Australian Dangerous Goods Code Comprehensive Review

Working group paper #9

National Transport Commission Leading change



Part 4 - Packing and tank provisions

November 2023



Report outline

Title	Australian Dangerous Goods Code Comprehensive Review - Part 4 – Packing and tank provisions
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 ninth in a series of topic specific discussion papers. It discusses the packing provisions in Part 4 of the draft code and compares them to the current code. This paper should be read in conjunction with the draft of Part 4 of the code.
Submission details	The NTC will accept submissions until Thursday 25 January 2024 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, Part 4 – Packing and tank provisions, discussion paper #9.
	If you have adapted, modified or transformed this work in anyway, please use the following, Source: based on National Transport Commission, Part 4 – Packing and tank provisions, discussion paper #9.
Key words	Dangerous goods, ADG Code review, ADR, dangerous goods packaging, Class 2, MECG, MEMU, MPU, vacuum waste tanks
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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 25 January 2024

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.

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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 ninth of a series of topic specific discussion papers. This paper should be read in conjunction with Part 4 – 'Packing and tank provisions' of the draft code.

The purpose of this discussion paper is to examine the structure and benefits of the restructured Part 4 – Packing and tank provisions of the draft code. It examines the key differences between the packing provisions in the current code and those in the draft code.

This paper is accompanied by a draft of Part 4 – Packing and tank provisions.

This paper relates to:

the Code – Part No.	Working group	Discrete issue	
Part 4 – Packing and tank provisions			

Executive summary

Part 4 of the code contains the procedures for the use of packagings, including IBCs and large packagings, tanks, multiple-element gas containers (MEGCs), mobile explosive manufacturing units (MEMUs) and vacuum operated waste tanks.

This paper explains the differences between part 4 of the current code and the redrafted part 4. This paper should be read in conjunction with the draft part 4 of the future code.

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 the consignment procedures contained in Part 5 of the code.

Issues (or) themes

Chapter 2 – context

Australia's modified adoption of the UN MR has resulted in significant gaps in the current code in relation to packing and tank instructions for the carriage of dangerous goods. To address this, part 4 of the future code has been drafted using the ADR as the base document, due to its comprehensiveness and cohesive drafting.

Chapter 3 – Use of packagings, including IBCs and large packagings

Chapter 3 discusses a number of clarifications that support the interpretation of requirements for the use of packagings, including IBCs and large packagings. It identifies the existing administrative burden on competent authorities relating to transport of discarded, empty and uncleaned packagings.

This chapter discusses the need for additional guidance for determining the degree of filling, the use of salvage packagings and verification of chemical compatibility with plastic packagings to ensure there is consistency in the methodologies and assessing compliance.

Chapter 4 – Packing instructions

Requirements in the UN MR have been developed to be suitable for multimodal transport of dangerous goods. It is expected that competent authorities may add additional detail relevant to their specific mode of transport. While the ADR and RID have been developed specific to land transport, there are some requirements that may not be relevant for the Australian context.

Chapter 5 – Packing provisions for Class 2 and goods of other classes assigned to packing instruction P200

Chapter 5 discusses the expansion of packing instruction P200 to incorporate open cryogenic receptacles. It also proposes the consolidation of the International and Australian Standards in one area of the future code to streamline duty holder accessibility.

Chapter 6 – Use of portable tanks and UN Multiple-element gas containers (MEGCs)

The comprehensive review aims to address the gaps in the current code to ensure that all means of containment are recognised. Chapter 6 identifies that MEGCs that are non-UN or non-multimodal are not currently recognised, highlighting a significant gap in Australia's oversight of these containers. This chapter also analyses minor discrepancies in the requirements for portable tanks between the current Code and the UN MR.

Chapter 7 – Use of vacuum operated waste tanks

The competent authorities identified a lack of regulatory oversight on vacuum operated waste tanks several years ago. Consequently, a determination was issued to address this gap in 2014. However, this CAP determination is not administered by the Code and is not accessible by the public. Chapter 7 proposes that adequate requirements be incorporated into the future Code to address this gap.

Chapter 8 – Use of Mobile Explosives Manufacturing Units (MEMUs)

Explosives have been historically omitted from the ADG Code due to the existence of the Australian Explosives Code (AEC). This chapter highlights the existing gap in the regulation of mobile explosive processing units, which are currently not regulated by either Code. Consequently, this chapter calls for an adequate regulation of these units supported by appropriate guidance.

Next steps

Consultation on this paper will end at 5:00 pm 25 January 2024.

Submissions received will help inform the final draft of Part 5 of the code.

Opportunities to comment on other provisions in the code will be provided over the coming months. A complete draft code will be released for public comment in 2024.

List of questions

Question 1:	Does the wording of the draft NOTE provide clarity that if a competent authority has issued a UN Packaging Approval, that the approval is recognised for land transport in Australia? If no, please provide alternative wording
Question 2:	Does removing the requirement for competent authority approval for the use of UN 3509 and replacing it with specific requirements add clarity and transparency of requirements? Please include any comments

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Question 17:	Are there any specific Australian Standard that are missing from the table in Appendix B? Please specify
Question 18:	If there are Australian Standards that should be included please specify the specific paragraph(s) in 4.1.6 that the Australian Standard applies to and provide details
Question 19:	Please provide any specific matters you would like the working group to consider
Question 20:	If you would like to be part of the working group, please provide your details and outline your interests
Question 21:	Is the current lack of information and requirements for non-UN MEGCs impacting your operations? Please provide details
Question 22:	Are you aware of any reason these requirements should not be included in the future code?
Question 23:	Should the requirement to provide evidence of the tests required in 4.2.1.13.1 be included in the future code? Please provide your reasoning
Question 24:	If the requirements to provide evidence is not included, how should compliance be verified?
Question 25:	Please provide any particular points you would like considered in the future discussion on this requirement
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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 Part 4 of the code, which contains the provisions relating to packing and tank provisions.

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 2024
- 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
- Vehicles for dangerous goods transport Working group paper #7, August 2023
- Tank and bulk container provisions for dangerous goods transport discussion paper #8, August 2023

2 Context of issue

Key points

- Packing instructions are an integral part of ensuring the safe transport of dangerous goods.
- The packing instructions in the UN MR are designed to be multimodal, enabling smooth cross border and cross mode transport.
- In some instances, the UN MR includes generic requirements with the expectation that specific modes or competent authorities will add more detailed requirements.

Importance of packagings for dangerous goods transport

The packagings used for the transport of dangerous goods, and the way these packagings are used is integral to the safe transport of dangerous goods. The Sub-Committee of Experts on the Transport of Dangerous Goods (UN SC) have developed both general and specific requirements for packagings and their use.

The general requirements include the quality, strength, suitability, use, reuse and handling of packagings. The general requirements are supplemented by a small number of specific instructions for particularly hazardous or specialised dangerous goods.

The UN MR assigns specific packing instructions to each substance, based on the packaging design and the hazards of the specific dangerous goods.

