Australian Dangerous Goods Code Comprehensive Review

Working group paper #7

National Transport Commission Leading change



Vehicles for dangerous goods transport

August 2023

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Report outline

Title	Vehicles for dangerous goods transport
Type of report	Discussion paper
Purpose	For public consultation
Abstract	In November 2020, transport and infrastructure ministers approved the NTC's recommendation to conduct a comprehensive review of the Australian Code for the Transport of Dangerous Goods by Road & Rail (the Code)
	This paper is the seventh of a series of topic specific discussion papers.
Submission details	The NTC will accept submissions until 22 September 2023 online at www.ntc.gov.au or by email to:
	dkirk@ntc.gov.au
Attribution	This work should be attributed as follows, Source: National Transport Commission, Vehicles for dangerous goods transport – discussion paper #7.
	If you have adapted, modified or transformed this work in anyway, please use the following, Source: based on National Transport Commission, Vehicles for dangerous goods transport – discussion paper #7.
Key words	Dangerous goods, ADG Code review, transport, ADR, tanks, bulk containers, vehicles
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Have your say

What to submit

We are seeking stakeholder views on the consultation questions in the Executive summary and throughout the document. We are also interested in any additional information submitters could provide to support their views.

When to submit

We are seeking submissions on this issues paper by 22 September 2023.

How to submit

Any individual or organisation can make a submission to the NTC.

Making a submission

Visit <u>www.ntc.gov.au</u> and select 'Engage NTC' on the homepage.

Or:

Email your submission to dkirk@ntc.gov.au

Where possible, you should provide evidence, such as data and documents, to support the views in your submission.

Publishing your submission

Unless you clearly ask us not to, we publish all the submissions we receive online. We will not publish submissions that contain defamatory or offensive content.

A deidentified list of responses to specific questions, and how these have been considered in the final drafts will be made publicly available.

The Freedom of Information Act 1982 (Cwlth) applies to the NTC.

Contents

Report outline2					
Ha	Have your say3				
Ex	ecu	itive su	immary	6	
1	Abo	out this	s project	9	
	1.1	Project	t objectives	9	
	1.2	Backgi	round	10	
	1.3	Approa	ach	10	
2	Cor	ntext		12	
3	Ass	signme	ent of vehicle types	14	
	3.1	Vehicle	e requirements in ADR	14	
		3.1.1	Requirements that apply to all vehicles used for dangerous goods	14	
		3.1.2	FL, AT, EX/II, and EX/III vehicle types	14	
		3.1.3	Vehicles types other than FL, AT, EX/II, or EX/III	15	
	3.2	Vehicle	e requirements in the current code	15	
		3.2.1	Problems with the current code	16	
		3.2.2	Vehicles for explosives transport	16	
4	Veł	nicles i	n the future code	17	
	4.1	Genera	al requirements for all dangerous goods vehicles	17	
	4.2	Specify	ying vehicle selection in the future Code	17	
		4.2.1	Adoption of FL and AT vehicles	18	
	4.3	3 Australian vehicle construction requirements 19			
	4.4	4 Pseudo tank vehicles constructed using a portable tank 20			
	4.5	5 Vehicles for packages, bulk containers and temperature-controlled substances 20			
	4.6	Vehicle	e maintenance requirements	21	
	4.7	Other i	ssues included in vehicle requirements	21	
		4.7.1	Braking equipment	22	
		4.7.2	Speed limitation devices	22	
	4.8	Option	s for incorporating requirements into the future code	22	
5	Dra	ft futu	re Code provisions		
	5.1	Assign	ment of items from AS 2809.1	24	
	5.2	Possib	le vehicle provisions for the future Code	26	
		5.2.1	How this section has been developed	26	
		5.2.2	Draft provisions for comment	27	
6	6 Next steps				
Ap	oper	ndix A	Part 9 in ADR	32	

Purpose of this paper

The National Transport Commission (NTC) is conducting a comprehensive review of the Australian Code for the Transport of Dangerous Goods by Road & Rail (the Code).

In conducting the review, the NTC will seek to achieve greater alignment with the internationally recognised land mode-specific requirements contained in the Agreement for the International Transport of Dangerous Goods by Road (ADR) and the Agreement for the International Transport of Dangerous Goods by Rail (RID).

The review is focused on outcomes that serve the best interest of all parties involved in the transport of dangerous goods. This includes those parties on which the requirements are imposed, those who regulate and administer the requirements, and those who must maintain them.

This paper is the seventh of series of topic specific discussion papers. This paper should be read in conjunction with working group supplementary paper #S1 – Tank provisions of the ADR - Terminology.

The purpose of this paper is to examine the current requirements for vehicles in ADR and the current code, and how these requirements can be combined and carried forward into the future code.

It focuses on vehicle requirements for non-explosives dangerous goods but has been prepared in a way that permits the requirements for vehicles for explosives to be incorporated at a later point in the process.

This paper relates to:

the Code – Part No.	Working group	\boxtimes	Discrete issue	\boxtimes
	Tanks, Vehicles and Emergencies		Vehicles used for dangerous goods transport	

Executive summary

Context

A full review of the Australian Dangerous Goods Code (the Code) has not been conducted for over a decade.

The Code is applicable across Australia, and adherence to it by all relevant parties ensures specific risks posed through transport of dangerous goods by land are effectively managed.

In 2020, transport and infrastructure ministers agreed for the NTC to conduct a full review of the Code. The NTC's responsibility for the Code's content and stakeholder engagement over several years, highlighted that the road and rail specific requirements of the Code in particular, do not fully support the smooth and safe movement of dangerous goods across borders and transport modes.

The purpose of the review, therefore, is to ensure that the Code is reflective of the Australian transport environment, draws upon road and rail mode specific concepts used elsewhere in the world where appropriate, and considers inclusion of explosives as regulated dangerous goods under the Code's requirements.

Given the scale of the review, the content of the code has been broken into a series of topics. This paper focuses on vehicles used for dangerous goods transport.

Themes

Chapter 1 – Project to Review the Australian Dangerous Goods Code

In November 2020, transport and infrastructure ministers approved the NTC's recommendation to conduct a comprehensive review of the Code.

The review seeks to better align Australia with international practices contained in the road and rail mode specific versions of the UN Model Regulations and will focus on improving transport of dangerous goods safety outcomes.

Chapter 2 – Context

This chapter provides contextual overview for the topics included within this paper. This paper deals with the approval processes for tanks, bulk containers and certain vehicle types used to transport dangerous goods. Approvals relating to other types of packagings (such as boxes, drums, and IBCs) are not within the scope of this paper.

Chapter 3 – Assignment of vehicle Types

This chapter discusses how ADR and the current code specify vehicle requirements. It also explains the impact of some of these requirements.

Chapter 4 – Vehicles in the future code

This chapter examines questions relating to known issues in the current code, the way that vehicle requirements in ADR are formatted, and presents some options for the layout of the future code.

Chapter 5 – Draft future code provisions

This chapter outlines one way that future code provisions may be specified. It is included to obtain feedback on how the future code may specify vehicle requirements, and to discuss options for the level of detail in the code.

Next steps

Consultation on this issues paper will close on 22 September 2023.

The responses to this paper will be used to develop a consultation draft of the vehicle approval for the future Code.

