### Contents

**Introduction**
- Scope .......................... 1
- Basis ............................. 1
- Meaning of instructions ......... 1
- Applicable vehicles ............. 1

**Part 1: DG tank vehicle identification** ........................................ 2

**Part 2: DG tank vehicle inspection checklist** .......................... 4
- Prime mover and tank trailer (or dog trailer) ............................ 7
- Rigid tank vehicle .......... 8
- Driver’s side ..................... 8
- Plan view ......................... 8
- Passenger side ................... 8

**Part 3: DG Tank Vehicle Inspection Guidance** .................. 9
1. Cleanliness .................. 10
2. Suitable and free of risk-creating defect ................ 10
3. AS 2809 compliance plate .... 11
4. Emergency information panels .......... 12
5. Hydrostatic test plate .......... 13
6. External tank inspection .......... 13
7. Internal tank inspection .......... 18
8. Closures closed and secured .......... 19
9. Landing legs/support points on semi-trailers .......... 19
10. Tank attachment .......... 20
11. Drive away protection (DAP) .......... 21
12. Vehicle attachments .......... 22
13. Cabin-to-tank clearance .......... 22
15. Guarding ......................... 24
16. Tail shaft protection .......... 24
17. Valve operation marking .......... 25
18. Valves interlocked and protective caps on outlets .......... 25
19. Enclosed air spaces .......... 26
20. Battery protection .......... 27
21. Battery isolation switch .......... 27
22. Protection of wiring .......... 28
23. Road clearance .......... 29
<table>
<thead>
<tr>
<th>Site</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>Protection against pump seal failure</td>
<td>30</td>
</tr>
<tr>
<td>25</td>
<td>Hydrostatic test</td>
<td>30</td>
</tr>
<tr>
<td>26</td>
<td>Vehicle rollover device (ROD)</td>
<td>33</td>
</tr>
<tr>
<td>27</td>
<td>No hoses between foot valve and first outside valve</td>
<td>33</td>
</tr>
<tr>
<td>28</td>
<td>Hatches, vents and valves integrity testing and inspection</td>
<td>34</td>
</tr>
<tr>
<td>29</td>
<td>Stowage of hoses and other loose equipment</td>
<td>35</td>
</tr>
<tr>
<td>30</td>
<td>Condition of transfer hoses</td>
<td>35</td>
</tr>
<tr>
<td>31</td>
<td>Condition of pressure: vacuum vents</td>
<td>36</td>
</tr>
<tr>
<td>32</td>
<td>Shielding of exhausts</td>
<td>37</td>
</tr>
<tr>
<td>33</td>
<td>Auxiliary engines</td>
<td>37</td>
</tr>
<tr>
<td>34</td>
<td>Installation of roll stability system (RSS)</td>
<td>38</td>
</tr>
</tbody>
</table>
Introduction

Scope
This inspection manual is provided to give guidance to persons undertaking inspections on road tank vehicles and prime movers intended to transport dangerous goods (DG) in bulk for classes 3, 5, 6, 8 and 9.

Basis
The checklist requirements are derived from the Australian Dangerous Goods Code 7.5 (the ADG Code) and from:

- AS 2809 Part 1 – all classes in scope
- AS 2809 Part 2 – class 3 liquids (flammable liquids)
- AS 2809 Part 4 – class 6.1 (toxic liquids)
- AS 2809 Part 4 – class 8 (corrosive liquids).

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 bulk dangerous goods. Alternative ways to achieve an equivalent or higher level of safety to that specified in the standards and the ADG Code may be used if they can be demonstrated to the satisfaction of the inspector and/or the competent authority.

Meaning of instructions
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 not mandatory.

Applicable vehicles
A tank vehicle is a vehicle that either:
- has a DG tank permanently attached and is intended for transporting class 3, 5.1, 6.1, 8 or 9 dangerous goods in bulk (referred to as ‘product’) or
- carries a portable or demountable that is filled or emptied while on the vehicle.

The truck fuel tank(s) is (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 in bulk.

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 DG prime mover is a prime mover configured and appointed to pull tank trailers (other than dog trailers and pig trailers).