Where no IBC instruction is assigned to a particular dangerous goods, that dangerous goods must not be transported in an IBC. Likewise, if no large packaging instruction is assigned, transport using a large packaging is not permitted.

The design, construction, testing and inspection requirements for packagings are detailed in Part 6 of the code. Part 4 of the code contains the packing and tank instructions and conditions for their use.

Transport by land only

Packing instructions in the UN MR are intended to be suitable for multimodal transport, allowing smooth cross border and cross mode transport. The provisions are often drafted with flexibility to allow the details to be developed by the mode specific working groups.

Specific modes may include instructions that are more or less restrictive. These instructions apply only to transport by the specific mode. Mode specific instructions are used primarily in air transport or land transport, where the entire journey will involve a single mode of transport.

Working party WP.15/AC.1/HAR Harmonization of RID/ADR/ADN with UN recommendations on TDG, is responsible for developing the land mode specific details for the ADR and RID.

Australia's current policy and process for adopting amendments to the UN MR results in these provisions not being developed and the code missing the detailed information.

Starting document for the draft Part 4 of the future code

The ADR has been used as the starting document for the draft of Part 4 of the code, that accompanies this discussion paper. The reason for using the ADR as the starting document is that it is more comprehensive, and the drafting is cohesive. The current code contains many omissions and errors and lacks cohesion between the individual requirements.

The benefit of using the ADR as the starting document is that it is a complete and well drafted document. Removing unnecessary requirements as required as opposed to starting with a document that is deficient and then trying to fill the gaps is expected to result in a more complete and integrated set of requirements.

While the starting document is the ADR, a comparative analysis has been undertaken to identify the differences between the ADR and the current ADG Code. These differences form the basis of this working group paper. Not all requirements in the ADR have been retained in the draft of Part 4 of the future code. For example, the ADR contains a comprehensive set of requirements for different dangerous goods that may be packed in the same outer packaging, and the detailed instructions for doing so. There is no suggestion that these requirements be incorporated into the future code. A primary reason for this is that the segregation requirements in the code are considerably more stringent than those in the ADR and closer aligned to the requirements in the International Maritime Dangerous Goods Code. Given the geographical isolation of Australia and our heavy reliance on imports and exports, enabling smooth cross mode transport is a priority.

Structure and content of Part 4 of the current code

A significant proportion of Part 4 of the current code is replicated from Part 4 of the UN MR. However, when initially aligning to the UN MR during the transition from ADG 6 to ADG 7, many provisions were either omitted completely, or dispersed through other areas of the code. This has created gaps in requirements and difficulty in navigating the code.

The requirements in Part 4 are primarily divided into:

- provisions relating to the use of packagings, including IBCs and large packagings;
- provisions relating to the use of tanks, multiple-element gas containers (MEGCs) and bulk containers; and
- provisions relating to the use of vehicles, tank vehicles, freight containers, equipment and segregation devices.

The provisions relating to the use of vehicles, tank-vehicles, freight containers and equipment in the current code have not been sourced from the UN MR. These provisions have been developed in Australia over the lifetime of the code. These requirements have been derived from various source, including old versions of the ADR, Australian Standards or developed by previous steering committees or the competent authorities.

Part 4 of the ADR and RID also replicate the requirements from the UN MR, supplemented by additional provisions that:

- assist in the application of the requirements; or
- are specific to land transport.

Part 4 of the ADR also includes requirements for the use of mobile explosives manufacturing units (MEMUs), and vacuum operated waste tanks. Neither of which are included in the current code. The following table provides a comparison of the chapters in the current code and the draft future code.

This discussion paper deals specifically with chapters 4.1, 4.2, 4.5 and 4.7. Chapters 4.3 and 4.4 (shown below in light text) will be covered in future discussion papers.

ADG 7.9		ADR	2023
4.1	Use of packagings, including intermediate bulk containers (IBCs) and large packagings	4.1	Use of packagings, including intermediate bulk containers (IBCs) and large packagings
4.2	Use of portable tanks and multiple- element gas containers (MEGCs)	4.2	Use of portable tanks and UN multiple-element gas containers (MEGCs)
4.3	Use of bulk containers (for solids)	4.3	Use of fixed tanks (tank-vehicles and tank-wagons), demountable tanks, tank-containers and tank swap bodies with shells made of metallic materials, and tube-vehicles and tube-wagons and multiple-element gas containers (MEGCs)
4.4	Use of vehicles, tank vehicles, freight containers, equipment and segregation devices	4.4	Use of fibre-reinforced plastics (FRP) tanks, fixed tanks (tank- vehicles and tank-wagons), demountable tanks, tank containers and tank swap bodies
		4.5	Use of vacuum operated waste tanks
		4.6	Reserved
		4.7	Use of mobile explosives manufacturing units (MEMUs)

3 Use of packagings, including IBCs and large packagings

Key points

- The packing instructions in the draft code contain a number of addition and clarifications that assist in the interpretation of requirements.
- Additional guidance has been included for:
 - determining the degree of filling;
 - packagings permitted to be used as salvage packagings;
 - verification of chemical compatibility with plastics packagings.

3.1 Changes to general provisions for packagings

Chapter 4.1 of the code starts with general provisions for the packing of dangerous goods in packagings, including IBCs and large packagings. These requirements are general in nature and apply globally to all packagings. There are several proposed amendments to these requirements in the draft code.

Most of the proposed amendments in Part 4 of the draft code are aimed at providing additional guidance to assist duty holders in understanding and applying the requirements. This detail has been sourced from the ADR and RID.

The proposed amendments are each discussed below.

3.1.1 Recognition of packaging approvals issued by other competent authorities.

Problem with the current code

The current code relies on the use of packagings that have been designed and constructed to the UN specifications and been approved to a UN packaging type. However, the recognition of design type approvals issued by other competent authorities is contained only in the relevant state or territory legislation.

Draft code

The following Note has been added at the commencement of Chapter 4.1.

NOTE: Packagings, including IBCs and large packagings, marked in accordance with 6.1.3, 6.2.2.7, 6.2.2.8, 6.2.2.9, 6.2.2.10, 6.3.4, 6.5.2 or 6.6.3 but which were approved by a non-ADG competent authority may nevertheless be used for carriage under this Code.

This note provides transparency that a packaging which has been approved for its type, by a competent authority, in confirmation that the packaging is ADR, ICAO, IMO, RID or UN approved, is approved for the purposes of the ADG Code.

Question 1: Does the wording of the draft NOTE provide clarity that if a competent authority has issued a UN Packaging Approval, that the approval is recognised for land transport in Australia? If no, please provide alternative wording.

3.1.2 Additional guidance for determining the degree of filling

Problem with the current code

Sub-section 4.1.1.4 of the code requires that, when filling packages, including IBCs and large packagings, sufficient ullage is left to allow for expansion of the liquid due to an increase in temperature during transport.