List of questions

Question 1:	Is there a reason why the future code should not adopt the system of specifying FL and AT vehicles, and associated requirements?
Question 2:	Is there a reason why the future code should not extend this requirement to vehicles that are used for tank transport (that are not tank vehicles)?
Question 3:	If the future code does include requirements for vehicles used for tank transport (other than tank vehicles), what is a reasonable time frame for the transition period
Question 4:	Are there requirements in parts $2-5$ of AS 2809 that you consider should be included in the vehicle requirements of the future Code? If yes, please provide details
Question 5:	Should the future code capture these "pseudo tank vehicles" using portable tanks, tank-containers, or similar? Please explain your reasoning
Question 6:	Should these provisions be extended to IBCs that are filled or emptied on a vehicle? Please explain your reasoning
Question 7:	Should an exemption be provided for single filling or emptying of a tank when in intermodal service (as in AS 2809)? Please explain your reasoning 20
Question 8:	If an exemption for single filling or emptying of a tank is appropriate, should it be limited to certain items that are impracticable to comply with? If yes, please advise what items should be exempted, and reasons why
Question 9:	Is there a reason not to incorporate the requirements relating to vehicles for packages, bulk containers and temperature-controlled substances into the future code? Please provide your reasoning
Question 10:	Are there requirements other than those in chapter 9.4 of the ADR that should be incorporated into the code for the transport of dangerous goods in packages? Please provide details
Question 11:	Are there requirements other than those in chapter 9.5 of the ADR that should be incorporated into the code for the transport of dangerous solids in bulk? Please provide details
Question 12:	Are there requirements other than those in chapter 9.6 of the ADR that should be incorporated into the code for the transport of dangerous goods requiring temperature control? Please provide details
Question 13:	Should the future code include detailed inspection and maintenance requirements (similar to AS 2809.1) or refer to the requirements in AS 2809.1? Please explain your reasoning

Question 14:	Should the future code contain inspection and maintenance requirements for vehicles other than FL and AT vehicles? Please provide details on these requirements
Question 15:	Should the future code include a requirement that vehicles be fitted with an endurance braking system? Please explain your reasoning, and when you think this should apply?
Question 16:	Should the future Code include a requirement that dangerous goods vehicles be fitted with a speed limiting device? Please explain your reasoning, and when you think this should apply?
Question 17:	Please explain your reasoning, and when you think this should apply? 22
Question 18:	Which of the above 3 options do you consider most appropriate for the future code (or an alternative)? Please explain your reasoning
Question 19:	Are there any vehicle requirements that are found elsewhere (in the code or in other rules or instruments) that you consider must be incorporated into the vehicle requirements of the future code? Please provide details
Question 20:	Are there any assignments ("tank", "tank and vehicle", "FL only" or "FL and AT") in Appendix A that you consider to be incorrect? If yes, please advise how you would correctly assign items you consider incorrect
Question 21:	Are there items missing in these provisions that you consider essential to be included in the vehicle requirements? Please provide details on what should be added and where?

1 About this project

Key points

- In November 2020, transport and infrastructure ministers approved the NTC's recommendation to conduct a comprehensive review of the Australian Code for the Transport of Dangerous Goods by Road and Rail (the Code).
- Mode-specific requirements of the current code consist of a repository of often disjointed, contradictory requirements that fall apart when closely examined.
- The review seeks to better align Australia with international practices as set out in the ADR and RID.
- The review will focus on outcomes that serve the best interest of all parties involved in the transport of dangerous goods.
- Given the scale of the review, the content of the code has been broken into a series of topics, each allocated to a topic specific working group.

1.1 Project objectives

In November 2020, transport and infrastructure ministers approved the NTC's recommendation to conduct a comprehensive review of the Australian Code for the Transport of Dangerous Goods by Road and Rail (the Code). Ministers also supported the proposal to incorporate into the Code principles from both:

- the Agreement for the International Transport of Dangerous Goods by Road (ADR)
- the Agreement for the International Transport of Dangerous Goods by Rail (RID).

The ADR and RID are used extensively throughout Europe, Africa and Asia. As with the Australian code, both the ADR and RID are based on the United Nations Recommendations on the Transport of Dangerous Goods - Model Regulations (UN Model Regulations). In general, the requirements of the ADR and RID are the same. They only differ where requirements need to apply specifically to either road transport or rail transport.

Stakeholder feedback over the years and a literature review of relevant materials suggests that the mode-specific requirements of the current code consist of a repository of often disjointed, contradictory requirements that fall apart when closely examined. In many instances, there was no supporting evidence or data for their introduction and there is no evidence that they have contributed to safer outcomes. The lack of consistency and cohesiveness in these requirements coupled with a lack of a framework for maintaining the mode-specific requirements results in a continuing cycle of ad-hoc, random amendments without consideration of the consequential inconsistencies or contradictions.

Goal of the review

The goal of the review is to deliver a code that:

- addresses the specific risks of transport by land, while also recognising any risks unique to the Australian transport environment
- remains contemporary

 is aligned to international practices that support the smooth and safe movement of dangerous goods across borders and transport modes.

The review is focused on outcomes that serve the best interest of all parties involved in the transport of dangerous goods. This includes:

- parties that must meet the requirements
- parties that regulate and administer the requirements
- parties that must maintain the requirements.

The aim of the review is to deliver more than just a cohesive and contemporaneous code. We also aim to deliver a framework for making sure the Code remains up to date and aligned with international standards.

1.2 Background

In 2020, the NTC released an issues paper on the land transport of dangerous goods. The paper focused on the legislative framework that supports the dangerous goods code. However, the responses we received highlighted several problems with the code itself.

A major concern raised in submissions centred on the Australia-specific chapters of the current code. The biennial maintenance cycle of the Code, which keeps it aligned to the UN Model Regulations, is appreciated. However, many submissions noted the Australia-specific chapters have not been reviewed or revised. Many of these chapters were carried over from the sixth edition of the Code (ADG 6), either in full or in part, without examination. They have not been critically reviewed for over 15 years and are now outdated. In the case of some requirements, no evidence base, or justification can be found to support their original introduction.

Industry and regulators also noted the Australian Explosives Code is outdated and has no responsible agency. They expressed a strong preference for the dangerous goods code to be expanded to include Class 1 Explosives, and for the Australian Explosives Code to be made obsolete.

After analysing the submissions received, the NTC made recommendations to infrastructure and transport ministers. All recommendations were endorsed, including the following:

Recommendation 4:

Conduct a full review of the Australian Dangerous Goods Code to update outdated chapters, identify and correct translation errors, incorporate relevant ADR concepts and incorporate requirements for Class 1 and Division 6.2. Note: the technical requirements for Class 1 and Division 6.2 will be incorporated into the [ADG] Code but the legal requirements will not be incorporated into the regulations.

1.3 Approach

A set of Review Principles has been developed to guide the review and give it the best chance of delivering the right outcome. These principles were developed with regard to the following key considerations:

Impacts and benefits

- stakeholder engagement
- maintaining currency of the Code and associated model laws.

Given the scale of the review, the content of the code has been broken into a series of topics, each allocated to a topic specific working group.

This discussion paper deals specifically with provisions relating to vehicle types used to transport dangerous goods.

