing apparatus must be secured, and kept in an accessible position in the cabin;
- Equipment with mandated service intervals must have records to verify service has been completed.

Reasons for rejection

1. Required PPE for the dangerous goods being carried not present.
2. Required PPE not clean, in good working order or serviced as required.
3. Eye wash bottle not filled with minimum 250 millilitre saline solution and ready for use in an accessible position.
4. Powered devices with missing or dead batteries.
5. Escape breathing apparatus not mounted securely, or not in an accessible location within the cabin.
6. Less than three portable warning devices.
7. Portable warning devices are not able to be used.

3.34. Emergency information holder (EIH)

Objective

To verify that the vehicle's emergency information holder is compliant.

Application

All classes of dangerous goods.

Rigid tank vehicles. DG prime movers

Legislative reference

ADG 7.8 chapter 11.2. Emergency information.

Guidance

The emergency information holder must be visible and accessible, and:

- secured to the inside of a door of the cabin; or
- immediately adjacent to a door of the cabin; or
- if the door's construction does not permit the emergency information holder to be fitted to or adjacent to the driver's door, it may be located elsewhere in the cabin, and a notice affixed to the driver's door identifying the its location.

The emergency information holder must be suitably sized for carrying emergency information and transport documentation.

The emergency information holder must be marked with "emergency procedure guides" or "emergency information" in red letters at least 10 millimetreshigh on a white background.

If the tank vehicle or combination is carrying dangerous goods residues at the time of inspection, the emergency information holder must contain:

- transport documentation for the dangerous goods on the vehicle that is amended to state that it is carrying "Empty Uncleaned" or "Residue Last Contained"
- emergency procedure guides for the dangerous goods, including the vehicle fire guide, or
- a valid emergency response guide handbook. Where possible, this should be the latest version of the ANZ-ERG (2021 at the time of publication). Older editions of the AERG or SA HB 76:2010 should be replaced.

Note: The Standards Australia HB 76:2010 will no longer be valid after ADG 7.8 is replaced by ADG 7.8.

Other items not relating to the transport of the goods or the safety of the vehicle must not be present in the emergency information holder.

Reasons for rejection

1. Emergency information holder on door is not marked.
2. Emergency information holder is somewhere else in the cabin and is not visible and accessible.
3. Emergency information holder is somewhere else in the cabin, and no notice is present on the driver's door.
4. Emergency information holder does not contain transport documents (when vehicle has DG residue) or the required emergency procedure guides or guide handbook.
5. Emergency information holder contains items other than transport documents, emergency procedure guides or guide book.

3.35. Loading protection

Objective

To verify that the vehicle's protection against overfill is fitted and operational.

Application

Class 3 dangerous goods.

Rigid tank vehicles. Tank trailers

Legislative reference

AS 2809.2 clause 2.3.7. Loading protection.

Guidance

If a tank vehicle is designed for bottom loading, it must be fitted with systems to prevent overfilling.

Reasons for rejection

1. Overfill protection is not fitted to a vehicle designed for bottom loading.
2. Overfill protection is not functional, or is not installed at the correct height in each compartment.
3. Overfill protection probes are not interlocked to prevent loading if the probe is not installed.

3.36. Burner and flame tube inspection

Objective

To verify that the burners and flame tubes on bitumen tank vehicles are in good working order.

Application

Bitumen based products.

Rigid tank vehicles. Tank trailers

Legislative reference

AS 2809.1 clause 3.2. Regular inspection and maintenace intervals

Guidance

Bitumen tank vehicles fitted with burners and flame tubes must be checked every three (3) months for carbon build up, evidence of incorrect operation and distortion of flame tubes.

The product heating system must operate and be in good working order.

Reasons for rejection

1. Flame tube has excessive carbon build up
2. Flame tube is distorted or damaged
3. Burner does not operate, or does not operate within manufacturer's specifications

3.37. Condition of transfer hoses

Objective

To make sure a hose that is used for product transfer is in a safe condition and has been tested.

Frequency

Inspect for damage every month.

Verify continuity every six (6) months.

Hydrostatic test every 12 months.

Application

All classes of dangerous goods.

Rigid tank vehicles. Tank trailers.

Legislative reference

ADG 7.8 clause 10.1.3. Condition of transfer hoses.

Guidance

Transfer hoses must be in good condition so that the risk of failure or product loss during transfer activity is minimised. The inspection should look for rips and cuts in the hose material, severe abrasion, cracks in metal ends, cross threads on end fittings, breaks in static wires and worn, torn or missing seals.