Tank trailer vehicles should be inspected in combination with a towing vehicle (DG 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.
Part 1:
DG tank vehicle identification
### Identification of the inspected vehicle

<table>
<thead>
<tr>
<th>Registration number/Fleet number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration/Fleet number of attached vehicle</td>
</tr>
<tr>
<td>Vehicle Identification Number (VIN)</td>
</tr>
<tr>
<td>Type of vehicle configuration as inspected</td>
</tr>
</tbody>
</table>

| Gross weight rating on the ADR compliance plate (GVM or ATM) | kg |
|---------------------------------------------------------------|

<table>
<thead>
<tr>
<th>Is a roll stability system (RSS/ESC) installed (if a heavy vehicle tank trailer)</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>If No, is ABS installed?</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

### Operator details

<table>
<thead>
<tr>
<th>Tank owner/operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator licence number (if applicable)</td>
</tr>
</tbody>
</table>

### Tank details

<table>
<thead>
<tr>
<th>Tank manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shell material</td>
</tr>
<tr>
<td>Date of tank manufacture</td>
</tr>
<tr>
<td>Class/division of DG transported</td>
</tr>
<tr>
<td>Tank vehicle ID number/tank serial number</td>
</tr>
<tr>
<td>Dangerous goods design approval number</td>
</tr>
<tr>
<td>Dangerous goods vehicle licence number</td>
</tr>
<tr>
<td>Number of compartments</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Capacity of each compartment:</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Total design approval weight or volume</th>
<th>kg/l</th>
</tr>
</thead>
</table>

| Safe Load Program (SLP) number (if applicable) |

### Inspection details

<table>
<thead>
<tr>
<th>Date of inspection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location of inspection</td>
</tr>
<tr>
<td>Inspector</td>
</tr>
<tr>
<td>Signature</td>
</tr>
</tbody>
</table>
Part 2:
DG tank vehicle inspection checklist
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.

### Table 1  Checklist for all tank vehicles

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Pass/Fail/NA*</th>
<th>If a rejection is rectified, give details of repair</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cleanliness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Suitable and free of risk-creating defect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>AS 2809 compliance plate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Emergency information panels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Hydrostatic test plate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>External tank inspection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Internal tank inspection</td>
<td></td>
<td></td>
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<tr>
<td>8</td>
<td>Closures closed and secured</td>
<td></td>
<td></td>
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<tr>
<td>9</td>
<td>Landing legs/support points on semi-trailers</td>
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<tr>
<td>10</td>
<td>Tank attachment</td>
<td></td>
<td></td>
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<tr>
<td>11</td>
<td>Drive away protection (DAP)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Vehicle attachments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Cabin-to-tank clearance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Rear-impact protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Guarding</td>
<td></td>
<td></td>
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<tr>
<td>16</td>
<td>Tail shaft protection</td>
<td></td>
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<td>20</td>
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<td>21</td>
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<td></td>
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<td>------</td>
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<tr>
<td>34</td>
<td>Installation of roll stability system (RSS)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Select ‘Pass’, ‘Fail’ or ‘NA’. For a failure, please note the reason for rejection reference (e.g. ‘30.1’).

Inspector’s signature: ____________________________________________________________

Date: __________________________________________________________________________

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

_Prime mover and tank trailer (or dog trailer)_

Driver’s side

Plan view

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

_Rigid tank vehicle_

Driver's side

Plan view

Passenger 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: ____________________________________________________________________________
Part 3:
DG tank vehicle inspection guidance
1. **Cleanliness**

**Objective**
To ensure that 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**
Classes 3, 5.1, 6.1, 8 and 9 dangerous goods.
Rigid tank vehicles. Tank trailers.

**Legislative reference**
ADG7.5 cl 4.4.1 (c). Clean (free from DG 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 adhering to residues in the vicinity of closures and valves may indicate weeping seals. If so, the integrity of the seals must be determined.

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

2. **Suitable and free of risk-creating defect**

**Objective**
The inspector must undertake 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**
Classes 3, 5.1, 6.1, 8 and 9 dangerous goods.
Rigid tank vehicles. DG prime movers. Tank trailers.