Previous consultation papers for this review include:

- Classification of dangerous goods Working group paper #1, January 2023
- Dangerous Goods List UN entries Working group paper #2, February 2023
- Tank provisions in ADR Terminology Supplementary paper #S1, March 2023
- Approval of tanks, bulk containers and vehicles Working group paper #3, March 2023
- Safety equipment for dangerous goods transport Working group paper #4, May 2023
- Fire extinguishers for dangerous goods transport Working group paper #5, May 2023
- Part 5 Consignment procedures Working group paper #6, June 2023
- Tank and bulk container provisions for dangerous goods transport Working group paper #8, August 2023

2 Context

Key points

- The design and construction of vehicles are critical controls in dangerous goods transport.
- The current code has some deficiencies, including a focus on tank vehicles, with limited controls on other vehicles.
- The ADR is more comprehensive, though the layout of the requirements will be unfamiliar to users of the code and therefore requires explanation.
- This paper examines options for combining the two systems in a way that is appropriate for the Australian transport context.
- While vehicles for explosives are excluded from this paper, they will be able to be readily integrated into the draft provisions.

Selecting the correct vehicle for the type and volume of dangerous goods being transported is essential to managing the risks associated with the dangerous goods. As an example, transporting a tank of class 3 flammable liquids using a vehicle that presents ignition source hazards could lead to a major fire or explosion incident.

This paper looks at the deficiencies in the current code and explores how these could be improved. In doing this, it looks to the ADR as a key source of information, whilst also retaining aspects of the current code. This approach allows Australia to take advantage of and learn from a broader range of experts, bringing in national and international best practice.

The discussion in the paper is organised as follows.

Assignment of vehicle types (chapter 3)

Chapter 3 explores the way that both the ADR and the current code specify the type of vehicle that is currently required for dangerous goods transport.

It explains how the ADR specifies vehicle types, when these vehicle types apply, and what the requirements are for each vehicle type. Additional detail on these provisions is provided in Appendix A. This chapter then explores how the current code specifies vehicles. It also explores some of the issues that arise from the mixed handling of tank and vehicle requirements.

Vehicles in the future code (chapter 4)

Chapter 4 explores some of the options for the future code, including the way vehicles are specified, when these requirements apply, and how the way the ADR vehicle requirements are composed could be improved.

The chapter discusses general requirements for dangerous goods vehicles, along with how special vehicle requirements can be specified in the future code. It also examines a model for specifying vehicle requirements in a clearer way than currently found in the ADR.

The chapter explores some particular issues relating to vehicle construction and use in Australia, including requirements for vehicles used to transport dangerous goods in packages, bulk containers and temperature-controlled transport, which are mostly absent from the current code. It also examines issues relating to how maintenance is specified, and some issues that are currently outside the scope of the current code but are captured by the ADR.

Finally, the chapter presents 3 general options for how the future code might specify the requirements for vehicles.

Draft future code provisions (chapter 5)

This chapter uses a variety of sources, in particular AS 2809.1 to examine what the potential future code requirements might include. It presents them using option 2 from Chapter 4, however the final way that they are included will depend on responses to this paper.

Scope of this paper

This paper deals with the design and construction requirements for vehicles used for dangerous goods transport. It examines how the future code can adopt some of the principles used in ADR to better specify these requirements.

Unlike in the current code, the ADR differentiates between the means of containment used to transport dangerous goods (such as a tank), and the vehicles that transport them. However, in recognition that the combination of a vehicle and the means of containment is critical, the ADR imposes requirements that apply both to the construction of the vehicle, and to the completed vehicle that is ready for transport.

It is expected that a similar model will be adopted in Australia, however with appropriate modifications for the Australian transport context.

While the ADR includes vehicles for explosives transport in the relevant chapters, and the future code will do the same, this paper does not deal with the specific requirements for explosives vehicles in Australia. This is a matter to be handled by or in conjunction with the explosives working group. Nonetheless, the provisions in this paper have been developed in a way to allow these provisions to be inserted into the future code with ease.

3 Assignment of vehicle types

Key points

- The ADR assigns general vehicle requirements, and then assigns special vehicle types to certain scenarios, such as tank transport.
- The current code co-mingles the requirements for tanks and vehicles, which leaves gaps for some transport scenarios.

The ADR applies vehicle requirements depending on the type of dangerous goods being transported, and the containers they are carried in. A general set of requirements apply to all dangerous goods transport, and then additional requirements apply in certain circumstances.

By comparison, the current code applies a general set of vehicle requirements, and includes additional requirements that apply to tank vehicles only. Furthermore, while the requirements for vehicles are contained in the ADR, the requirements for tank vehicles in Australia are split between the ADG code and AS 2809.

This chapter examines and contrasts the two systems.

3.1 Vehicle requirements in ADR

The requirements for vehicles are set out in detail in Part 9 of the ADR. These requirements are applied depending on the type of goods being transported, and the type of vehicle being used:

- general requirements apply to all vehicles being used for dangerous goods transport
- special vehicle type requirements apply to vehicles used for:
 - dangerous goods transport in tanks,
 - transport of explosives
- there are some additional requirements for certain transport scenarios.

A more detailed examination of the layout and content of Part 9 is found in Appendix A.

3.1.1 Requirements that apply to all vehicles used for dangerous goods

Chapter 7.1 of the ADR contains a general requirement that vehicles used for the transport of dangerous goods must conform to the requirements of Part 9 of the ADR.

This does not apply to vehicles that are using the "small loads" provisions of section 1.1.3.6. The concept of "small loads" aligns with the Australian concept of a "placard load" in the Code. See Working Group Paper #6 - Consignment procedures for dangerous goods transport for a more detailed discussion on "small loads".

3.1.2 FL, AT, EX/II, and EX/III vehicle types

ADR includes specific codes that apply to the type of vehicle that is required to be used when dangerous goods are transported in tanks, portable tanks, MEGCs, tank vehicles, or

tube vehicles. These vehicles have additional construction and safety requirements in recognition of the higher risks from these transport scenarios.

These codes are assigned to dangerous goods in column 14 of the ADR dangerous goods list, and their use is directed in Chapter 7.4.

- FL vehicles are generally assigned to vehicles transporting flammable liquids, gases and certain hydrogen peroxides.
- AT vehicles are generally assigned to materials other than flammable substances, for example toxic, corrosive or oxidising substances.
- EX/II and EX/III vehicles are only assigned for the transport of class 1 explosives. Note that issues relating to vehicles for these purposes are being considered by the explosives working group.

Requirements relating to the type approval, certification, inspection and construction requirements, including the technical specifications, for FL, AT, EX/II and EX/III are provided in Part 9 of ADR. The requirements relating to FL and AT vehicles are broadly similar to those contained in AS 2809.1 that apply to vehicles. The main differences between FL and AT vehicles are that FL vehicles include precautions relating to potential sources of ignition.

EX/II and EX/III vehicles are specified only for the transport of explosives. These vehicles include additional controls to reflect the special hazards that are presented in explosives transport.

3.1.3 Vehicles types other than FL, AT, EX/II, or EX/III

There are some transport scenarios that have additional requirements, but do not have a special vehicle code classification for transport. These vehicle types are:

- Vehicles used to transport packages of dangerous goods.
- Vehicles used to transport dangerous solids in bulk.
- Vehicles used to transport dangerous goods requiring temperature control.

Chapter 9 of the ADR imposes some additional requirements to reflect these for vehicles used in the above scenarios. As already noted, this does not apply to loads carried under the "small loads" provisions in section 1.1.3.6 of ADR.

3.2 Vehicle requirements in the current code

The current code does not apply specific requirements to vehicles other than those that are used as tank vehicles.