The ullage must be sufficient so that the liquid will not completely fill the package at a temperature of 50 °C. For IBCs, the ullage must be sufficient to ensure that at the mean bulk temperature of 50 °C, the IBC is not filled to more than 98% of its water capacity.

The sub-section provides no guidance to assist in determining the degree of filling.

Degree of filling is defined in the code as the ratio, expressed in %, of the volume of liquid or solid introduced at 15 °C into the means of containment and the volume of the means of containment ready for use.

Draft code

The requirement specified in sub-section 4.1.1.4 remains as per the current code. However, the following additional guidance has been added at the end of 4.1.1.4 to assist in meeting the requirement:

For a filling temperature of 15 °C, the maximum degree of filling shall be determined as follows, unless otherwise provided, either:

(a)	Boiling point (initial boiling point) of the substance in °C	< 60	≥ 60 < 100	≥ 100 < 200	≥ 200 < 300	≥ 300
	Degree of filling as a percentage of the capacity of the packaging	90	92	94	96	98

or

(b) degree of filling =
$$\frac{98}{1 + \alpha (50 - t_f)}$$
% of the capacity of the packaging.

In this formula α represents the mean coefficient of cubic expansion of the liquid substance between 15 °C and 50 °C; that is to say, for a maximum rise in temperature of 35 °C,

 α is calculated according to the formula : $\alpha = \frac{d_{15} - d_{50}}{35 \times d_{50}}$

 d_{15} and d_{50} being the relative densities 1 of the liquid at 15 °C and 50 °C and t_f the mean temperature of the liquid at the time of filling.

3.1.3 Transport of discarded, empty, uncleaned packagings

The following Note has also been added to sub-section 4.1.1.11 to reiterate the conditions and restrictions on the use of UN 3509.

NOTE: When such packagings are carried for disposal, recycling or recovery of their material, they may also be carried under UN 3509 provided the conditions of special provision 663 of Chapter 3.3 are met

Problem with the current code

The current code assigns special provision SP 374 to UN 3509 PACKAGINGS DISCARDED, EMPTY, UNCLEANED, restricting that this UN number may only be used 'as authorised by the competent authority'.

SP 374 This entry may only be used, as authorised by the competent authority, for packagings, large packagings or intermediate bulk containers (IBC), or parts thereof, which have contained dangerous goods, other than radioactive material, which are transported for disposal, recycling or recovery of their material, other than reconditioning, repair, routine maintenance, remanufacturing or reuse, and which have been emptied to the extent that only residues of dangerous goods adhering to the packaging parts are present when they are handed over for transport.

The requirement for authorisation by the competent authority introduces unnecessary time delays and burden on all parties, including competent authorities. It also introduces the potential for inconsistencies in the conditions and restrictions being imposed across the competent authorities.

Draft code

UN 3509 is now assigned special provision SP 663 rather than SP 374. SP 663 replicates the main text from SP 374 but removes the requirement for competent authority authorisation. This requirement is replaced by additional text specifying the conditions and restrictions on the use of UN 3509.

SP 663 This entry may only be used for packagings, large packagings or IBCs, or parts thereof, which have contained dangerous goods which are carried for disposal, recycling or recovery of their material, other than reconditioning, repair, routine maintenance, remanufacturing or reuse, and which have been emptied to the extent that only residues of dangerous goods adhering to the packaging parts are present when they are handed over for carriage.

Scope:

Residues present in the packagings, discarded, empty, uncleaned shall only be of dangerous goods of classes 3, 4.1, 5.1, 6.1, 8 or 9. In addition, they shall not be:

Substances assigned to packing group I or that have "0" assigned in Column (7a) of Table A of Chapter 3.2; nor

¹ Relative density (d) is considered to be synonymous with specific gravity (SG) and will be used throughout this Chapter.

- Substances classified as desensitized explosive substances of Class 3 or Class 4.1; nor
- Substances classified as self-reactive substances of Class 4.1; nor
- Radioactive material; nor
- Asbestos (UN 2212 and UN 2590), polychlorinated biphenyls (UN 2315 and UN 3432) and polyhalogenated biphenyls, halogenated monomethyldiphenylmethanes or polyhalogenated terphenyls (UN 3151 and UN 3152).

General provisions:

Packagings, discarded, empty, uncleaned with residues presenting a primary or subsidiary hazard of Class 5.1 shall not be loaded in bulk together with packagings, discarded, empty, uncleaned with residues presenting a hazard of other classes. Packagings, discarded, empty, uncleaned with residues presenting a primary or subsidiary hazard of Class 5.1 shall not be packed with other packagings, discarded, empty, uncleaned with residues presenting hazards of other classes in the same outer packaging.

Documented sorting procedures shall be implemented on the loading site to ensure compliance with the provisions applicable to this entry.

NOTE: All the other provisions of this Code apply.

Discussion

UN 3509 and special provision 374 were first introduced into the UN MR in 2013, Rev. 18. Following discussions by experts, SP 374 was written in such a way as to enable each competent authority to define further conditions for the use of UN 3509.

The conditions in SP 663 were developed by a dedicated working group that met in April 2012, which considered the specific risks for land transport, whilst also harmonising with the UN MR.

The conditions developed by the working group were then adopted by the Joint Meeting of the RID Committee of Experts and the Working Party on the Trasport of Dangerous Goods (ADR). The text of SP 663 has been further refined since its introduction, to ensure it continues to achieve its intent.

Replicating SP 663 from ADR and RID will reduce the burden on duty holders and regulators by providing clear transparent requirements for the use of UN 3509 and removing the need for authorisation. At the same time, it takes advantage of the collective expertise of land mode competent authorities from over 50 countries, both in the drafting of the current text and the ongoing maintenance of SP 663.

A more detailed discussion on special provisions in Part 3 of the code will be the subject of a separate working group paper.

Question 2: Does removing the requirement for competent authority approval for the use of UN 3509 and replacing it with specific requirements add clarity and transparency of requirements? Please include any comments.

3.1.4 Use of salvage packagings (4.1.1.19.1)

The provision relating to the packagings permitted to be used as salvage packagings has been clarified to show that the only IBCs permitted to be used as salvage packaging are IBCs of type 11A. Type 11A IBCs are steel for solids, filled or discharged by gravity.

The draft code now reads:

4.1.1.19.1 Damaged, defective, leaking or non-conforming packages, or dangerous goods that have spilled or leaked may be carried in salvage packagings mentioned in 6.1.5.1.11 and in large salvage packagings mentioned in 6.6.5.1.9. This does not prevent the use of a larger size packaging, an IBC of type 11A or a large packaging of appropriate type and performance level and under the conditions of 4.1.1.19.2 and 4.1.1.19.3.

Discussion

In line with the UN MR, the current code allows the use of larger size packagings or a large packaging of appropriate type and performance level. The wording does not specifically permit or prohibit the use of IBCs for salvage. This can lead to interpretation discrepancies when reading paragraph 4.1.1.19.1.