**Legislative reference**
ADG7.5 cl 4.4.1 (a) and (b). Suitable and free of a defect that could create a risk in the transport of dangerous goods.
Guidance

The item concerns the inherent safety of the vehicle. The truck, trailer and tank vehicle must not exhibit a serious defect that could reasonably cause a loss of vehicle control or develop into a failure resulting in loss of containment. 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.

3. AS 2809 compliance plate

Objective

To provide evidence that the tank vehicle has been designed and constructed in accordance with AS 2809.

An AS 2809 compliance plate must:

- be fitted
- be in a conspicuous location
- include/display required information.

Application

Classes 3, 5.1, 6.1, 8 and 9 DG.

Rigid tank vehicles. Tank trailers.

Legislative reference

ADG 7.5 cl 6.9.2.2. 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 containing all the required information.

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 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 absent.
2. Absence of a hydrostatic testing plate marked with the test date(s) and the witnessing organisation if subsequent hydrostatic tests have been undertaken.
3. The required information cannot be read.
4. The plate is not located in a conspicuous location that is readily accessible for inspection.
5. There is reason to believe that the plate is not correct.
6. The plate is missing required information.

4. Emergency information panels

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

Application
Classes 3, 5.1, 6.1, 8 and 9 dangerous goods.
Rigid tank vehicles. Tank trailers.

Legislative reference
ADG 7.5, Sections 5.3.6.1 and 5.3.6.2. Emergency information panel.

Guidance
Dangerous goods tank vehicles are required to be placarded with EIPs 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.

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

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

The EIP should be vertical or as close to vertical as practicable ('in a substantially vertical plane').

Reasons for rejection
1. There is no provision for the installation of an EIP (800 millimetres wide x 600 millimetres high) on both sides and at the rear of the tank vehicle (or combination).
2. The affixed EIPs do not have the required information as required in section 5.3.1.3 of the ADG Code.
3. The EIPs are illegible, misleading, obscured, damaged or discoloured.
4. The EIPs are not in a substantially vertical plane (EIP is greater than 45 degrees from vertical).

5. Hydrostatic test plate

Objective
To verify that hydrostatic test(s) have been conducted 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
Classes 3, 5.1, 6.1, 8 and 9 dangerous goods.
Rigid tank vehicles. Tank trailers.

Legislative reference
ADG 7.5 cl 6.9.2.2.3 (k). Hydrostatic test dates.

Guidance
The first hydrostatic test can be recorded on the AS 2809 compliance plate. Subsequent tests must be evidenced by a test plate that reports the date of the test and the organisation that conducted the test.
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. The hydrostatic test plate is illegible.

6. External tank inspection

Objective
The tank condition must not present a risk of loss of containment.
The shell and tank attachments 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 the point where individual tanks are mounted to a chassis rail
- fatigue/stress points identified by the tank manufacturer
- at the bottom outlet or flange.

Items of relevance include:
- scrapes or scratches on the tank surface that exceed 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 prior to being covered.

Application

Classes 3, 5.1, 6.1, 8 and 9 dangerous goods.

Rigid tank vehicles. Tank trailers.

Legislative reference

ADG 7.5 cl 4.4.2.4 1(b). Tank vehicles s not leaking, defective or damaged.

AS 2809.2 cl 2.2.14.

AS 2809.4 cl 3.3.11.

Guidance

Leaks

Any sign of product weeping, accumulated residue or evidence of road grime accumulating on DG residue shall constitute a fail and warrant further investigation.

A release of vapour can result in a product film near to seals between valve bodies and the tank skin. Dust may attach to this film. Such a film of product may not constitute a leak. However, the viability of the seal should be investigated.

Special attention for leaks 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.

Defective welding

Welding must be failed if the repair weld is not substantially similar to the adjacent original equipment weld. Poor-quality welding that is irregular in width and shows substantial 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 repair is required or inadvisable. The referral and response should be documented.

Serious dents

Serious dents are deformations of the tank shell material that:

- traverse 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 previously verified, the external body filler shall be removed to verify that there are not deep scratches in the surface of the tank.

