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Road tank vehicles for dangerous goods

Part 1: General requirements for all road tank vehicles



AS 2809.1:2023

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- Department of Mines, Industry Regulation and Safety WA
- Department of Transport and Main Roads (QLD)
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- Gas Energy Australia
- Heavy Vehicle Industry Australia
- National Bulk Tanker Association
- National Heavy Vehicle Regulator
- Resources Safety & Health Queensland
- SafeWork SA
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Preface

This Standard was prepared by the Standards Australia Committee ME-057, Road Tankers For Hazardous Liquids and Gases, to supersede AS 2809.1:2020, *Road tank vehicles for dangerous goods, Part 1: General requirements for all road tank vehicles*.

The objective of this document is to provide designers, planners, operators and regulators with technical requirements for road tank vehicles transporting dangerous goods.

This document specifies general requirements for all road tank vehicles. Additional specific requirements applicable to particular road tank vehicles are detailed in the appropriate part of the AS 2809 series on road tank vehicles, which comprises six parts.

The major changes in this edition are as follows:

- (a) The requirements for electrical equipment safety have been revised.
- (b) The requirements for stability height marking have been more clearly stated.
- (c) The clause defining rear impact protection has been rewritten to clarify the distinction between requirements for RUPD and bumper for tank protection.
- (d) Additional inspection and maintenance items have been included with their required frequencies.

This document is intended to serve as a reference document for industry and for the various statutory authorities administering regulations for the safe design and maintenance of dangerous goods road tank vehicles. The wording of the title and scope have been chosen to align with the Australian Dangerous Goods (ADG Code).

Authorities and regulations may affect the use of this document. Conformance with this document does not fulfil all legal obligations. Designers, manufacturers and importers have a legal obligation to ensure, so far as is reasonably practicable, that plant and equipment is without risks to health and safety to workers throughout its life.

The terms “normative” and “informative” are used in Standards to define the application of the appendix to which they apply. A “normative” appendix is an integral part of a Standard, whereas an “informative” appendix is only for information and guidance.

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Australian Standard®

Road tank vehicles for dangerous goods

Part 1: General requirements for all road tank vehicles

Section 1 Scope and general

1.1 Scope

This document specifies general requirements for the design, construction, testing, maintenance and inspection of road tank vehicles powered by conventional internal combustion engines, irrespective of the cargo, that are intended for the road transport of dangerous goods. The document deals with vehicles that are designed and constructed specifically as road tank vehicles. This document is applicable also to conventional vehicles that carry portable or demountable tanks which are filled or discharged while on the vehicle and as a consequence are deemed to be a road tank vehicle for the purposes of the AS 2809 (see Note 1).

NOTE 1 This does not include single filling or discharge of a portable tank in intermodal service.

NOTE 2 The general vehicle and safety requirements are regulated by the Australian Design Rules (ADR) for motor vehicles issued by the Australian Commonwealth Government; these rules are outside the scope of this document.

NOTE 3 Throughout this document the term “road tank vehicle” is used and has the same meaning as “tanker”.

1.2 Application

Road tank vehicles intended for the transport of dangerous goods shall conform with this document, and with such other parts of the AS 2809 series as relevant to the hazards of the particular cargo. Where a cargo has two characteristics, e.g. flammable and toxic and, or where a road tank vehicle is switched from one cargo to another, the requirements of all relevant parts shall apply.

1.3 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document:

NOTE Documents referenced for informative purposes are listed in the Bibliography.

AS 1657, *Fixed platforms, walkways, stairways and ladders — Design, construction and installation*

AS 2809.2, *Road tank vehicles for dangerous goods, Part 2: Road tank vehicles for flammable liquids*

AS 2809.3, *Road tank vehicles for dangerous goods, Part 3: Road tank vehicles for compressed liquefied gases*

AS 2809.4, *Road tank vehicles for dangerous goods, Part 4: Road tank vehicles for toxic, corrosive or ammonium nitrate emulsion, suspension or gel cargoes*

AS 2809.5, *Road tank vehicles for dangerous goods, Part 5: Tankers for bitumen-based products*

AS 2809.6, *Road tank vehicles for dangerous goods, Part 6: Tankers for cryogenic liquids*