ADG 7.8 clause 10.1.3 requires that hose assemblies be inspected for damage monthly.

Transfer hoses must be marked with a durable identifying mark that allows the hose to be uniquely identified. Written records must be available for inspection to verify that the hoses have been tested. Hoses should have testing record plates affixed; however this is not mandatory.

Hoses must be hydrostatically tested every 12 months. If records do not exist to show this has been done, hoses that are in acceptable condition can be tested as part of the vehicle inspection.

If a check of continuity of transfer hoses for class 3 dangerous goods is done, the resistance measured using a multimeter between the end couplings must not exceed 10 ohms.

Reasons for rejection

1. Hoses have substantial cuts or grazes or severe abrasion.
2. Cracks exist in hose-end metal fittings.
3. Seals in end fittings are in poor condition and could leak.
4. Electrical continuity wire is broken.

5. Each hose is not marked with a distinctive and unique identifying number.
6. There are no records that show that periodic hydrostatic testing has been conducted on every hose assembly for more than the past 12 months.
7. There are no records that show that periodic electrical continuity testing has been conducted on every hose assembly used for the transfer of class 3 liquids for more than the past six months.
8. The resistance between the ends of any hose assembly used for the transfer of class 3 liquids exceeds 10 ohms.

3.38. Earthing and bonding equipment

Objective

To verify that the vehicle's equipment to provide earthing and bonding is in good working order.

Frequency

Check every six (6) months

Application

Class 3 dangerous goods.

Rigid tank vehicles. Tank trailers

Legislative reference

AS 2809.2 clause 2.7. Earthing point

ADG 7.8 clause 10.1.3.2. Hose electrical continuity testing.

Guidance

Where fitted, an earth reel must be checked for damage. The clamp must be in good condition, and able to form a good electrical connection to an earthing lug or point.

The resistance between the clamp and the shell of the tank must be no more than 10 ohms.

Any earthing lugs or points must be non-corrodible bare metal, welded to the tank vehicle, or be an integral part of the tank vehicle.

Any other equipment with bonding leads (for example slops buckets or pails) must be checked for damage and clamps verified to be in good condition. The resistance between the end of the lead and the equipment in contact with dangerous goods (such as the surface of the pail) must be verified to be no more than 10 ohms.

All product transfer hoses carried on the vehicle must be verified as having a resistance between end couplings of no more than 10 ohms.

Reasons for rejection

1. Earth reels or leads damaged, not working, missing, corroded, or damaged clamps
2. Resistance of earthing equipment more than 10 ohms (tested between clamps and body or tank shell)
3. Earthing lugs not made of non-corrodible, bare metal.
4. Earthing lugs bolted onto tanker structure.
5. Product transfer hoses have a resistance of more than 10 ohms (tested between end couplings)

3.39. Bitumen tank vehicle annual inspection

Objective

To verify that the tank and equipment remain in good working order. Bitumen tank vehicles are not subject to the requirement to undergo hydrostatic testing every five (5) years, so these extra checks are required to make sure the tank vehicle is suitable for continued service.

Frequency

Check every 12 months

Application

Bitumen-based products.

Rigid tank vehicles. Tank trailers

Legislative reference

AS 2809.1 clause 3.2. Regular inspection and maintenace intervals

Guidance

Bitumen tank vehicles have an extra set of annual inspections to account for the different design requirement and use conditions for bitumen tank vehicles.

Check that the vents are clean and are in good working order.

Drain pipes must be clean and in good working order.

Check the lagging for any damage, gaps or missing fasteners.

Inspect tank internals and verify that there is no build up of carbon or product residues. Pay close attention to the areas close to the burner tubes.

Carefully inspect the external tank cladding (without removing the lagging), to check for signs of initial corrosion such as stains or possible product leaks. If any evidence of corrosion is visible, it must be investigated to verify if further inspection or repairs are required.

Reasons for rejection

1. Damage to the lagging, gaps or fasteners missing from the lagging
2. Excess build up of carbon or product residues inside the tank
3. Evidence of corrosion beneath the tank cladding

3.40. Hatches, vents and valves testing and inspection

Objective

To ensure that hatches, vents and valves are in operable condition.

Frequency

Check every 2.5 years (30 months)

Application

All classes of dangerous goods.

Rigid tank vehicles. Tank trailers.

Legislative reference

AS 2809.1 clause 3.3. Testing of hatches, vents and valves.