An internal examination is also required 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 exhibit 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 repetitive 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, the opinion of a qualified engineer who is experienced with tank vehicle manufacture and repair should be obtained.

Scrapes, dents and creases
Damage to the tank skin that has removed more than 1 millimetre material is considered a risk for future failure. Dents associated with creases across the dent line are unacceptable because the creases represents 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 necessary to determine whether unacceptable damage to the tank skin has occurred.

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 the severity of the scrape.

**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 failure occurs and the failure could occur 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 traversing 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 millimetres 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/flow 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 repeated 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 result in distortion and a large HAZ.

5. Root Crack: These are generally due to hydrogen embrittlement 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 metal 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 longitudinal shrinkage stresses acting on a low ductile weld material.

10. Craters: 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, Tastring, T-Joints, Bevel groove, V-groove.
7. Internal tank inspection

Objectives
To identify internal defects.
The inspection can be conducted manually, or it can be conducted 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 undertaken manually, appropriate safety precautions (including confined space entry) shall be undertaken in accordance with health and safety legislation. Manual internal inspections shall only be undertaken 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.

Application
Classes 3, 5.1, 6.1, 8 and 9.
Rigid tank vehicle. Tank trailers.

Legislative reference
ADG 7.5 cl 4.4.2.4 1(b). Tank vehicles not leaking, defective or damaged.
AS 2809.4 cl 3.2.2 and 3.2.3 (corrosive liquids).

Guidance
A preliminary internal inspection, undertaken 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.

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.

8. Closures closed and secured

Objective
To ensure that vibration or movement during transit 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
Classes 3, 5.1, 6.1, 8 and 9.
Rigid tank vehicle. Tank trailers.

Legislative reference
ADG 7.5 cl 4.4.2.4.2. Closures closed and secured.
AS 2809.4 cl 2.3.1.

Guidance
ADG 7.5 requires that closures are kept closed and secured. The requirement to be secured 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.

Acceptable securing of cam lock arms can be achieved using spring clips, padlocks, polyamide (cable) ties or some other reliable method.

Dust caps on 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. Shut-off valves on compartments that do not contain an internal shut-off valve (foot valve) are not mounted directly to, or immediately adjacent to, the outlet flange on the bottom of the compartment.

9. Landing legs/support points on semi-trailers

Objective
To ensure that the tank trailer can be safely separated from the prime mover.

Application
Classes 3, 5.1, 6.1, 8 and 9.
Tank vehicle semi-trailers.

Legislative reference
AS 2809.1 cl 2.2.1. Attachments.

Guidance
The vehicle must be fitted with landing legs or support points that are:
- securely attached
- adequately strong
- free from impact and mounting damage
- operable.
If the landing legs are not fitted the tank vehicle must have provision in the structure for external support.

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.

10. Tank attachment

Objective
To ensure that the tank remains securely attached on tank vehicle where the tank is separate from the vehicle chassis.

Application
Classes 3, 5.1, 6.1, 8 and 9.
Rigid tank vehicle. Tank trailers.

Legislative reference
AS2809.1 cl 2.1.3. Tank attachment.

Guidance
The means of attachment of a 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 ensure they do not work loose. Acceptable means include spring washers, polyamide insert nuts (nycloc), 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.*

**11. Drive away protection (DAP)**

**Objective**

To ensure that the tank vehicle is immobilised when cargo transfer is being undertaken.

**Application**

Classes 3, 5.1, 6.1, 8 and 9.
Rigid tank vehicle. Tank trailers.

**Legislative reference**

AS2809.1, cl 2.1.12. Drive away protection (DAP).

**Guidance**

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

There are risks associated with the vehicle moving while the product transfer is being undertaken and a risk of structural damage if the vehicle were to drive off with delivery hoses attached. The vehicle must be fitted with a means of ensuring that these risks are addressed.

A DAP bar that covers the product outlets ensures that 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 DAP operating when the vehicle is being normally driven.