AS 3992, *Pressure equipment — Welding and brazing qualification*

AS 4037, *Pressure equipment — Examination and testing*

AS/NZS 1891, *Industrial fall-arrest systems and devices (series)*

AS/NZS 2053.1, *Conduits and fittings for electrical installations, Part 1: General requirements*

AS/NZS 2053.7, *Conduits and fittings for electrical installations, Part 7: Rigid metal conduits and fittings*

AS/NZS 2865, *Confined spaces*

AS/NZS 3788, *Pressure equipment — In-service inspection*

AS/NZS 4481, *Pressure equipment — Competencies of inspectors*

AS/NZS 60079.14, *Explosive atmospheres, Part 14: Design selection, erection and initial inspection*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

EN 13317, *Tanks for transport of dangerous goods — Service equipment for tanks — Manhole cover assembly*

ECE R105, *Uniform provisions concerning the approval of vehicles intended for the carriage of dangerous goods with regard to their specific constructional features*

Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code).

Australian Design Rules for motor vehicles and trailers

ADR 13/00, *Vehicle Standard (Australian Design Rule 13/00 — Installation of Lighting and Light Signalling Devices on other than L-Group vehicles)*

ADR 35/06, *Vehicle Standard (Australian Design Rule 35/06 Commercial Vehicle Brake Systems)*

ADR 38/05, *Vehicle Standard (Australian Design Rule 38/05 Trailer Brake Systems)*

1.4 Terms and definitions

For the purposes of this document, the definitions in the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code) and the following definitions apply.

1.4.1

approved

approval

approved by, or approval by, an authority

1.4.2

Australian Design Rules

ADRs

national standards for vehicle safety, anti-theft and emissions

1.4.3

authority

authority having statutory (legal) control over a particular aspect of a road tank vehicle

1.4.4

auxiliary engine

engine that is additional to the main propulsion engine of the road tank vehicle

1.4.5

baffle

transverse device which is not liquid-tight, which limits the surge of contents and which can provide circumferential reinforcement

1.4.6

bitumen-based products

residual bitumen, polymer modified bitumen, cutback bitumen, tar, and bitumen emulsion

1.4.7**bulkhead**

transverse closure forming a liquid-tight division between adjacent compartments of a tank and which can provide circumferential reinforcement

1.4.8**bumper system**

all structural elements used to protect the tank in the event of a rear collision

Note 1 to entry: This can include the rear underrun protection device, subframe, drum tray etc.

1.4.9**capacity**

as defined in the ADG Code

1.4.10**cargo**

load to be transported in the tank

1.4.11**cargo-carrying component**

any component that holds or transfers cargo

Note 1 to entry: Examples of a cargo-carrying component are: cargo tank, cargo pipe-work, cargo pump, cargo-meter, cargo air eliminator, cargo hose-reel and hose, cargo jumper/bridger hose. A cargo hose is considered a cargo-carrying component only when connected to a cargo-carrying component.

1.4.12**cargo transfer**

movement of cargo into or from the road tank vehicle

1.4.13**centroid of the tank**

position defined by the geometrical centre of the tank capacity, independent of all masses including tank mass, payload mass etc

1.4.14**cleaning ring**

ring used in the attachment of a bulkhead to a tank shell, and having the annular space vented and drained

1.4.15**compartment**

liquid-tight division of a tank

1.4.16**competent person**

person who has acquired through training, qualification or experience, or a combination of these, the knowledge and skills enabling that person to perform the task required

1.4.17**compressed gas**

any permanent gas enclosed under such conditions that its gauge pressure exceeds 170 kPa when its temperature is 15 °C, or any liquefied gas, as hereunder defined, within a closed container

1.4.18**compressed liquefied gas**

gas which on the application of pressure liquefies at normal ambient temperatures, and which is Class 2 dangerous goods as defined in the ADG Code

1.4.19**corrosive material**

Class 8 dangerous goods as defined in the ADG Code

1.4.20**cryogenic liquid (refrigerated)**

liquefied gas having a boiling point below $-90\text{ }^{\circ}\text{C}$ at atmospheric pressure (101.325 kPa absolute)

1.4.21**dangerous goods**

any material which conforms with the definition of dangerous goods as published in the ADG Code

1.4.22**deflector**

panel designed to stop or redirect cargo released due to a failed cargo-carrying component, a panel designed to prevent cargo from making contact with components