Section 4.4.1 of the code includes general information on vehicles that are used to transport dangerous goods, including general requirements that they are suitable for the transport of dangerous goods, free of defects that are likely to create risks, and are clean. However, very limited information on what this means, or how it should be interpreted is provided in the code.

There are more specific requirements that apply to tank vehicles in section 4.4.2. Even here, the current code requires conformance to AS 2809, and some general provisions relating to compatibility and securing closures, with limited additional information.

As noted in the supplementary paper on tanks and vehicles, the requirements for vehicles are co-mingled with those for tanks in AS 2809.

3.2.1 Problems with the current code

The current code creates some challenges for regulators and industry. The current code takes a restrictive view of tank vehicles because tank vehicles are expected to comply with AS 2809. This means that some niche applications where an AS 2809 compliant tank vehicle is ill-suited are handled poorly. Examples include very small tanks and tank vehicles that include other functions, such as aerial support vehicles.

For tank vehicles, the current code provides no clear dividing line between a tank and the vehicle that transports it. This creates confusion for the assessment of demountable tanks, which are designed to be attached and detached from vehicles (though not while loaded with dangerous goods).

The process of "re-horsing" a tank onto a new vehicle has been captured in an ad hoc fashion. Generally, regulators have understood this to require a new tank design approval, however identifying when this has occurred and taking appropriate action in response has not always been successful. It also creates problems associated with re-assessing a tank that has already been approved for transport.

Unlike in the ADR, there are no prescriptive *vehicle* requirements that apply to tank transport, other than for tank vehicles. With the current definition of tank vehicle excludes portable tanks, this means that no requirements specific to the transport of dangerous goods are applied to portable tanks, other than those relating to stowage and load restraint in Part 8 of the current code. This is not necessarily reflective of the risks presented by the dangerous goods and transport scenario.

3.2.2 Vehicles for explosives transport

The current code does not provide requirements for explosives. However, the Australian Explosives Code and related explosives legislation mandate certain vehicle requirements that must be met during explosives transport. As with the ADR, these are intended to ensure the safe transport of explosives.

Due to the specialised nature of these provisions, the specific requirements are beyond the scope of this working group paper. However, in keeping with the recommendations endorsed by transport ministers, these requirements will be developed and incorporated into the future code. The specific provisions will be developed by or in conjunction with the explosives working group.

4 Vehicles in the future code

Key points

- The future code will include a general set of requirements for all vehicles, and will specify vehicles for certain transport scenarios, in a similar manner to the ADR.
- Vehicles used in Australia don't need to operate internationally, so some additional flexibility is available in incorporating the ADR requirements.
- There are some issues that are not addressed in the current code, including temperature control and vehicles used for portable tank transport.
- Options are provided for the level of detail to be included in the future code.

4.1 General requirements for all dangerous goods vehicles

The current Code includes general requirements that apply to all tank vehicles, including that:

- the vehicle is suitable for the transport of the goods.
- is free from defects that are likely to create a risk in transporting the goods.
- that the vehicle is clean.

It is expected that similar requirements will be included in the future code in some form. The NSW EPA has provided guidance material on interpreting these requirements for tank vehicles in the *Dangerous Goods Tank Vehicle Inspection Manual*.

These requirements are specified in Part 7 of the ADR, in particular in sub-sections 7.5.1.1 and 7.5.1.2. Additionally, the chapter on safety obligations of the participants (Chapter 1.4) impose requirements to ensure that vehicles are suitable for transport.

Note: as part of the ADG Code review, it is intended to replicate Chapter 1.4 of the ADR in the future code.

4.2 Specifying vehicle selection in the future Code

Following the ADR model, it's anticipated that the future code will include a separated system of requirements for tanks (or bulk containers), and the vehicles that transport them. The responses to Working Group Paper #3 indicated support for this, though there were some concerns expressed that the vehicle must be assessed once the tank and vehicle have been mated together.

To reflect these concerns, the model indicated in this paper is similar to the ADR, though it is intended to be written in a more accessible manner. This would result in:

- Provisions for tanks, bulk containers and other packagings.
- Provisions for the construction of the vehicle that will be used to transport these types of containers.
 - This would primarily be of interest to people building vehicles intended for dangerous goods service, especially those used for tank vehicles.
- Provisions that the vehicle must meet once it has been "completed".

- These provisions would need to be met before the dangerous goods can be transported.
- As in the ADR, some oversight is needed to ensure this process is properly undertaken should be included. This will be developed along with the approval mechanisms for tanks and vehicles.

This would also mean that transporters of dangerous goods would need to ensure that the containment for the dangerous goods, the vehicle for the dangerous goods, and the combination of the two must all meet the requirements of the Code, while providing some flexibility to transporters in how these are combined.

The skills and competencies for assessing compliance with these requirements may vary. This would allow regulators (with industry) to work together to determine and define who can undertake these tasks.

4.2.1 Adoption of FL and AT vehicles

In addition to requirements for vehicles generally, this paper proposes that the future Code incorporates FL and AT vehicle types. This will provide certainty for the transporters of dangerous goods in tanks and will reflect the hazards that these transport operations present.

As in the ADR, the specification of FL and AT vehicles would mean that a specific set of design and construction requirements would be applied to vehicles used for tank transport in Australia, corresponding to those included in AS 2809.1. As already noted, there are currently no construction requirements for tank transport other than for tank vehicles in Australia. So, while this is unlikely to have a significant impact on tank vehicles, which are already required to comply with AS 2809, it will mean that vehicles used for other tank transport scenarios will need to comply with certain construction requirements. It would be expected that a transition period would apply to these requirements.

Note that in accordance with the UN model regulations, the ADR considers IBCs to be packagings. So, vehicles used for the transport of IBCs are not subject to these requirements.

Generally, FL vehicles are required for the transport of flammable substances (and concentrated hydrogen peroxide) in tanks; and AT vehicles are required for the transport of other dangerous goods in tanks.

A more detailed description of when FL and AT vehicles are required is provided in Appendix A.

Question 1:	Is there a reason why the future code should not adopt the system of specifying FL and AT vehicles, and associated requirements?
Question 2:	Is there a reason why the future code should not extend this requirement to vehicles that are used for tank transport (that are not tank vehicles)?
Question 3:	If the future code does include requirements for vehicles used for tank transport (other than tank vehicles), what is a reasonable time frame for the transition period.

4.3 Australian vehicle construction requirements

Unlike in ADR countries, dangerous goods vehicles operated in Australia don't travel internationally. This provides some flexibility to define provisions for vehicles for Australia, unlike the case for packagings and similar issues where cross-border harmonisation is much more critical.

As with the ADR, separating out tank and vehicle requirements will make it possible to more clearly define requirements that are vehicle-specific versus those that have a product containment function. By following a similar pattern, when changes are made to vehicle requirements in the ADR, they can be readily examined for incorporation into the Code. This will support code updates to be more responsive to developments in vehicle design.

The current Australian Explosives Code (AEC) contains extensive requirements relating to vehicles. Ministers have agreed that requirements relating to explosives be incorporated into the code and the AEC be made obsolete. As a result, vehicle requirements of the future code will also have an impact on the transport of explosives. The outline of the draft provisions in this paper has been prepared in a way that can accommodate the needs of the Explosives Working Group, either through a separate chapter or chapters in Part 9, or by directly inserting them into the provisions as needed.