AS 2809.1 Appendix B. Testing of vents, hatches and other tank top fittings.

Guidance

Testing of hatches, vents and valves to be done either as a full hydrostatic test according to AS 2809.2 clause 2.8.1 or individually do a bench test according to AS 2809.1 Appendix B, Testing of vents, hatches and other tank top fittings. Repair as necessary.

Hatches, valves, vents including vapour vents, must be tested either in the tank with the pressure-vacuum vents blocked off, or in a bench test, at 25 kPa (minimum).

For corrosive cargos that are not flammable, a free vent in each compartment must be constructed so that loss of product liquid is prevented due to surge and rollover. Vents in corrosive tank vehicles must be regularly inspected and/or cleaned to prevent product residue from impacting on vent operation.

Free vents are not permitted on division 6.1 tank vehicles (AS 2809.4 clause 3.4.4 (a)).

For class 6.1 tank vehicles, free vents are not permitted and a means of manually depressurizing the compartment is required.

For division 5.1 ammonium nitrate emulsion, suspension or gel tank vehicles, hatches are not required to conform with AS 2809.1 Appendix B (Testing of vents, hatches and other tank top fittings). They must nonetheless prevent leaks or loss of containment under normal conditions of transport.

Reasons for rejection

1. If hatch vent and valve testing is not done at the time of inspection of the vehicle, the vehicle has not been tested at 25 kPa (minimum) within the last 2.5 years.
2. A hatch, vent or valve unit fails testing.
3. A compartment fails a hydrostatic test.
4. For a class 8 tank vehicle, a free vent has no means of preventing liquid loss due to surge or rollover.
5. For a class 8 tank vehicle, product residue has built up internally around vents and other components.
6. For a class 6.1 tank vehicle, free vents are fitted in any compartment.
7. For a class 6.1 tank vehicle, there is no means of manually depressurising the compartment.

3.41. Hydrostatic test

Objective

A hydrostatic test should be conducted periodically to verify that the tank and all its valves and closures do not leak.

Frequency

Check every five (5) years (60 months)

Application

All classes of liquid dangerous goods (except tank vehicles for bitumen-based products).

Rigid tank vehicles. Tank trailers.

Legislative reference

AS 2809.1 clause 3.3. Performance testing - Tank hydrostatic testing.

AS 2809.2 clause 2.8.1. Pressure testing as part of commissioning – Tanks.

Guidance

A hydrostatic test is mandatory for a new tank vehicle and after hatch removal or structural repairs to compartments. The test details must be recorded on the AS 2809 approval plate. Subsequent hydrostatic tests to validate the condition of the tank should be done according to the initial hydrostatic test procedure as specified in AS 2809. The details of the test shall be recorded on a plate attached to the tank vehicle for later reference.

It is standard for class 3 tank vehicle hatch, vent and valve testing to be done as a hydrostatic test without removal of the hatch. If such a hydrostatic test is done, the details of the test must be recorded on a plate affixed to the vehicle.

See Item 5 - Hydrostatic Test Plate (page 13) for details of the plate that is required when a hydrostatic test is conducted.

For guidance, a sample test plan is attached.

Hydrostatic test procedure

- Drain excess product from the tank vehicle.
- Visually check for sealing ring plugs and remove if fitted.
- Place the tank vehicle on an appropriately rated tank stand for support when the tank vehicle is filled.
- Disconnect the vapour vents.
- Remove and blank the pressure vacuum vents.
- Open the emergency lids.
- Break the vapour vent jumper hose to coaming to allow inspection of the vent sealing.
- Attach the hydro tube to the top of the tank vehicle.
- Fill the compartments with water (adjacent compartments must be empty to allow inspection):
  - compartments 1, 3 and 5 can be filled at the same time
  - compartments 2, 4 and 6 can be filled at the same time
- Once each compartment is full, close the emergency lid.
- Continue to fill and check the emergency vent blow off pressure (needs to open at 30kPa+/-4).
- Wedge the emergency vent and test to 30kPa (or 45kPa for large compartment circular tanks); make sure no air is trapped.
- Check for pressure loss (monitor the level in the hydro tube for 10 minutes minimum).
- If pressure loss is present, locate the leak and repair it.
- Test check the gaskets and valves, including for internal leaks.
- Disconnect the filling hose from the manifold.
- Check for any API adaptor leaks.
- Carry out an external visual inspection.
- Close the internal valve and drain the manifold pipeline (after 10 minutes under pressure).
- Check the internal valve is sealing by checking for leaks down the pipeline to the API (minimum five minutes).
- Complete any repairs.
- Repeat the hydrostatic test procedure after any repairs.
- Move to the next compartment, repeat the procedure.