**Reasons for rejection**

1. A DAP is not fitted.
2. Product transfer can occur without engaging the DAP.
3. When active the DAP does not cause the park brakes on the tank vehicle to be applied.
4. Where a ‘no-air-in-motion system’ is not fitted, the DAP control has no effective locking mechanism.
5. If fitted, the ‘no-air-in-motion system’ is inoperative.
12. Vehicle attachments

Objective
To ensure that attachments to the tank vehicle cannot cause structural damage to the tank if left unsecured or projecting.

Application
Classes 3, 5.1, 6.1, 8 and 9.
Rigid tank vehicles. Tank trailers.

Legislative reference
AS2809.1, cl 2.1.4. Attachments.
AS2809.4, cl 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 (DAP).

For tank vehicles in classes 5.1, 6.1, 8 and 9, 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.

Reasons for rejection
1. The above-tank handrail system can be deployed without the parking brakes being applied.
2. Any other attachment that could cause structural damage to the tank when deployed 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 (classes 5.1, 6.1, 8 and 9 liquids).
4. The pad mentioned in item 3 is not continuously welded to the tank, unless a drain is provided (classes 5.1, 6.1, 8 and 9 liquids).
5. The component attachment creates pockets that collect liquid and could promote corrosion if product were to collect in the pocket (classes 5.1, 6.1, 8 and 9).

13. Cabin-to-tank clearance

Objective
To ensure that the clearance between the tank and the cabin is adequate to avoid a mechanical clash under adverse circumstances.

Application
Classes 3, 5.1, 6.1, 8 and 9.
Rigid tank vehicles. DG prime movers in combination with a tank vehicle semi-trailer.

Legislative reference
AS2809.1, cl 2.1.5 and ADR 43 cl 6.1.2.2. Adequate tank-to-cabin clearance.
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 Australian Design Rules (ADRs).

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 ADRs.

14. Rear-impact protection

Objective
To ensure that the product containing elements of the tank are sufficiently protected from damage by a rear impact.

Application
Classes 3, 5.1, 6.1, 8 and 9.
Rigid tank vehicles. Tank trailers.

Legislative reference
AS2809.1 cl 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.

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.
15. **Guarding**

**Objective**
To ensure that personnel operating power-driven rotating machinery are protected from contact with rotating parts.

**Application**
Classes 3, 5.1, 6.1, 8 and 9.
Rigid tank vehicles. DG prime movers. Tank trailer.

**Legislative reference**
AS2809.1 cl 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 inadvertent 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 unintentional contact by an operator.

16. **Tail shaft protection**

**Objective**
To ensure that the failure of a tail shaft does not result in damage to the tank.

**Application**
Classes 3, 5.1, 6.1, 8 and 9.
Rigid tank vehicles. DG prime movers.

**Legislative reference**
AS2809.1 cl 2.1.8. Tail shafts.

**Guidance**
This item concerns protection against the risk that a tail-shaft failure could puncture the tank. The exposure only exists when the vehicle is moving.
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 motive vehicles. The risk zone is predominantly between the chassis rails of the vehicle.
Protection is required to protect 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.
If there is a clear path between the tail shaft and the tank on the connected vehicle, specific protection is required. Possible protections are:

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

17. Valve operation marking

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

Application
Classes 3, 5.1, 6.1, 8 and 9.
Rigid tank vehicles. Tank trailers.

Legislative reference
AS2809.1 cl 2.7.2. Valve operation marking.

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

18. Valves interlocked and protective caps on outlets

Objective
To ensure that valves operate as required and are free from defects. To ensure that dust caps cannot come off in transit and cause damage.

Application
Classes 3, 5.1, 6.1, 8 and 9.
Rigid tank vehicles. Tank trailers.

Legislative reference
AS2809.2 cl 2.3.3 and AS2809.4 cl 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.

Product build-up in a sight glass of an empty compartment likely indicates a leaking foot valve. Such observations justify 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.

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 DAP is active and/or do not close when the DAP is deactivated.
3. There are structural cracks in valve components or there are missing parts of a protective cap or valve.
4. 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.
5. Caps on a product discharge opening are not restrained.