As a general matter, it is expected that requirements that are within the scope of the Australian Design Rules for vehicles will be omitted from the code, except for items where it is determined that the code should extend their application beyond the requirements of the Australian Design Rules.

An analysis of the six parts of AS 2809 suggests that only part 1 contains significant vehiclerelated provisions.

Question 4: Are there requirements in parts 2 – 5 of AS 2809 that you consider should be included in the vehicle requirements of the future Code? If yes, please provide details.

Completed vehicle requirements

In addition to the vehicle construction requirements, chapter 9.7 of the ADR specifically contains requirements for completed vehicles (i.e. once the tank and vehicle have been mated together). This chapter includes a particular requirement that once a demountable tank is mated to a vehicle, it must comply with the requirements of a tank vehicle.

Section 5.1 provides a breakdown of how the different sections of AS 2809.1:2023 could be considered to apply to:

- Both the tank and vehicle together, or the vehicle alone.
- Both FL and AT vehicles, or to FL vehicles alone.

Section 5.2 below provides draft text of how a future Part 9 of the code could be constructed to develop vehicle requirements. This draft is tentative but is intended to show how the AS 2809 requirements, those in the current code, and those in the ADR could be combined together to provide a detailed set of vehicle requirements in the future code.

Section 5.2 includes a detailed listing of sections from AS 2809.1:2023 that would apply, based on the breakdown in Section 5.1. This would need to be updated with each update to the Australian Standard to ensure it remains current, but significant updates generally only

occur every 5 - 10 years. An alternative to this would be to specifically incorporate the relevant requirements from AS 2809.1 into the ADG Code.

4.4 Pseudo tank vehicles constructed using a portable tank

The way that these provisions are constructed will resolve an ongoing issue in the current code. When a portable tank or tank-container is used in combination with pipework and pumping equipment, it functions more like a tank vehicle than a vehicle transporting packages of dangerous goods. This is especially the case when operated on an ongoing basis, with the tank filled and emptied while on the vehicle. These have been described as "pseudo tank vehicles" as they don't necessarily meet the current definition of tank vehicle but are used as such. AS 2809.1 recognises this as an issue for portable tanks and deems such a vehicle to be a tank vehicle.

However, the specific exclusion of portable tanks from the definition of tank vehicle under the current code makes the situation unclear. An advantage of treating tanks and vehicles separately, but with detailed requirements for the completed vehicle (as in Chapter 9.7 of the ADR) is that any vehicle with a tank fitted must meet the relevant requirements. It may also be appropriate to allow the use of IBCs as tanks on such vehicles, provided they comply with the same requirements.

There are likely to be some impacts from this approach. For example, this would mean that any vehicle that transports a portable tank that is filled or emptied on the vehicle would need to meet the requirements for use as a tank vehicle, such as brake interlock driveaway protection. AS 2809.1 recognises this issue, by providing an exemption from the scope for "single filling or discharge of a portable tank in intermodal service." It may be appropriate to limit this exemption to certain items only, for example brake interlock driveaway protection.

- **Question 5:** Should the future code capture these "pseudo tank vehicles" using portable tanks, tank-containers, or similar? Please explain your reasoning.
- **Question 6:** Should these provisions be extended to IBCs that are filled or emptied on a vehicle? Please explain your reasoning.
- **Question 7:** Should an exemption be provided for single filling or emptying of a tank when in intermodal service (as in AS 2809)? Please explain your reasoning.
- **Question 8:** If an exemption for single filling or emptying of a tank is appropriate, should it be limited to certain items that are impracticable to comply with? If yes, please advise what items should be exempted, and reasons why.

4.5 Vehicles for packages, bulk containers and temperaturecontrolled substances

The current code does not provide detailed requirements for vehicles used to transport dangerous goods in packages, bulk containers or requiring temperature control. The requirements for these in the ADR are not particularly extensive but reflect some of the risks associated with the vehicles used to transport these substances. Incorporating these requirements into the future code ensures that these situations are captured properly.

Section 5.2 below contains draft text that would incorporate these provisions into the future code.

Question 9:	Is there a reason not to incorporate the requirements relating to vehicles for packages, bulk containers and temperature-controlled substances into the future code? Please provide your reasoning.
Question 10:	Are there requirements other than those in chapter 9.4 of the ADR that should be incorporated into the code for the transport of dangerous goods in packages? Please provide details.
Question 11:	Are there requirements other than those in chapter 9.5 of the ADR that should be incorporated into the code for the transport of dangerous solids in bulk? Please provide details.
Question 12:	Are there requirements other than those in chapter 9.6 of the ADR that should be incorporated into the code for the transport of dangerous goods requiring temperature control? Please provide details.

4.6 Vehicle maintenance requirements

At present the code only defines specific maintenance requirements, other than general suitability requirements, by reference to AS 2809. This applies to both tanks and vehicles. This effectively "locks away" critical compliance requirements behind a paywall.

Until the 2020 edition of AS 2809.1, limited information was provided in AS 2809.1 on the items to be inspected. The NSW EPA produced a tank vehicle inspection manual providing more detail that was used to support this, and similar information is now included in AS 2809.1.

Section 5.2 below contains draft text that would require compliance with the inspection and maintenance requirements for vehicles in AS 2809.1 for FL and AT vehicles. An additional option would be to include the inspection and maintenance requirements into the code in more detail.

Question 13: Should the future code include detailed inspection and maintenance requirements (similar to AS 2809.1) or refer to the requirements in AS 2809.1? Please explain your reasoning.

Question 14: Should the future code contain inspection and maintenance requirements for vehicles other than FL and AT vehicles? Please provide details on these requirements.

4.7 Other issues included in vehicle requirements

The ADR includes a number of requirements that are currently outside the remit of the code. These requirements are discussed below. Note: the requirement to include these systems don't generally require retrofitting, so vehicles constructed prior to certain dates (provided in the ADR) are not required to comply with certain provisions.

4.7.1 Braking equipment

The ADR mandates that specific braking equipment is fitted to certain dangerous goods vehicles, including anti-lock brakes on all FL and AT vehicles. In Australia, dangerous goods tank vehicles are now required to be constructed and used with an operating roll stability function, and one state (NSW) has mandated that these systems are retrofitted onto all tank trailers over 4.5 tonnes GVM. This means that the Australian requirements are generally more advanced than European requirements. It is expected that these roll stability requirements will be carried forward into the future code.

The ADR also mandates that endurance braking systems are fitted to vehicles over 16 tonnes. Australia does not mandate the use of endurance braking systems.

Question 15: Should the future code include a requirement that vehicles be fitted with an endurance braking system? Please explain your reasoning, and when you think this should apply?

4.7.2 Speed limitation devices

The ADR requires that speed limitation devices are fitted to all vehicles over 3.5 tonnes used for dangerous goods transport. These must be set so the speed cannot exceed a maximum of 90 km/h. Australia imposes differential speed limits on heavy vehicles (as compared to light vehicles), and certain heavy vehicles require speed limitation devices to be fitted and operating.

Question 16: Should the future Code include a requirement that dangerous goods vehicles be fitted with a speed limiting device? Please explain your reasoning, and when you think this should apply?

Question 17: Please explain your reasoning, and when you think this should apply?

4.8 Options for incorporating requirements into the future code

Three options have been developed for incorporating the requirements from the ADR, the current code and AS 2809 into the future code. These are broad categories, rather than specific proposals. Responses to this paper will be used to develop more detailed provisions for consultation.