Reasons for rejection

1. The tank vehicle fails the hydrostatic test.
2. The test plate is not affixed.

3.42. Internal tank inspection

Objective

To identify internal defects.

The inspection can be conducted manually, or using an inspection camera on an arm. If an inspection camera is used, it must be capable of being positioned to view and/or record all significant internal features.

If the internal inspection is to be done manually, appropriate safety precautions (including confined space entry) shall be done according to health and safety legislation. Manual internal inspections shall only be done by suitably qualified personnel at premises equipped for such inspections.

Photographs of previous repairs should be taken by the inspector and kept for later reference.

All compartments must be inspected. The tank vehicle must be freed of dangerous goods prior to a comprehensive internal inspection taking place.

Frequency

Check every five (5) years (60 months)

Application

All classes of dangerous goods.

Rigid tank vehicles. Tank trailers.

Legislative reference

ADG 7.8 clause 4.4.2.4 1(b). Tank vehicles not leaking, defective or damaged.

AS 2809.4 clause 3.2.2 and 3.2.3 (corrosive liquids).

Guidance

A preliminary internal inspection, done from outside the compartment, shall be conducted.

A comprehensive internal inspection shall be conducted when the preliminary inspection identifies suspected reasons for rejection.

A comprehensive internal inspection should be done by a suitably qualified person inspecting inside the tank. If reliable remote camera inspection techniques can be applied then these can be used. In any case, photographs of failed elements and/or previous repairs should be taken.

Where the vehicle has design features to manage corrosion of the tank shell:

- if fitted with a liner, it must be inspected to make sure it continues to provide protection against corrosion of the tank; and
- if designed for a limited service life time, the tank must be checked to make sure it will be able to continue in service until that lifetime is reached.

Reasons for rejection

1. The dip or fill tube (where fitted) is broken/loose.
2. There is no dip wear plate when a dip tube is fitted.
3. There is wear of greater than 5 millimetres depth on the dip wear plate (where fitted).
4. The dip stick spring (where fitted) is failed, ineffective or damaged.
5. There are barrel weld cracks.
6. There is debris in the bottom of the tank.

7. There are poor quality previous internal weld repairs (see weld repair guidance).
8. Baffles are loose.
9. Foot valve bodies (where fitted) are cracked.
10. The foot valve seal (where fitted) is damaged or defective.
11. Internal welds are cracked.
12. There is evidence of attack of the tank shell material by product producing a loss of thickness of 1 millimetre or more at any location.
13. There is evidence of pitting or other corrosion damage of the shell, including delamination of fiberglass shells.
14. There is evidence that the internal liner (if fitted) has been perforated or is leaking.

3.43. No hoses between foot valve and first outside valve

Objective

To make sure lines running from the bottom of the tank are durable and offer a high level of mechanical protection against breakage.

Frequency

Check every five (5) years (60 months)

Application

Class 3 liquids.

Rigid tank vehicles. Tank trailers.

Legislative reference

AS 2809.2 clause 2.5.4. Hoses and hose couplings.

Guidance

The connection must be a metal pipe.

Reasons for rejection

1. A flexible hose is used between the bottom of a compartment and the first outside valve on any compartment.

3.44. Coaming clearance for hatches and fittings

Objective

To make sure enough protection is provided for hatches by coaming rails.

Frequency

Check every five (5) years (60 months)

Application

Rigid tank vehicles. Tank trailers.

Legislative reference

AS 2809.2 clause 2.2.16. Roll-over protection

Guidance

Check that the roll over coaming projects at least 25 millimetres higher than any hatches or fittings. The plane of measurement across the coaming rails is drawn as a flat surface, not curved to match the tank profile. (see AS 2809.2 figure 2.2.16 for examples)

Measure by laying a straightedge between the coaming rails (over the hatches), and check that the clearance to any fittings is at least 25 millimetres.

Reasons for rejection

1. Clearance to hatches or fittings is less than 25 millimetres.

3.45. Bitumen tank vehicle shell corrosion inspection

Objective

To check that mild steel components used in bitumen tank vehicle manufacture are not corroding.

Frequency

Check every five (5) years (60 months). Note that the first inspection is not required until 10 years.

Application

Rigid tank vehicles. Tank trailers.