The clarification that only IBCs of type 11A are permitted is in line with the clarification in the ADR and RID. The current wording in ADR and RID was the result of discussions held by the working party responsible for harmonising the ADR, RID and UN MR.

- **Question 3:** Will the revised wording of 4.1.1.19.1 provide greater clarity as to what packagings are permitted for use as salvage packagings?
- **Question 4:** Will explicitly permitting type 11A IBCs for use as a salvage packaging provide greater flexibility for transporting dangerous goods that have been recovered from a spill or leak?

3.1.5 Substances likely to become liquid during carriage (4.1.3.4)

Problem with the current code

Sub-section 4.1.3.4 of the current code lists the types of packagings that are not permitted to be used for substances likely to become liquid during transport. There is no guidance provided for determining if a substance is likely to become liquid during transport.

This can lead to the use of inconsistent methods and makes it difficult for regulatory authorities to assess compliance.

Additionally, 4.1.3.4 of the current code lists the packaging types that are prohibited for use for the transport of substances likely to become liquid during transport. The list of prohibited boxes is incomplete in that it does not include the following box types:

- 4A Steel
- 4B Aluminium
- 4N Metal, other than steel or aluminium
- 4H2 Plastics, solid

As indicated in packing instructions P002 and P410, these box types are prohibited for such substances and should be included in the specified packaging types in 4.1.3.4.

- In packing instruction P 002, Note e) is assigned to boxes, including 4A, 4B, 4H2 and 4N. Note e) states: "These packagings shall not be used when substances being transported may become liquid during transport (see 4.1.3.4)."
- In packing instruction P 410, Note c) is assigned to boxes, including 4A, 4B, 4H2 and 4N. Note c) states: "These packagings shall not be used when the substances being transported may become liquid during transport (see 4.1.3.4)."

The omission of box types 4A, 4B, 4H2 and 4N from the list in 4.1.3.4 appears to be an oversight.

Draft code

1. The following additional text has been added at the end of 4.1.3.4 to specify the criteria for determining if a substance is likely to become liquid during carriage.

For the purposes of this paragraph, substances and mixtures of substances having a melting point equal to or less than 45 °C shall be treated as solids liable to become liquid during carriage.

2. Boxes of types 4A, 4B, 4H2 and 4N have been added to the list of prohibited packagings in 4.1.3.4.

3.1.6 Unpackaged articles other than Class 1 articles (4.1.3.8)

The draft code includes a new sub-section (4.1.3.8) that contains the requirements for unpackaged articles other than Class 1 articles. This sub-section is a consolidation of requirements. In the current code, these requirements are dispersed throughout the code, making it difficult for duty holders to identify the requirements.

This sub-section may be redrafted as part of the work of the explosives working group.

3.2 Verification of the chemical compatibility of plastics packagings

The code includes a requirement (see 4.1.1.2) that parts of packagings which are in direct contact with dangerous goods are compatible with the dangerous goods.

- 4.1.1.2 Parts of packagings, including IBCs and large packagings, which are in direct contact with dangerous goods:
 - (a) shall not be affected or significantly weakened by those dangerous goods;
 - (b) shall not cause a dangerous effect e.g. catalysing a reaction or reacting with the dangerous goods; and
 - (c) shall not allow permeation of the dangerous goods that could constitute a danger under normal conditions of carriage.

Where necessary, they shall be provided with a suitable inner coating or treatment.

Problem with the current code

The current code provides no guidance or detail on how to assess compatibility of the dangerous goods and the packagings. This lack of guidance creates an environment for variations in the appropriateness of methods used and acceptance criteria. It also creates difficulties for competent authorities in assessing compliance.

Draft code

A new sub-section, 4.1.1.21 Verification of the chemical compatibility of plastics packagings, including IBCs, by assimilation of filling substances to standard liquids, has been added to the draft code.

This sub-section includes an assimilation procedure and scheme for the assimilation of filling substances to standard liquids. Rules and examples for aqueous solutions, collective entries are included. An extensive assimilation list of standard liquids for specific UN numbers is also included.

A full excerpt of sub-section 4.1.1.21 is contained in Appendix A of this paper.

Additionally, the following note has been added to 4.1.1.2.

NOTE: For chemical compatibility of plastics packagings, including IBCs, made from polyethylene see 4.1.1.21.

Question 5: Are there assimilation methods currently used in Australia that are different to those in the draft of 4.1.1.21? Please provide details.

4 Packing instructions

Key points

- Packing instructions in the UN MR are developed with the objective of being suitable for multimodal transport.
- The draft code replicates the packing instructions from the UN MR, with minor variations for application in road or rail transport.
- The unique Australian packing instruction P62 has been retained but renumbered for consistency with other packing instructions.

For the most part, packing instructions originating from the UN MR remain as per the current code. However, several minor variations have been incorporated in Part 4 of the draft code. These variations are primarily aimed at improving safety during transport or adding clarity.

As outlined in section 2 of this paper, the packing instructions in the UN MR are developed with the objective of being suitable for multimodal transport. It is anticipated that the mode specific codes may add additional restrictions.

Packing instructions follow a consistent structure and generally consist of:

- applicable UN Numbers
- general requirements
- permitted packaging types
- additional requirements
- special packing provisions

Draft amendments to packing instructions have been grouped into the following topics:

- amended packing instructions and special packing instructions
- land mode specific special packing provisions.

4.1 Amended packing instructions and special packing instructions

Each packing instruction in the draft that differs in its main content from the current code is discussed below.

P001

The following additional requirement has been added:

For substances of Class 3, packing group III, which give off small quantities of carbon dioxide or nitrogen, the packagings shall be vented.

P002

The following additional special packing provision has been included.

PP85 For UN Nos. 1748, 2208, 2880, 3485, 3486 and 3487, if bags are used as single packagings they should be adequately separated to allow dissipation of heat.

P003 and P801 for batteries of UN 2800

The current code assigns both new and used batteries of UN No. 2800 BATTERIES, WET, NON-SPILLABLE, electric storage to P003 and PP16.

The draft code continues to assign new batteries of UN No. 2800 to P003 and PP16 but used batteries of UN No. 2800 are assigned to P801.

Both packing instructions have also been amended, as follows:

PP16 of P002 now states:

PP16 For UN No. 2800, batteries shall be protected from short circuits and shall be securely packed in strong outer packagings.

NOTE 1: Non-spillable batteries which are an integral part of, and necessary for, the operation of mechanical or electronic equipment shall be securely fastened in the battery holder on the equipment and protected in such a manner as to prevent damage and short circuits.

NOTE 2: For used batteries (UN 2800), see P801.

P801 has been amended to include a requirement for bins carrying used batteries to be either covered or carried in closed or sheeted vehicles or containers.

The draft future code will also assign the following two special provisions to batteries of UN No. 2800.