19. Enclosed air spaces

Objective
To ensure that product leakage from enclosed air spaces can be detected.

Application
Classes 3, 5.1, 6.1, 8 and 9.
Rigid tank vehicles. Tank trailers.

Legislative reference
AS2809.2 cl 2.2.11 (class 3). Enclosed air spaces.

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.

The bottom port is required to be open so that leakage into the air space from a compartment will leak out. For classes 5.1, 6.1, 8 and 9 liquids, the bottom opening must be fitted with a valve that can be shut off (AS2809.4 cl 3.3.8).

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

Reasons for rejection
1. Top vent holes do not contain a screw-in plug.
2. There is evidence of product residue in or adjacent to a bottom vent hole.
3. Bottom vent holes are plugged or blocked with solid debris (class 3 tank vehicles).
4. Bottom vent holes are not fitted with a shut-off valve (classes 5.1, 6.1, 8 and 9 tank vehicles).
20. **Battery protection**

**Objective**
To ensure that the battery is secured and that short-circuits are controlled.

**Application**
Classes 3, 5.1, 6.1, 8 and 9.
Rigid tank vehicles. DG prime movers.

**Legislative reference**
AS2809.1 cl 2.1.9. Battery.

**Guidance**
Batteries shall be restrained by features that are effective in the event that the vehicle rolls over.

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 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.

21. **Battery isolation switch**

**Objective**
To ensure that the electrical system can be isolated in an emergency.

**Application**
Classes 3, 5.1, 6.1, 8 and 9.
Rigid tank vehicles. DG prime movers.

**Legislative reference**
AS2809.1 cl 2.1.10. 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 (BIS) 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.

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 sufficiently large to be readily seen.

The battery isolation switch control at the rear of the cabin shall be labeled and any other secondary controls shall be labeled.

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’ or ‘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 (not including complying permanently energised circuits).
7. Terminals and cables are loose or uninsulated.

22. Protection of wiring

Objective

To ensure that electrical wiring is adequately protected against impact, abrasion and ingress of product.

To ensure that the vehicle ignition circuit supply cables have a manual reset circuit breaker or fuse protection against short-circuit.

Application

Classes 3, 5.1, 6.1, 8 and 9.
Rigid tank vehicles. DG prime movers. Tank trailers.

Legislative reference

AS2809.2 cl 2.6.2, 2.6.5 and 2.6.6. Protection of wiring
AS2809.4 cl 3.8.

Guidance

For class 3 liquids:

- Wiring must be protected by conduit or double insulation of a type illustrated in AS 2809.2 (Figure 2.3) from the rear of the cabin.
- 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.

For classes 5.1, 6.1, 8 or 9 liquids:
• Electrical cables must be adequately protected against vibration, impact, abrasion, corrosion and pull stresses at ends. Conduiting is not mandatory. However, conduiting 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. These pins exhibit 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:**

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

**23. Road clearance**

**Objective**
To ensure that any product containing component of the tank vehicle have sufficient clearances from the roadway to minimise the risk of damage.

**Application**
Classes 3, 5.1, 6.1, 8 and 9.
Rigid tank vehicles. Tank trailers.

**Legislative reference**
AS2809.1, cl 2.1.2. 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.

**24. Protection against pump seal failure**

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

**Application**
Classes 5.1, 6.1, 8 and 9.
Rigid tank vehicles. Tank trailers.

**Legislative reference**
AS2809.4 cls 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 standing.

**Reason 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.

**25. Hydrostatic test**

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

**Application**
Classes 3, 5.1, 6.1, 8 and 9.
Rigid tank vehicles. Tank trailers.

**Legislative reference**
AS2809.2 cl 2.7.1. Hydrostatic testing.
**Guidance**

A hydrostatic test is mandatory for a new tank vehicle. The test details must be recorded on the AS 2809 approval plate. Subsequent hydrostatic tests to validate the condition of the tank should be conducted in accordance with initial hydrostatic tests as specified in AS2809. When conducted, 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 undertaken as a hydrostatic test without removal of the hatch. If such a hydrostatic test is undertaken, 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, an exemplar test plan is attached.