Legislative reference

AS 2809.1 clause 3.2. Regular inspection and maintenance intervals.

Guidance

Detach a 1200 millimetre (length) sheet of lagging at the rollover coaming, skid plate area and rear suspension subframe attachment area.

Inspect these sites for evidence of corrosion.

If there’s evidence of corrosion, more detailed investigation must be done to determine the extent of the corrosion, and what repairs are required.

Reasons for rejection

1. Corrosion identified after lagging is removed.

4. Appendices

4.1. Appendix A: Inspection requirements for vacuum tank vehicles

Note: vacuum tank vehicles have some extra design and construction requirements that need to be checked during inspections. Operators of vacuum tank vehicles should make sure these items are included in tank vehicle inspections as appropriate. These requirements are based on vacuum tanker requirements that were agreed to by the Competent Authorities Panel in 2014.

4.1.1. All vacuum tank vehicles

Where tanks are fitted with the following items, they must be checked as part of the inspection process.

Openable ends

Openable ends are secured and leak-tight when closed.

Measures to prevent unintentional opening.

Power operated openings remain closed in the event of a power failure.

Interlock to make sure openable ends are not opened when residual pressure in place, or operator can observe movement and is not endangered during opening or closing.

Openable ends protected and prevented from opening during roll over.

Suction boom

Boom fitted with stop valve fixed directly to the shell, or immediately after rotation crown wheel, and rotation crown wheel is protected against damage.

Stop valve interlocked to the drive away protection system.

Boom constructed to prevent leakage of the tank in the event of an accidental impact on the boom.

Extra service equipment

Pump/exhauster unit outlet discharges to place that is not dangerous.

Pumps that can create positive pressure have safety devices in pipework that can be pressurized. Safety valve to operate at pressure not more than the maximum working pressure.

Stop valve fitted between shell or overfill prevention device and pipework to the pump/exhauster unit.

Pressure/vacuum gauge mounted in position where operator can watch it during operation of the pump/exhauster unit. Gauge fitted with marking for maximum working pressure.

Tank or each compartment fitted with level indicators.

Where the level indicator is a sight glass, it must:

- either form part of the wall and have resistance to pressure equal to or greater than the tank, or be fitted external to the tank.
- have shut-off valves on both top and bottom connections to the tank that are interlocked to drive away protection system.
- be suitable for operation at the maximum working pressure of the tank.
- be positioned to prevent accidental damage.

Safety valves preceded by bursting disc

Vacuum operated waste tanks are to be fitted with safety valve preceded by a bursting disc.

Safety valve shall open at pressure of 0.9 – 1.0 times the test pressure of the tank, pressure gauge or indicator between bursting disc and safety valve.

Bursting disc verified as intact and safety valve in working order.

Vent or raiseable stack

Pump/exhauster unit vent able to be positioned at least 15 metres away from, and directed away from the tank, or vehicle fitted with raiseable stack extending at least 3.7 metres above the vehicle.

The vent or stack should be interlocked to prevent transfer without it being deployed.

4.1.2. Class 3 vacuum tank vehicles

Filling devices are located at a low level.

Measures to minimize the production of spray are in place.

Maximum allowed pressure of 100 kPa for liquids with flash point < 23°C.

Flame arrestor at inlet and outlet of vacuum pump/exhauster units that may create sparks.

4.2. Appendix B: Modifications to approved tank vehicles

Tank vehicle approvals require that tanks and vehicles are not modified from their approved design.

When do modifications need approval?

Modifications to the following items require either a new or amended approval from the competent authority that issued the approval, except where such a modification is a permitted variation under the approval:

- Cargo-carrying components including the shell, service and structural equipment required by AS 2809;
- Modifications to any vehicle equipment that are required by AS 2809; or
- Changing the vehicle that a tank is mounted on (re-horsing).

If one is available, a tank and vehicle dossier should be checked to understand the design and construction of the vehicle. Any modifications that are made to the vehicle will need to comply with the latest published parts of AS 2809 that apply to the vehicle.

Note: A modified tank vehicle may be issued with a new approval number.

Do I need approval for a proposed modification?