- SP 295 Batteries need not be individually marked and labelled if the pallet bears the appropriate mark and label.
- SP 598 The following are not subject to the requirements of this Code:
 - (a) New storage batteries when
 - they are secured in such a way that they cannot slip, fall or be damaged;
 - they are provided with carrying devices, unless they are suitably stacked, e.g. on pallets;
 - there are no dangerous traces of alkalis or acids on the outside;
 - they are protected against short circuits;
 - (b) Used storage batteries when:
 - their cases are undamaged;
 - they are secured in such a way that they cannot leak, slip, fall or be damaged, e.g. by stacking on pallets;
 - there are no dangerous traces of alkalis or acids on the outside of the articles;
 - they are protected against short circuits.

"Used storage batteries" means storage batteries carried for recycling at the end of their normal service life. **Question 6:** Will the proposed amendment to the transport of UN 2800 impact your operations? Please provide details.

P110(a) and P110(b)

The following Note has been added to application section of P110(a) and P110(b), to clarify that Division 1.1A must not be transported without approval of the competent authority.

NOTE: Explosives of Division 1.1A shall only be transported with the approved of the Competent Authority

Question 7:	Should this stay as a Note, or should it be included in the standard text? Please provide your reasons.
Question 8:	Will adding the requirement to the packing instruction make it more obvious that approval is required?

P200

Substantial changes have been made to P200 and associated requirements relating to pressure receptacles. These are discussed in chapter 5 of this discussion paper.

P403

The following additional requirement has been added:

Packagings shall be hermetically sealed.

P406

The list of UN numbers in PP26 and PP80 has been expanded to include UN 3344. This is typographical correction only. Column 9 of the current code already assigns PP26 and PP80 to UN 3344 but this was not reflected in the packing instruction.

<u>P410</u>

The following UN entries have been included in the list of UN numbers assigned to PP40.

UN 1395 ALUMINIUM FERROSILICON POWDER

UN 1396 ALUMINIUM POWDER, UNCOATED

UN 1436 ZINC POWDER or ZINC DUST

UN 2805 LITHIUM HYDRIDE, FUSED SOLID

PP40 prohibits the use of bags for packing group II.

Question 9: Are you aware of any packing group II substances of UN numbers 1395, 1396, 1436 or 2805 currently being transported in bags in Australia? Please provide details.

Question 10: Do you believe the extension of PP40 to UN numbers 1395, 1396, 1436 and 2805 appropriate? Please provide your reasons.

<u>P504</u>

The ADR allows the following 'removable head' single packages. These packagings are not permitted for P504 in the current code.

Single packagings:	Maximum capacity
Drums	
steel, removable head (1A2)	250 /
aluminium, removable head (1B2)	250 /
metal other than steel or aluminium, removable head (1N2)	250 /
plastics, removable head (1H2)	250 /
Jerricans	
steel, removable head (3A2)	60 /
aluminium, removable head (3B2)	60 /
plastics, removable head (3H2)	60 /

Special packing instruction PP10 is also assigned to UN 2984. PP10 requires the packaging to be vented.

Packing instruction P504 is assigned to UN Nos. 2014, 2427, 2428, 2429, 2626, 2984, 3098, 3099, 3139, 3149, 3210, 3211, 3213, 3214, 3216, 3218, 3219, 3405, 3406, 3407 and 3408.

Question 11: Is there a reason why these removable head single packagings should not be included in P504 of the future code? Please explain your reasoning.

P601

P601 Is assigned to packing group I substances that have a primary or secondary hazard of class 6.1.

A new item (g) has been inserted in (3) of the packing instruction.

(3)(g) The complete packaging shall be visually inspected to the satisfaction of the competent authority at least every 3 years;

Item (3)(g) in the current code has been renumbered as (3)(h) in the future code and amended as follows:

- (3) (h) The outer and inner packaging shall bear in clearly legible and durable characters:
 - (i) the date (month, year) of the initial test and the latest periodic test and inspection;
 - (ii) the stamp of the expert who carried out the test and inspection;

Item (3)(h)(ii) of the current code requires the name or authorised symbol of the party performing the test and inspection. It does not require the stamp of the expert.

Discussion

It is understood that persons accredited or authorised to conduct inspections are provided with a verification stamp, which is recorded in a register maintained by JAS-ANZ. If this is the case, then requiring the stamp would provide assurance that the person was properly authorised.

Question 12: Are there circumstances where the person conducting the tests or inspections would not have an official stamp? Please provide details.

<u>P62A</u>

Packing instruction P62 in the current code is unique to Australian. Recent discussions at the UN Sub-Committee of Experts have confirmed the relevance of this packing instruction.

In the draft code, P62 has been retained but renumbered to 621A. The renumbering acknowledges that this is unique to Australia whilst also maintaining consistency with the numbering conventions for packing instructions.

The renumbering also allows the packing instruction to be seamlessly incorporated into the Code so that it is collocated with P621.

<u>P650</u>

The following additional instruction has been added to P650, for UN No. 3373 BIOLOGICAL SUBSTANCE, CATEGORY B:

(14) If any substance has leaked and has been spilled in a cargo transport unit, it may not be reused until after it has been thoroughly cleaned and, if necessary, disinfected or decontaminated. Any other goods and articles carried in the same cargo transport unit shall be examined for possible contamination.

Discussion

The current code provides no requirements or guidance on cleaning of a cargo transport unit in which there has been a spill or leak of a Category B biological substance. Section 7.1.7 of the current code contains a number of Notes saying that decontamination of transport units for infectious substances of Class 6.2 is addressed by other legislation but provides no indication as to which legislation.

As part of the code review, technical requirements for the transport of Division 6.2 substances will be included in the code.

Question 13: Should a Note be added to P650 (14) advising duty holders that they may be subject to other requirements under state or territory legislation?

Question 14: If the answer to Q 13 is yes, please provide details of relevant legislation that applies in your jurisdiction.

B1 and B2

For many substances carried in IBCs, there is a requirement that the IBCs be carried in closed cargo transport units. This is particularly the case for solids.

Problem with the current code

In the current code, this requirement is identified by the assignment of special packing provision B1 or B2, as follows:

- **B1** For packing group I substances, IBCs must be transported in closed cargo transport units.
- **B2** For solid substances in IBCs other than metal or rigid plastics IBCs, the IBCs must be transported in closed cargo transport units.

Draft code

Special packing provisions have been omitted from the IBC packing instructions and have been replaced with the following special provisions for carriage in 7.2.4.

- V1 packages shall be loaded on to closed or sheeted vehicles or into closed or sheeted containers.
- V10 IBCs shall be carried in closed or sheeted vehicles or closed or sheeted containers.
- V11 IBCs other than metal or rigid plastics IBCs shall be carried in closed or sheeted vehicles or closed or sheeted containers.
- V12 IBCs of type 31HZ2 (31HA2, 31HB2, 31HN2, 31HD2 and 31HH2) shall be carried in closed vehicles or containers.
- V15 IBCs shall be carried in closed vehicles or in closed containers.

Special provisions for carriage applicable to individual UN entries are identified in column 16 of the dangerous goods list.