Option 1: General reference requiring compliance with AS 2809

This option would be similar to the current code, where a set of general requirements are applied to vehicles. However, some provisions of AS 2809 may also be applied to vehicles other than tank vehicles, in recognition of the merits of those provisions in AS 2809. For example, the requirements for a roll over device and battery isolation switch could be taken to apply to all vehicles transporting dangerous goods in tanks.

This option is likely to provide the least certainty to manufacturers, constructors, and users of vehicles captured by these requirements. This lack of certainty would also apply to regulators. This option also leaves the question of determining requirements up to the standards technical committee, rather than being part of the code maintenance process. Further, the requirements will remain in a document that must be purchased.

While this option is the simplest to implement initially, it will bring the least benefit on an ongoing basis.

Option 2: Detailed listing of requirements in AS 2809 that apply

This option would result in the code detailing which sections of AS 2809 apply to a given type of vehicle.

This option would also be relatively simple to implement but would provide greater certainty for the users of the code to understand which requirements apply to a vehicle. It would mean that the determination of what parts of AS 2809 apply to a particular vehicle is part of the code maintenance process, but the actual requirement text would be left to the standards technical committee. This would not mean the requirements are freely available, rather they will remain in the standard, which must be purchased by users.

This option will be more complex to develop but will provide greater control to the maintenance process. However, it will not require the maintainers of the code to develop new requirements as they become necessary.

Option 3: Direct incorporation of requirements into the future code

This option would see the detailed requirements incorporated into the text of the future code, (similar to the way the ADR is presented). In this case, the requirements would need to be developed to allow them to be incorporated by reviewing the potential source documents.

This option is the most complex to develop but provides the greatest transparency of requirements to users. However, it will likely be slightly more demanding to maintain. But, as in option 2, it will ensure that the determination of what requirements apply to particular vehicles and transport scenarios are part of the ongoing code maintenance process, rather than being left to Standards Australia.

- **Question 18:** Which of the above 3 options do you consider most appropriate for the future code (or an alternative)? Please explain your reasoning.
- **Question 19:** Are there any vehicle requirements that are found elsewhere (in the code or in other rules or instruments) that you consider must be incorporated into the vehicle requirements of the future code? Please provide details.

5 Draft future Code provisions

Key points

- ADR and AS 2809.1 are the main sources for requirements for the future code.
- Draft provisions are provided to permit a more detailed discussion of the future code requirements.

This section uses the requirements in the ADR, AS 2809.1 and the current code to develop a model set of provisions for Chapter 9 of the future code. When reading this, please note that the assignment of information, drafting and numbering is provisional. How they are incorporated into the future code will depend on other work on the future code, and responses to this paper. This incorporation will include using harmonised language with the future code, and with references corrected as appropriate.

5.1 Assignment of items from AS 2809.1

This section contains a possible analysis of how the requirements in AS 2809.1:2023 may be divided up between application to the vehicle, or the tank and cargo carrying components. It also includes an analysis of whether the requirements would likely apply to both FL and AT vehicles, or FL vehicles alone.

Note that this is a draft, and comment is sought on whether this information is appropriately assigned.

Section	Section Title	Vehicle only, or tank and vehicle?	Applies to FL or AT?
2.1.1	General	Tank and vehicle	FL and AT
2.1.2	Stability	Tank and vehicle	FL and AT
2.1.3	Vehicle stability function	Vehicle	FL and AT
2.1.4	Road clearance	Tank and vehicle	FL and AT
2.1.5	Cabin-to-tank clearance	Tank and vehicle	FL and AT
2.1.6	Rear impact protection	Vehicle	FL and AT
2.1.6.2	Rear underrun protection device (RUPD)	Vehicle	FL and AT
2.1.6.3	Bumper system	Vehicle	FL and AT
2.1.7	Guarding	Tank and vehicle	FL and AT
2.1.8	Tail shafts	Vehicle	FL and AT

Section	Section Title	Vehicle only, or tank and vehicle?	Applies to FL or AT?
2.1.9	Vehicle main driver cabin	Vehicle	FL and AT
2.1.10	Battery	Vehicle	FL and AT
2.1.11	Battery isolation switch	Vehicle	FL and AT
2.1.12	Permanently energized circuits	Vehicle	FL only
2.1.13	Vehicle roll-over device	Vehicle	FL and AT
2.1.14	Stowage of hoses and other equipment	Vehicle	FL and AT
2.2.1	Protection	Vehicle	FL and AT
2.2.2	Wiring system	Vehicle	FL and AT
2.3	Equipment for hazardous areas	Vehicle	FL only
2.4	Lighting for hazardous areas	Vehicle	FL only
2.5	Brake interlock driveaway protection	Tank and vehicle	FL and AT
2.6	Spillage hazards	Tank and vehicle	FL and AT
2.7	Stability of disconnected trailers	Vehicle	FL and AT
2.9	Pump pressure and controls	Tank and vehicle	FL only
2.10.1	Propulsion engines	Vehicle	FL and AT
2.10.2	Auxiliary engines	Vehicle	FL and AT
2.11.3	Tank ladder, steps and fall arrest	Vehicle	FL and AT
2.11.4	Mudguards	Vehicle	FL and AT
2.11.5	Pneumatic emergency stop	Tank and vehicle	FL and AT
2.12.1	Markings – Remote valve operation	Tank and vehicle	FL and AT
2.12.2	Markings – Identification plate	Tank and vehicle	FL and AT
2.12.3	Markings – Heating jackets/ducts	Tank and vehicle	FL and AT
2.13	Heating jackets/ducts	Tank and vehicle	FL and AT

Note: this analysis has been used to develop the potential provisions in Section 5.2. In particular:

- "Vehicle" requirements are used in the section on vehicle construction ("Chapter 9.2").
- "Tank and vehicle" requirements are used in the section on requirements for completed vehicles ("Chapter 9.3").
- "FL only", and "FL and AT" is used to variously assign the requirements in Chapter 9.2 and Chapter 9.3 to the relevant vehicles.

As already noted, these are draft assignments, and will be corrected if errors are identified in response to Section 5.1.

Question 20: Are there any assignments ("tank", "tank and vehicle", "FL only" or "FL and AT") in Appendix A that you consider to be incorrect? If yes, please advise how you would correctly assign items you consider incorrect.

5.2 Possible vehicle provisions for the future Code

5.2.1 How this section has been developed

This section contains a potential method for specifying vehicle requirements in the future code. It is based on a combination of the requirements in the current code, the ADR and AS 2809 (using the analysis in 5.2 above). The actual layout of the content may vary from how it is presented here, for example there would need to be consideration of whether to simply refer to AS 2809, or to incorporate text that includes the relevant information (as either general or specific requirements).

It is divided into the following chapters:

- Chapter 9.1 Scope, definitions and vehicle approvals
 - This chapter would provide the introduction to this part of the Code.
 - This chapter will undergo development based on responses to this paper, and the paper on tank and vehicle approvals.
- Chapter 9.2 requirements for construction of FL and AT vehicles used for the transport of tanks
 - This chapter would outline the construction requirements for vehicles that are used as part of an FL or AT vehicle.
- Chapter 9.3 requirements for completed vehicles
 - This chapter outlines the requirements that apply to a completed vehicle (i.e., one that is ready to be used for the transport of dangerous goods).
 - For tank vehicles, this is when the tank has been mated to the vehicle.
 - It also includes the inspection and maintenance requirements for a completed vehicle for dangerous goods transport, including tank vehicles.