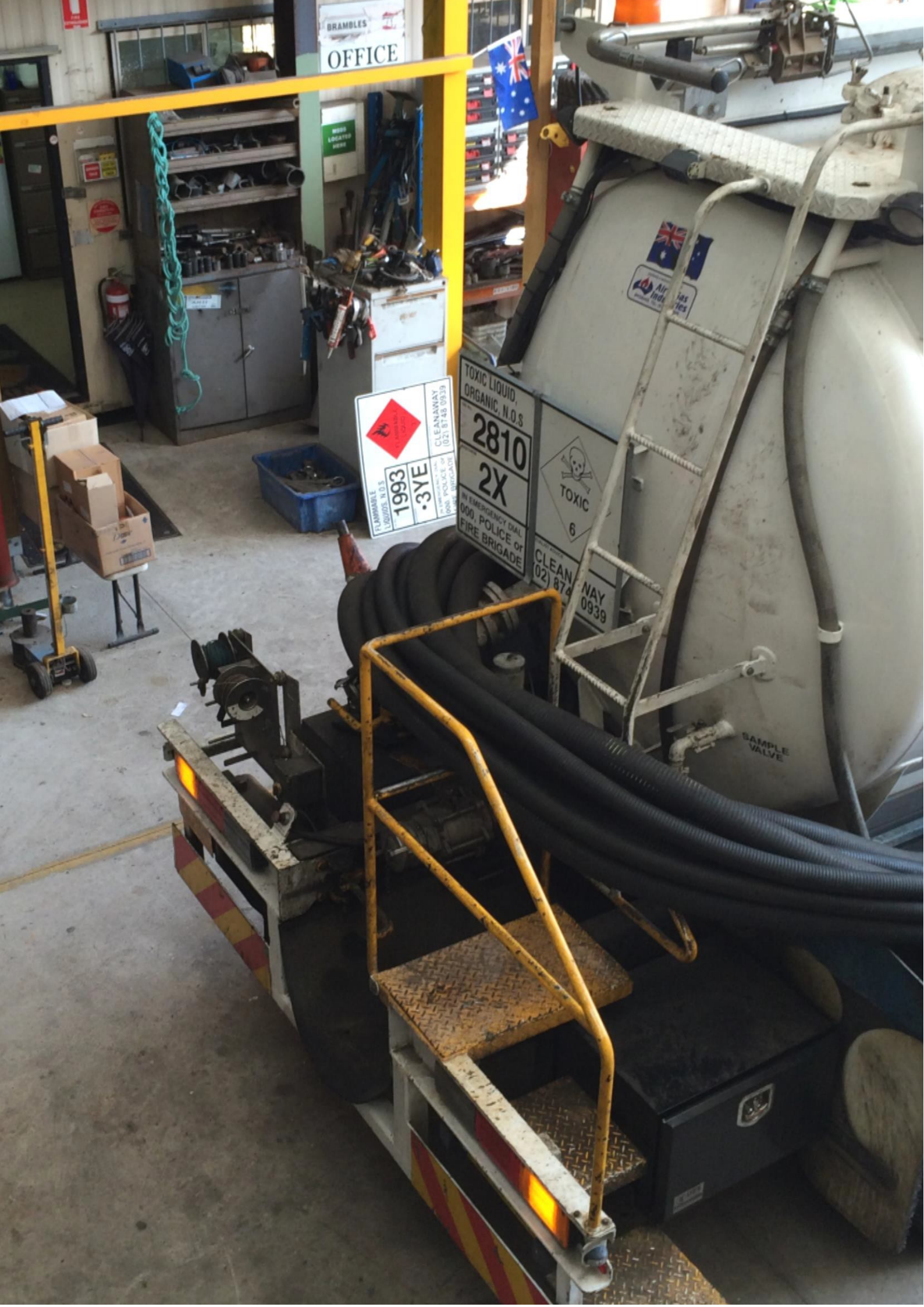
If you are unsure a proposed modification will require a new or amended approval, you should first approach the tank vehicle manufacturer who holds the tank approval. If the manufacturer is no longer available, you should discuss this with a tank vehicle engineer or the competent authority to determine if a new or modified approval is required.

Definitions

"Shell" (for tanks), means the part of the tank which retains the substance intended for carriage, including openings and their closures, but does not include service equipment or external structural equipment.

"Service equipment" means filling and discharge, breather, safety, heating, heat insulating and additive devices and measuring instruments.

"Structural equipment" for tanks of a tank-vehicle or demountable tank, means the external or internal reinforcing, fastening, protective or stabilizing members of the shell.


BRAMBLES
OFFICE
TOXIC LIQUID, ORGANIC, N.O.S
2810
2X
IN EMERGENCY DIAL 000, POLICE or FIRE BRIGADE
TOXIC
6
1993
·3YE
CLEANAWAY
(02) 8748 0939
SAMPLE VALVE