Discussion

The packing instruction in Part 4 of the code are intended for duty holders responsible for undertaking packing tasks, e.g., placing the dangerous goods in their packagings, including single packagings, combination packagings, IBCs, large packagings, etc.

In the future code, provisions relating to the type of vehicle to be used or how it is to be loaded will be contained in Part 7. This is in keeping with structuring the code to align with the transport process. This will simplify the identification of duties and navigation of the code. Navigation of the code was identified by stakeholders as a key issue with the current code.

The special provisions for carriage in column 16 of the dangerous goods list will be discussed in more detail in a future discussion paper.

Question 15: Please provide your initial thoughts on the changes to B1 and B2. Your input will help inform the future discussion on special provisions for carriage.

4.2 Land mode specific special packing provisions

Key points

- The draft code contains a number of additional special packing provisions that apply specifically to land transport.
- The land specific special packing provisions have been developed by the various WP.15 working parties as part of the work of WP.15/AC.1/HAR Harmonization of RID/ADR/ADN with UN recommendations on TDG.
- The special packing provisions have been developed to ensure the cohesiveness of, and with other provisions is maintained

4.2.1 ADR/RID special packing instructions

The draft code includes special packing provisions that are specific to land transport. These provisions are not included in the UN MR, IMDG or IATA. These special packing provisions have been developed by the various WP.15 working parties as part of the work of WP.15/AC.1/HAR Harmonization of RID/ADR/ADN with UN recommendations on TDG. The special packing provisions are developed to provide risk appropriate controls in land transport. The special packing provisions are in addition to those in the UN MR.

Each of the following special packing provisions has been developed by WP.15 to be an integral part of the ADR and RID. They are developed to ensure the cohesiveness of, and with other provisions is maintained.

The following history of the development of special packing provision BB4 is provided as an example of the process for developing special packing provisions. This example is provided to demonstrate the rigour of the decision-making process and how the input from various experts contribute to the outcome. The example also demonstrates the interrelationship with other provisions are considered and amended as relevant. In many instances, the special packing provisions are introduced to give effect to or as a result of other provisions in the code.

Document	Title	Date	WP.15 session	Location in document
<u>INF.5/Rev.1 E</u>	Texts adopted by the Joint Meeting: amendments to ADR for entry into force on 1 January 2015	24 April 2014	6–9 May 2014	draft new amendments 2.2.3.1.4 and 4.1.4.2
ECE/TRANS/WP.15/ AC.1/134/Add.2	Report of the Joint Meeting of the RID Committee of Experts and the Working Party on the Transport of Dangerous Goods on its spring 2014 session	23 April 2014	17–21 March 2014	Chapter 2.2.3.1.4 Chapter 4.1.4.2
<u>INF.29</u>	Assignment of flammable liquids in packing group II to packing group III according to their viscosity: comments on	11 March 2014	17–21 March 2014	All

	ECE/TRANS/WP.15/AC.1/2014/20 and INF 26			
<u>INF.26</u>	Texts kept in square brackets	7 March 2014	17–21 March 2014	2.2.3.1.4
ECE/TRANS/WP.15/ AC.1/2014/20	Assignment of flammable liquids in packing group II to packing group III according to their viscosity	30 December 2013	17–21 March 2014	All
ECE/TRANS/WP.15/ AC.1/132	Report of the Joint Meeting of the RID Committee of Experts and the Working Party on the Transport of Dangerous Goods on its autumn 2013 session	23 October 2013	17–27 September 2013	Paras 23-24
ECE/TRANS/WP.15/ AC.1/2013/31/Add.1	Report of the Ad Hoc Working Group on the Harmonization of RID/ADR/ADN with the United Nations Recommendations on the Transport of Dangerous Goods	14 June 2013	17–27 September 2013	2.2.3.1.4
ECE/TRANS/WP.15/ AC.1/2013/31	Report of the Ad Hoc Working Group on the Harmonization of RID/ADR/ADN with the United Nations Recommendations on the Transport of Dangerous Goods	12 June 2013	17–27 September 2013	

The following list of additional special packing provisions included in the draft of Part 4 of the future code grouped into the following:

- Special packing provisions for P packing instructions (RR)
- Special packing provisions for IBC instructions (BB)
- Special packing provisions for LP packaging instructions (LL)

A reference to the impacted packing instructions is included at the end of each special packing provision.

Special packing provisions for P packing instructions (RR)

- RR2 For UN No. 1261, removable head packagings are not permitted (P001)
- RR4 For UN No. 3130, the openings of receptacles shall be tightly closed by means of two devices in series, one of which shall be screwed or secured in an equivalent manner. (P402)
- RR5 Notwithstanding special packing provision PP84, only the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.5 to 4.1.1.7 need be complied with if the gross mass of the package is not more than 10 kg.

NOTE: For waste lighters collected separately see Chapter 3.3, special provision 654. (P002)

- RR6 For UN 1950 in the case of carriage by full load, metal articles may also be packed as follows: The articles shall be grouped together in units on trays held in position with an appropriate plastics cover, these units shall be stacked and suitably secured on pallets. (P003, P207)
- RR7 For UN No. 3129, the pressure receptacles shall however be subjected to the tests every five years. (P402, P601)

- RR8 For UN Nos. 1389, 1391, 1411, 1421, 1928, 3129, 3130, 3148 and 3482, the pressure receptacles shall however be subjected to an initial test and to periodic tests at a pressure of not less than 1 MPa (10 bar). (P402)
- RR9 For UN 3509, packagings are not required to meet the requirements of 4.1.1.3.

Packagings meeting the requirements of 6.1.4, made leak tight or fitted with a leak tight and puncture resistant sealed liner or bag, shall be used.

When the only residues contained are solids which are not liable to become liquid at temperatures likely to be encountered during carriage, flexible packagings may be used.

When liquid residues are present, rigid packagings that provide a means of retention (e.g. absorbent material) shall be used.

Before being filled and handed over for carriage, every packaging shall be inspected to ensure that it is free from corrosion, contamination or other damage. Any packaging showing signs of reduced strength shall no longer be used (minor dents and scratches are not considered as reducing the strength of the packaging).

Packagings intended for the carriage of packagings, discarded, empty, uncleaned with residues of Class 5.1 shall be so constructed or adapted that the goods cannot come into contact with wood or any other combustible material. (P003)

RR10 UN No. 1614, when completely absorbed by an inert porous material, shall be packed in metal receptacles of a capacity of not more than 7.5 litres, placed in wooden cases in such a manner that they cannot come into contact with one another. The receptacles shall be entirely filled with the porous material which shall not shake down or form dangerous spaces even after prolonged use or under impact, even at temperatures of up to 50 °C. (P601)

Special packing provisions for IBC instructions (BB)

- BB1 For UN No. 3130, the openings of receptacles for this substance shall be tightly closed by means of two devices in series, one of which shall be screwed or secured in an equivalent manner. (IBC01)
- BB2 For UN No.1203, notwithstanding special provision 534 (see 3.3.1), IBCs shall only be used when the actual vapour pressure is not more than 110 kPa at 50 °C, or 130 kPa at 55 °C. (IBC02)
- BB3 For UN 3509, IBCs are not required to meet the requirements of 4.1.1.3.