1.4.23**demountable tank**

as defined in the ADG code

1.4.24**design pressure**

maximum allowable working pressure in a tank, pipe or component

1.4.25**excess-flow valve**

valve normally in the open position, which closes automatically when the flow in the direction for which the valve was designed exceeds a predetermined limit specified by the manufacturer, and which re-opens when the conditions which resulted in closure are no longer present

1.4.26**flammable liquid**

Class 3 liquid dangerous goods as defined in the ADG Code

1.4.27**“g”**

acceleration due to gravity (9.81 m/s^2)

1.4.28**hazardous area**

area in which an explosive gas atmosphere is present or can be expected to be present, in quantities such that special precautions for the construction, installation and use of equipment are required

[SOURCE: AS/NZS 60079.10.1]

1.4.29**head**

transverse liquid-tight closure at the end of a tank

1.4.30**hot component**

any part of a vehicle propulsion engine, auxiliary engine, or exhaust system that can attain or exceed a temperature of $180\text{ }^{\circ}\text{C}$

Note 1 to entry: If the auto ignition temperature of the cargo is less than $200\text{ }^{\circ}\text{C}$ then any component that can attain or exceed a temperature of $20\text{ }^{\circ}\text{C}$ below the auto ignition temperature of the cargo, is considered a hot component.

1.4.31**hot work**

any condition that is likely to produce a source of ignition or be an ignition source

Note 1 to entry: Examples of hot work include the following:

- (a) Welding or flame cutting equipment.
- (b) Grinding, drilling or other activities that could create heat or spark.
- (c) Electrical equipment not suitable for hazardous areas.
- (d) Spark ignition engines or compression ignition engines not suitable for hazardous areas.
- (e) Hand tools that could create a spark.

1.4.32**ignition source**

source of energy sufficient to ignite an explosive atmosphere

Note 1 to entry: Such sources include the following:

- (a) Flames.
- (b) Incandescent material.
- (c) Electrical sparks.
- (d) Hot surfaces.
- (e) Mechanical impact sparks.
- (f) Matches, naked lights, cigarettes.

1.4.33**internal safety control valve****ISC**

combination of an excess-flow valve and a quick-closing internal valve, used on compressed liquefied gas road tank vehicles

1.4.34**internal shut-off valve**

valve designed to be closed both automatically by the operation of one or more sensing devices (which may be fusible links), and manually from a remote position by the release of the means of holding the valve open

1.4.35**large-compartment tank**

tank having one or more compartments any of which exceeds 8 600 L capacity

Note 1 to entry: A large-compartment tank is specific to AS 2809.2 and AS 2809.4.

1.4.36**mass-filling ratio**

ratio of the maximum mass of a liquefied gas permitted in a container to the mass of water which that container would hold at 15 °C

1.4.37**National Heavy Vehicle Regulator****NHVR**

independent body established under the heavy vehicle national law to administer that law (HVNL)

1.4.38**normal operation**

situation when the equipment is operating within its designed parameters

Note 1 to entry: Failures such as the breakdown of pump seals, flange gaskets or spillages caused by accidents which involve repair or shut-down are not considered to be part of normal operation. Normal operation includes start up and shut down conditions and routine maintenance but excludes initial start up as part of commissioning.

1.4.39**performance based standards****PBS**

scheme administered by the NHVR for heavy vehicles to achieve higher productivity and safety through innovative and optimized vehicle design

1.4.40**permanently energized circuits**

all electrical circuits that remain powered after the battery isolation switch is open

1.4.41**portable tank**

as defined in the ADG code

1.4.42**prime mover**

as defined in the ADG code

1.4.43**propulsion engine**

main drive engine or power plant of the road tank vehicle

1.4.44**quick-closing internal valve**

see *internal shut-off valve* ([1.4.34](#))

1.4.45**rigid vehicle**

as defined in the ADG code

1.4.46**rear underrun protection device****RUPD**

device providing protection against under-running of vehicles in the event of a rear collision

1.4.47**road tank vehicle**

road vehicle of which a tank forms part or to which a tank is attached and where the tank is filled or discharged while on the vehicle

1.4.48**safe fill level**

capacity less the ullage

1.4.49**self closing type valve**

valve held in the closed position by means of stored energy (such as a spring) which opens only by application of external force and which closes when the external force is removed

1.4.50**shell**

part of the tank which retains the cargo excluding the heads