**Reasons for rejection**

1. If conducted, the tank vehicle fails the hydrostatic test.
2. The test plate is not affixed.
## 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 simultaneously
  - compartments 2, 4 and 6 can be filled simultaneously
- 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); ensure 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.
26. Vehicle rollover device (ROD)

Objective
To ensure that in the event of a rollover the battery isolation is triggered.

Application
Class 3 liquids.
Rigid tank vehicles. Tank trailers.

Legislative reference
AS2809.1 cl 2.1.11. Vehicle rollover device.

Guidance
A rollover device (ROD) is fitted to prime movers and rigid tank vehicles transporting flammable liquids and may be required to be fitted to other tank vehicles.
The ROD must operate the battery isolation switch (BIS) when the vehicle is tilted at an angle of 45 degrees or more.
The ROD need not be located adjacent to the BIS.
If fitted, the inspector shall test the ROD and verify that it activates the BIS. The test must be able to be readily undertaken.
It is noted that some ROD devices may be able to electronically simulate a rollover 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 BIS.

Reasons for rejection
1. If the vehicle is required to be fitted with a ROD, the vehicle is not fitted with a ROD.
2. The ROD does not trigger the BIS within three seconds of the device being tilted at an angle greater than 45 degrees.
3. The ROD or its test function is not installed in a manner that allows the vehicle operator to easily achieve the requirements for regular testing.

27. No hoses between foot valve and first outside valve

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

Application

Legislative reference
AS2809.2 cl 2.5.3 class 3. No hoses between foot valve and first outside valve.

Guidance
The connection must be a metal pipe.
**Reason for rejection**

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

**28. Hatches, vents and valves integrity testing and inspection**

**Objective**

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

**Application**

Class 3 liquids.

Rigid tank vehicles. Tank trailers.

**Legislative reference**

AS2809.2 cls 2.7.1 and 3.5.1 class 3. Testing of hatches, vents and valves.

AS2809.4 cl 3.4.4. Provision of vents.

**Guidance**

Undertake testing of hatches, vents and valves either as a full hydrostatic test in accordance with AS2809.2 cl 2.7.1 or individually conduct a bench test in accordance with AS2809.2 Cl 3.5.1. Repair as necessary.

The period between tests must not exceed 2.5 years.

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 class 6.1 tank vehicles (AS2809.4 cl 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.

**Reasons for rejection**

1. If hatch vent and valve testing is not undertaken 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 (if undertaken).
3. A compartment fails the hydrostatic test (if undertaken).
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.
29. **Stowage of hoses and other loose equipment**

**Objective**
To ensure that hoses and other potentially loose equipment are adequately restrained to prevent ejection from the vehicle or damage to the tank as the result of a road incident.

**Application**
Class 3 liquids.
Rigid tank vehicles. Tank trailers.

**Legislative reference**
AS 2809.2 cl 1.7.4. Stowage of hoses and other equipment.

**Guidance**
The restraints can be elastic straps that stretch between sides of the tray. The ends of the elastic (or spring) straps must be captive 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 inverted.

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

**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.

30. **Condition of transfer hoses**

**Objective**
To ensure that a hose that is used for product transfer is in a safe condition and has been tested.

**Application**
Classes 3, 5.1, 6.1, 8 and 9 dangerous goods.
Rigid tank vehicles. Tank trailers.

**Legislative reference**
ADG 7.5 cl 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, cracks in metal ends, cross threads on end fittings, breaks in static wires and worn, torn or missing seals.

ADG 7.5 cl 10.1.3 requires that hose assemblies be inspected 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 that testing has occurred, hoses that are in acceptable condition can be tested as part of the vehicle inspection.

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

**Reasons for rejection**

1. Hoses exhibit substantial cuts or grazes.
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 6 months.
8. The resistance between the ends of any hose assembly used for the transfer of class 3 liquids exceeds 10 ohms.

**31. Condition of pressure: vacuum vents**

**Objective**
To ensure that pressure and vacuum vents (PVVs) are operational.

**Application**
Class 3 liquids.
Rigid tank vehicles. Tank trailers.

**Legislative reference**
AS2809.2 cl 3.5.2 Condition of pressure and vacuum vents.

**Guidance**
Every 2.5 years PVVs must be removed, disassembled, cleaned and inspected. Seals and gaskets must be replaced with new.