IBCs meeting the requirements of 6.5.5, made leak tight or fitted with a leak tight and puncture resistant sealed liner or bag, shall be used.

When the only residues are solids which are not liable to become liquid at temperatures likely to be encountered during carriage, flexible IBCs may be used.

When liquid residues are present, rigid IBCs that provide a means of retention (e.g. absorbent material) shall be used.

Before being filled and handed over for carriage, every IBC shall be inspected to ensure that it is free from corrosion, contamination or other damage. Any IBC showing signs of reduced strength, shall no longer be used (minor dents and scratches are not considered as reducing the strength of the IBC). IBCs intended for the carriage of packagings, discarded, empty, uncleaned with residues of Class 5.1 shall be so constructed or adapted that the goods cannot come into contact with wood or any other combustible material. (IBC08)

BB4 For UN Nos. 1133, 1139, 1197, 1210, 1263, 1266, 1286, 1287, 1306, 1866, 1993 and 1999, assigned to packing group III in accordance with 2.2.3.1.4, IBCs with a capacity greater than 450 litres are not permitted. (IBC02)

Special packing provisions for LP packaging instructions (LL)

LL1 For UN 3509, large packagings are not required to meet the requirements of 4.1.1.3.

Large packagings meeting the requirements of 6.6.4, made leak tight or fitted with a leak tight and puncture resistant sealed liner or bag, shall be used.

When the only residues are solids which are not liable to become liquid at temperatures likely to be encountered during carriage, flexible large packagings may be used.

When liquid residues are present, rigid large packagings that provide a means of retention (e.g. absorbent material) shall be used.

Before being filled and handed over for carriage, every large packaging shall be inspected to ensure that it is free from corrosion, contamination or other damage. Any large packaging showing signs of reduced strength, shall no longer be used (minor dents and scratches are not considered as reducing the strength of the large packaging).

Large packagings intended for the carriage of packagings, discarded, empty, uncleaned with residues of Class 5.1 shall be so constructed or adapted that the goods cannot come into contact with wood or any other combustible material. (LP02)

Question 16: Are there any land specific special packing provisions that you disagree with? Please provide details and your rationale.

5 Packing provisions for Class 2 and goods of other classes assigned to packing instruction P200

Key points

- Packing instruction P200 has been expanded to include open cryogenic receptacles.
- References to Standards throughout out section 4.1.6 have been consolidated into a single table rather than being dispersed throughout.
- .

5.1 Provisions for packing and use of pressure receptacles

Provisions relating to pressure receptacles are divided into the following two broad categories:

- 1. provisions relating to their use, including test pressure, filling ratios, filling requirements, periodic inspections, material compatibility, etc.; and
- 2. provisions relating to the design, construction, performance, approval, testing and inspection requirements.

Part 4 of the code is intended to contain the provisions relevant to category 1 above. Provisions relating to category 2 are contained in part 6 of the code. Pressure receptacles may be designed, constructed and type approved as UN pressure receptacles or designed and constructed to a recognised Standard.

General requirements applicable to the use of pressure receptacles for the transport of Class 2 gases and other dangerous goods in pressure receptacles are set out in 4.1.6 of the code.

The detailed requirements for the use of pressure receptacles are specified in packing instruction P200. The use of assembled multiple-element gas cylinders (MEGCs) is specified in chapter 4.2 of the code for UN MEGCs and chapter 4.3 for non-UN. The use of UN MEGCs is discussed in section 6 of this working group paper. The use of non-UN MEGCs will be discussed in a future paper.

5.1.1 General requirements for the use of pressure receptacles (section 4.1.6)

Section 4.1.6 of the draft code remains much the same as the current code with some minor differences. Each of the differences is discussed below.

Scope

The scope of section 4.1.6 special packing provisions for goods of Class 2 and goods of other classes assigned to packing instruction P200 has been expanded to include open cryogenic receptacles.

Amended requirement for shut-off valves

The following Note has been added to 4.1.6.5:

NOTE: Shut-off valves fitted to individual cylinders in bundles may be open during carriage, unless the substance carried is subject to special packing provision 'k' or 'q' in packing provision P200.

References to Standards

There are several references to ISO Standards in section 4.1.6. In the current code, the references are dispersed throughout the section and appear as in line text. In the draft code, the references to Standards been consolidated into a table, located in 4.1.6.15 at the end of the section.

A copy of Table 4.1.6.15.1 is contained in Appendix B.

Question 17:	Are there any specific Australian Standard that are missing from the
	table in Appendix B? Please specify.

Question 18: If there are Australian Standards that should be included please specify the specific paragraph(s) in 4.1.6 that the Australian Standard applies to and provide details.

5.1.2 P200

Packing instruction P200 specifies requirements for use of the elements of MEGCs (e.g. tubes) but not the use of the assembled MEGC. General requirements for the use of UN MEGCs are specified in Chapter 4.2 of the draft code. Detailed requirements for the use of non-UN MEGCs are specified in Chapter 4.3 of the draft code.

Unlike the current code, which includes a column for MEGCs in P200, in the draft future code, gases authorized for carriage in MEGCs are indicated with the letter "(M)" in Column (10) of dangerous goods list in Chapter 3.2 of the code.

The instructions and conditions for the use of pressure vessels, including test pressure, filling ratios, filling requirements, periodic inspections, material compatibility, etc, are based on the type of pressure vessel and the specific substance. As per the following example for UN 1660 NITRIC OXIDE, COMPRESSED.

UN No.	Name and description	Classification code	LCso ml/m ³	Cylinders	Tubes	Pressure drums	Bundles of cylinders	Test period, years ^a	Test pressure, bar ^b	Maximum working pressure, bar ^b	Special packing provisions
1660	NITRIC OXIDE, COMPRESSED	1TOC	115	Х			Х	5	225	33	k, o

As can be seen from the above, UN 1660 is permitted to be transported in cylinders and bundles of cylinders but not in tubes or pressure drums. The entry in P200 also specifies other requirements relevant to the transport of UN 1660. For example, the test frequencies, test pressure and maximum working pressure as well as any special packing provisions. The special packing provisions are detailed in the body of P200.

Problem with the current code

The requirements in the current code relating to the use of pressure receptacles and the requirements for design and construction are intermingled and confusing. As an example, a statement is included in part 6 of the code that filling of cylinders must be in accordance with AS 2030. Part 6 of the code relates to design and construction. A person filling a cylinder will look to P200 for the requirements, they are unlikely to look at Part 6.

AS 2030 defines a cylinder as up to 3000 litres but the UN MR, and the code, define a cylinder as having a maximum of 150 litres. The instruction in P200 are based on the UN MR definition. Using P200 for a cylinder with a greater capacity than 150 litres could potentially lead to unsafe transport.