These chapters have been structured in a way that vehicles for explosives could be developed as a standalone chapter (or chapters) or distributed through these chapters.

Note: Where the chapter or section numbers have been placed in [square brackets], the reference is to the ADR. These references will be updated as part of the development of the final version.

5.2.2 Draft provisions for comment

Chapter 9.1 – Scope, definitions and vehicle approvals

Note: The scope, definitions and approval requirements will be developed based on responses to this paper and the paper on approvals of tanks and vehicles. They are excluded from this paper.

Chapter 9.2 – requirements for construction of FL and AT vehicles used for the transport of tanks

9.2.1 FL and AT vehicles used for the transport of tanks shall comply with:

The following sections in AS 2809.1:

2.1.3	_	Vehicle stability function
2.1.6	_	Rear impact protection
2.1.6.2	_	Rear underrun protection device (RUPD)
2.1.6.3	_	Bumper system
2.1.8	_	Tail shafts
2.1.9	_	Vehicle main driver cabin
2.1.10	_	Battery
2.1.11	_	Battery isolation switch
2.1.13	_	Vehicle roll-over device
2.1.14	_	Stowage of hoses and other equipment
2.2.1	_	Protection
2.2.2	_	Wiring system
2.7	_	Stability of disconnected trailers
2.10.1	_	Propulsion engines
2.10.2	_	Auxiliary engines
2.11.3	_	Tank ladder, steps and fall arrest
2.11.4	_	Mudguards
		for the transport of tanks shall additionally somely

- 9.2.2 FL vehicles used for the transport of tanks shall additionally comply with the following sections in AS 2809.1:
 - 2.1.12 Permanently energized circuits
 - 2.3 Equipment for hazardous areas
 - 2.4 Lighting for hazardous areas

Chapter 9.3 – requirements for completed vehicles

9.3.1 Completed vehicle requirements for tank transport

- 9.3.1.1 Completed FL and AT vehicles shall comply with the following sections in AS 2809.1:
 - 2.1.12 Permanently energized circuits
 - 2.3 Equipment for hazardous areas

- 2.4 Lighting for hazardous areas
- 2.12.1 Markings Remote valve operation
- 2.12.3 Markings Heating jackets/ducts
- 2.13 Heating jackets/ducts
- 9.3.1.2 Completed FL vehicles shall comply with the following sections in AS 2809.1:
 2.9 Pump pressure and controls

9.3.2 Completed vehicles for the transport of dangerous goods in packages

- 9.3.2.1 Combustion heaters shall meet the following requirements:
 - (a) The switch may be installed outside the driver's cab;
 - (b) The device may be switched off from outside the load compartment; and
 - (c) It is not necessary to prove that the heat exchanger is resistant to the reduced afterrunning cycle.
- 9.3.2.2 If the vehicle is intended for the carriage of dangerous goods for which a label conforming to models Nos. 1, 1.4, 1.5, 1.6, 3, 4.1, 4.3, 5.1 or 5.2 is prescribed, no fuel tanks, power sources, combustion air or heating air intakes as well as exhaust tube outlets required for the operation of the combustion heater shall be installed in the load compartment. It shall be ensured that the heating air outlet cannot be blocked by cargo. The temperature to which packages are heated shall not exceed 50° C. Heating devices installed inside the load compartments shall be designed so as to prevent the ignition of an explosive atmosphere under operating conditions.
- 9.3.2.3 Additional requirements concerning the construction of the bodies of vehicles intended for the carriage of given dangerous goods or specific packagings may be included in [Chapter 7.2] in accordance with the indications in Column (16) of [Table A, Chapter 3.2], for a given substance.

9.3.3 Completed vehicles for the transport of dangerous solids in bulk containers

- 9.3.3.1 Combustion heaters shall meet the following requirements:
 - (a) The switch may be installed outside the driver's cab;
 - (b) The device may be switched off from outside the load compartment; and
 - (c) It is not necessary to prove that the heat exchanger is resistant to the reduced afterrunning cycle.
- 9.3.3.2 If the vehicle is intended for the carriage of dangerous goods for which a label conforming to models Nos. 4.1, 4.3 or 5.1 is prescribed, no fuel tanks, power sources, combustion air or heating air intakes as well as exhaust tube outlets required for the operation of the combustion heater shall be installed in the load compartment. It shall be ensured that the heating air outlet cannot be blocked by cargo. The temperature to which packages are heated shall not exceed 50° C. Heating devices installed inside the load compartments shall be designed so as to prevent the ignition of an explosive atmosphere under operating conditions.

9.3.3.3 Additional requirements concerning the construction of the bodies of vehicles intended for the carriage of given dangerous goods or specific packagings may be included in [Chapter 7.2] in accordance with the indications in Column (16) of [Table A, Chapter 3.2], for a given substance.

9.3.4 Completed vehicles for the transport of dangerous goods requiring temperature control

- 9.3.4.1 Insulated, refrigerated and mechanically-refrigerated vehicles intended for the carriage of temperature-controlled substances shall conform to the following conditions:
 - (a) the vehicle shall be such and so equipped as regards its insulation and means of refrigeration, that the control temperature prescribed in [2.2.41.1.17 and 2.2.52.1.15]¹ and in [2.2.41.4 and 2.2.52.4]¹ for the substance to be carried is not exceeded. The overall heat transfer coefficient shall be not more than 0.4 W/m²K;
 - (b) the vehicle shall be so equipped that vapours from the substances or the coolant carried cannot penetrate into the driver's cab;
 - (c) a suitable device shall be provided enabling the temperature prevailing in the loading space to be determined at any time from the cab;
 - (d) the loading space shall be provided with vents or ventilating valves if there is any risk of a dangerous excess pressure arising therein. Care shall be taken where necessary to ensure that refrigeration is not impaired by the vents or ventilating valves;
 - (e) the refrigerant shall not be flammable; and
 - (f) the refrigerating appliance of a mechanically refrigerated vehicle shall be capable of operating independently of the engine used to propel the vehicle.
- 9.3.4.2 Suitable methods to prevent the control temperature from being exceeded are listed in [7.1.7.4.5]. Depending on the method used, additional provisions concerning the construction of vehicle bodies may be included in [Chapter 7.2].

9.3.5 Inspection and maintenance of completed vehicles

9.3.5.1 Completed FL and AT vehicles shall be inspected and maintained in accordance with the requirements of AS 2809.1.

Note: Tanks are required to be inspected and maintained in accordance with the requirements of [Chapter 6.8]

- 9.3.5.2 Records of all inspections and maintenance shall be kept by the vehicle owner.
- 9.3.5.3 When a vehicle is sold or transferred, a copy of all maintenance records shall be provided to the new owner along with the vehicle.

¹ These sections in ADR define substances requiring temperature control in Part 2 (classification), and their control temperatures. These references will be corrected during the preparation of consolidated drafts.

Question 21: Are there items missing in these provisions that you consider essential to be included in the vehicle requirements? Please provide details on what should be added and where?

6 Next steps

Consultation on this issues paper will close on 22 September 2023.

The responses to the questions in this paper will be used to develop detailed provisions for the future code.