The reassembled vents must be tested in accordance with AS 2809.2 Appendix B.

**Reasons for rejection**

1. The pressure/vacuum vent (PVV) is in an unserviceable condition.
2. No evidence is provided verifying that the PVVs have been completely refurbished within the last 2.5 years.
32. Shielding of exhausts

Objective
To ensure that hot exhaust components are shielded to protect against contact with spilled product.

Application
Class 3 liquids.
Prime movers. Rigid tank vehicles.

Legislative reference
AS2809.2 Is 1.7.1. Exhaust shielding and cl 1.7.2 Propulsion 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:
1. 50 millimetres away from the hot part; and  
2. 75 millimetres from any cargo carrying component

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:
1. Begin not less than 200 millimetres from the bottom of the outlet opening (at the top of the exhaust); 
2. Extend above the top of the cabin;  
3. Be sealed at the top;  
4. 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 (where this occurs).

If an existing rigid tank vehicle/prime mover has a shielding gap slightly exceeding 200 millimetres, this should be noted and not failed. New fitment of exhaust shielding must not have a gap exceeding 200 millimetres.

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.

33. Auxiliary engines

Objective
To ensure that 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.

Legislative reference
AS2809.2 cls 1.7.3. Auxiliary engines.

Guidance
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 guide: Zone 1 extends 1.5m vertically, 3m horizontally and to the ground underneath an open outlet, vent or closure.
Zone 2 extends up to a height of 3m and a radius of 6m 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 exhaust of a compression ignition engine is inside Zone 1.
3. The exhaust of a compression ignition engine is inside Zone 2 and it has no enveloping shield.
4. An electric motor is installed in Zone 1 when it could be installed in Zone 2.
5. An electric motor that is installed in Zones 1 or 2 does not have a suitable Ex rating.

34. Installation of roll stability system (RSS)

Objective
To ensure that a roll stability system (if installed) is correctly installed and operational.

Application
Classes 3, 5.1, 6.1, 8 and 9 dangerous goods.
All dangerous goods heavy vehicle tank trailers used in jurisdictions that require the fitting of a roll stability system.

Legislative reference
NSW EPA Determination and ADR 64/00 and Appendix 1 of ADRs 35/05 and 38/05.

Roll stability system is mandatory for tank trailers in NSW. It is not required on rigid tank vehicles. All dangerous goods heavy vehicle tank trailers built after 30 June 2014 must have RSS fitted if used in NSW. From 1 January 2019 all dangerous goods heavy vehicle tank trailers used in NSW must be fitted with operational RSS.

RSS is also commonly installed on tank vehicles that operate in other jurisdictions. If it is installed then the following requirements shall be met.
Guidance

The RSS controller must be set-up for the specific tank trailer characteristics. A record of the set-up on the trailer should be available. If not, details of the set-up should be sought from the installer. The trailer VIN or registration number should be stated on the record.

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

A RSS system will usually have a seven-pin power connector. It is likely that an ABS system will have a five-pin connector that does not include the two CAN (Controller Area Network) communication wires. A five-pin plug will insert into a seven-pin connector and vice-versa.

ADR 35/04 and 38/04 require that the electrical supply connector for an ABS system is a five-pin or seven-pin connector as per DIN standard 72570 or ISO/DIN 7836. In Australia multi-volt RSS are often used on trailers. Voltage can be either 12V or 24V. Sometimes an additional 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 RSS cable. A five-pin or seven-pin connector is acceptable.

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

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 tank vehicle 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 RSS is cut or cracked.
4. The five or seven pin RSS connector pair has corroded pins.
5. When the ignition key on the prime mover is turned on but the engine is not cranked:
   i. a modulation solenoid valve on the trailer does not ‘click’ when the system is powered on; or
   ii. 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 CAN bus voltage level is not the same as the supply voltage level.

Reference information for ABS/ESC/RSS connector pins

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

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