Appendix A Part 9 in ADR

The ADR breaks up part 9 into 8 chapters. It is unclear why the authors of the ADR have structured it in this manner. A brief overview of each of the chapters is provided below. As noted, these apply to all vehicles transporting dangerous goods, except for small loads. This analysis does not consider vehicles that will be used for the transport of class 1 (explosives) however they are noted below for completeness.

ADR differentiates between vehicle construction requirements and the requirements for complete (or completed) vehicles.

- Provisions for the construction of the vehicle provide information relating to how the vehicle itself is constructed. These provisions are likely to be of most interest to a person who is building or specifying a vehicle that will be used to transport dangerous goods.
- Provisions that the vehicle must meet once it has been "completed", that is the product containment or body have been mounted onto the vehicle.

Chapter 9.1

Scope, definitions and requirements for the approval of vehicles

This chapter provides definitions for the types of vehicles, and how the approval processes operates where it is required. This includes both type approvals and individual vehicle approvals. This chapter also outlines the requirement for initial and periodic inspection of vehicles.

Importantly, this chapter defines when an FL or AT vehicle is required.

FL vehicles are required for the transport of:

- Flammable liquids (note that in ADR this includes diesel) in fixed or demountable tanks with a capacity of more than 1000 L; and in tank-containers, or portable tanks with a capacity of more than 3000 L.
- Flammable gases in fixed or demountable tanks with a capacity of more than 1000 L; and in tank-containers, portable tanks, or MEGCs with a capacity of more than 3000 L.
- Tube-vehicles for flammable gases with a capacity of more than 1000 L
- Hydrogen peroxide (of UN 2015 only) in fixed or demountable tanks with a capacity of more than 1000 L; and tank-containers, or portable tanks with a capacity of more than 3000 L.

AT vehicles are required for the transport of:

- dangerous goods in fixed tanks or demountable tanks with a capacity exceeding 1000 L or in tank-containers, portable tanks or MEGCs with an individual capacity exceeding 3000 L.
- Tube-vehicles with a total capacity exceeding 1000 L.

Note: The requirements for FL vehicles, EX/III vehicles and MEMUs supersede those of AT vehicles.

Chapter 9.2

Requirements concerning the construction of vehicles

These are the primary requirements applying to how vehicles are constructed. Many of the requirements in this section are also found in AS 2809.1, and so effectively already apply to tank vehicles in Australia.

The requirements in this chapter include a number of sub sections, and the requirements are variously applied to EX/II, EX/III, FL or AT vehicles. For some requirements, they only apply to vehicles first registered after certain dates.

The different sub-sections cover the following topics:

- cabling, protection, fuses and circuit breakers, lighting and other electrical safety items.
- antilock braking systems and endurance braking systems.
- fire risks arising from fuel tanks, engines, exhaust systems, braking systems and combustion heaters.

Note: In the 2023 edition of ADR, additional requirements for electric power trains have been introduced, including a specific ban on their use for EX and FL vehicles.

- speed limitation device that limits vehicle speed to no more than 90 km/h
- coupling devices between towing vehicles and trailers
- risks caused by refrigerated LNG fuels.

In addition to the requirements that apply to EX/II, EX/III, FL or AT vehicles, there are two general requirement that apply to all vehicles constructed for dangerous goods transport. These are:

- braking systems (as required for FL and AT vehicles)
- speed limitation device that limits vehicle speed to no more than 90 km/h (as required for FL and AT vehicles)

Where these requirements apply to vehicles for explosives transport, these provisions will be considered by (or in conjunction with) the Explosives Working Group.

The ADR requirements for braking systems and speed limitation may be considered more likely to be within the scope of the Australian Design Rules or road transport legislation:

- Braking systems
 - Anti-lock braking systems are required for vehicles over 16 tonnes, and trailers exceeding 10 tonnes
 - Endurance braking systems are required for vehicles over 16 tonnes, or authorised to tow a trailer over 10 tonnes
- Mandatory speed limitation
 - Vehicles for the transport of dangerous goods must be fitted with a speed limitation device, that limits the vehicle to no more than 90 km/h.

Chapter 9.3

Additional requirements concerning complete or completed EX/II or EX/III vehicles intended for the carriage of explosive substances and articles (Class 1) in packages

Requirements in this chapter only apply to vehicles within the scope of the explosives working group. These provisions will be considered by (or in conjunction with) the Explosives Working Group.

Chapter 9.4

Additional requirements concerning the construction of the bodies of complete or completed vehicles intended for the carriage of dangerous goods in packages (other than EX/II and EX/III vehicles)

This chapter provides provisions for:

- combustion heaters
- risks arising from installation of items of equipment within the load compartment.

Chapter 9.5

Additional requirements concerning the construction of the bodies of complete or completed vehicles intended for the carriage of dangerous solids in bulk

This chapter closely replicates the requirements in chapter 9.4, providing provisions for:

- combustion heaters
- risks arising from installation of items of equipment within the load compartment.

Chapter 9.6

Additional requirements concerning complete or completed vehicles intended for the carriage of temperature-controlled substances

This chapter applies requirements to the refrigeration systems that may be fitted to a vehicle for the carriage of substances that must be temperature controlled.

Chapter 9.7

Additional requirements concerning fixed tanks (tank-vehicles), battery-vehicles and complete or completed vehicles used for the carriage of dangerous goods in demountable tanks with a capacity greater than 1 m³ or in tank-containers, portable tanks or MEGCs of a capacity greater than 3 m³ (EX/III, FL and AT vehicles)

This chapter provides construction requirements concerning fixed, demountable tanks, tankcontainers, portable tanks or MEGCs. As these requirements apply to complete and completed vehicles, this means that they apply once the tank has been fixed to the vehicle. Chapter 9.1 of ADR requires that these vehicles are subjected to an initial inspection prior to use.

As for chapter 9.2, many (though not all) of these issues are addressed in AS 2809.1, and therefore already apply. Further, two new issues have been addressed in the 2023 edition, automatic fire suppression systems and protection from wheel fires.

The different sub-sections variously cover the following topics:

- the various parts of Part 6 that must be met by the tanks used on the vehicle
- fastening of tanks to the vehicle
- electrical bonding for FL vehicles
- vehicle stability
- rear protection of the vehicle
- combustion heaters
- electrical equipment for FL vehicles
- automatic fire protection for FL and EX/III vehicles
 - Note: this is a new requirement introduced in the 2023 edition of ADR
- thermal protection (from wheel fires) for vehicles carrying flammable gases, PG I or PG II flammable liquids and EX/III vehicles.
 - Note: this is a new requirement introduced in the 2023 edition of ADR

As for other matters, where these requirements apply to vehicles for explosives transport, these provisions will be considered by (or in conjunction with) the Explosives Working Group.

Chapter 9.8

Additional requirements concerning complete and Completed MEMUs

Requirements in this chapter apply to vehicles within the scope of the explosives working group.

Glossary

See the supplementary paper on tank and vehicle terminology for detailed discussion of terms relating to tanks, bulk containers and vehicles.

Term	Definition
the Code	Refers to the Australian Code for the Transport of Dangerous Goods by Road & Rail – np specific edition
current code	Refers to edition of 7.8 of the code
future code	Refers to the revised code
ADR	Agreement concerning the International Carriage of Dangerous goods by Road
RID	Agreement concerning International Carriage of Dangerous Goods by Rail
UN MR	United Nations Model Regulations on the Transport of Dangerous Goods

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