It's understood that the gas related Australian Standards are gradually moving to closer alignment with the ISO Standards. This will also result in alignment with the requirements in the UN MR and other international standards.

Requirements relating to pressure receptacles are interrelated with many other legislative requirements, including work health and safety legislation. A working group of relevant government and industry representatives will be organised to redraft the requirements relating to pressure receptacle. The aim will be to draft a comprehensive and coherent set of requirements for further consultation.

- **Question 19:** Please provide any specific matters you would like the working group to consider.
- **Question 20:** If you would like to be part of the working group, please provide your details and outline your interests.

6 Use of portable tanks and UN Multipleelement gas containers (MEGCs) (Chapter 4.2)

Key points

- The current code does not recognise MEGCs that are non-UN or nonmultimodal.
- The requirements for multi-modal MEGCs remain largely as per the current code.
- There are minimal differences between the current and future codes in relation to the use of portable tanks.

NOTE: The gases authorized for carriage in MEGCs are indicated with the letter "(M)" in Column (10) of Table A of Chapter 3.2.

6.1 Use of multiple-element gas containers (MEGCs)

Problem with the current code

The current code defines an MEGC as a multimodal assembly of cylinders, tubes or bundles of cylinders which are interconnected by a manifold and assembled within a framework. Multimodal is further defined as applicable to, or suitable for use on, more than one mode of transport.

Multiple element gas containers that are not designed to be multimodal are omitted from the code. This omission is now recognised as a significant gap. Particularly since the introduction of Australia's hydrogen strategy.

Draft code

General requirements for the use of UN MEGCs are specified in chapter 4.2, as per the current code. Requirements for non-UN MEGCs are specified in chapter 4.3.

Chapter 4.3 of the future code will contain the requirements for the use of fixed tanks (tank-vehicles and tank-wagons), demountable tanks, tank-containers and tank swap bodies with shells made of metallic materials, and tube-vehicles and tube-wagons and multiple-element gas containers (MEGCs). This chapter is out of scope for this working group paper.

Chapter 4.3 of the draft code, which accompanies this working group paper, is replicated from the ADR. It is provided for information and context only. The detailed requirements in chapter 4.3 will be drafted following analysis of the submissions received in response to working group papers #7 and #8.

Question 21: Is the current lack of information and requirements for non-UN MEGCs impacting your operations? Please provide details.
6.2 Carriage in portable tanks

The requirements relating to portable tanks in Chapter 4.2 of the draft code remain largely as per the current code. There are a few minor differences as discussed below.

Retention and availability of certificates

The following sections are contained in the UN MR but were not replicated in ADG 7. Each of these sections is marked in the current code as 'reserved'. The requirements in these sections appear to be reflect standard expectations. It's unclear why they were left as 'reserved' in the current code.

Requirements applicable to class 1 and classes 3 to 9

- 4.2.1.7 The design approval certificate, the test report and the certificate showing the results of the initial inspection and test for each portable tank issued by the competent authority or its authorized body shall be retained by the authority or body and the owner. Owners shall be able to provide this documentation upon the request of any competent authority.
- 4.2.1.8 Unless the name of the substance(s) being carried appears on the metal plate described in 6.7.2.20.2 a copy of the certificate specified in 6.7.2.18.1 shall be made available upon the request of a competent authority or its authorized body and readily provided by the consignor, consignee or agent, as appropriate.

General provisions for non-refrigerated liquefied gases and chemicals under pressure

4.2.2.5 Unless the name of the gas(es) being carried appears on the metal plate described in 6.7.3.16.2, a copy of the certificate specified in 6.7.3.14.1 shall be made available upon a competent authority request and readily provided by the consignor, consignee or agent, as appropriate.

General provisions for carriage of refrigerated liquefied gases

- 4.2.3.4 Unless the name of the gas(es) being carried appears on the metal plate described in 6.7.4.15.2, a copy of the certificate specified in 6.7.4.13.1 shall be made available upon a competent authority request and readily provided by the consignor, consignee or agent, as appropriate.
- **Question 22:** Are you aware of any reason these requirements should not be included in the future code?

Additional requirements for carriage of Class 5.2 and Class 4.1

The words 'as necessary' in 4.2.1.13.1 of the current code have been replaced by the text shown in **bold underlined**.

4.2.1.13.1 Each substance shall have been tested <u>and a report submitted to the</u> <u>competent authority of the country of origin for approval.</u> <u>Notification thereof shall be sent to the competent authority of the</u> <u>country of destination. The notification shall contain relevant</u> <u>transport information and the report with test results. The tests</u> <u>undertaken shall include those necessary</u>:

- (a) To prove the compatibility of all materials normally in contact with the substance during carriage;
- (b) To provide data for the design of the pressure and emergency relief devices taking into account the design characteristics of the portable tank.

Any additional provision necessary for safe carriage of the substance shall be clearly described in the report.

- **Question 23:** Should the requirement to provide evidence of the tests required in 4.2.1.13.1 be included in the future code? Please provide your reasoning.
- **Question 24:** If the requirements to provide evidence is not included, how should compliance be verified?

The following proposed amendment is provided for information only. It will be discussed in greater detail as part of a future working group paper on chapter 4.3 of the code.

Requirements for carriage of Class 3

Current code

4.2.1.10.1 All portable tanks intended for the transport of flammable liquids must be closed and be fitted with relief devices in accordance with 6.7.2.8 to 6.7.2.15.

Future code

4.2.1.10.1.1 For portable tanks intended for use only on land, open venting systems may be used if allowed according to chapter 4.3.

Question 25: Please provide any particular points you would like considered in the future discussion on this requirement.

7 Use of vacuum operated waste tanks (Chapter 4.5)

Key points

- Requirements relating to vacuum operated waste tanks are currently contained in a 2014 CAP determination rather than in the code.
- Many of the requirements in the 2014 determination were replicated from ADR 2013.
- The draft code includes the requirements for vacuum operated waste tanks, providing transparency and the ability to maintain them for currency.

Problem with the current code

The current code contains no requirements relating to vacuum operated waste tanks. This lack of regulation and specific requirements was recognised several years ago by the dangerous goods transport competent authorities. To fill this gap, the Competent Authorities Panel (CAP) issued a determination in May 2014, mandating the requirements for dangerous goods vacuum tankers.

The determination CAP decision CA2014/19 sits outside of the code and of the associated regulations. The determination is not publicly available.

Most of the requirements prescribed in the determination for the use and operation were replicated from ADR 2013. The determination required the design and construction of a vacuum waste tank to comply with specified clauses in Australian Standards AS 1210 and AS 2809. Both Standards have been revised since the determination was issued. The determination has not been reviewed or updated since it was issued in 2014 and there is no mechanism in place to do so.

A copy of determination CA2014/19 is contained in Appendix C.

Draft code

Requirements relating to vacuum operated waste tanks have been included in the draft future code. Chapter 4.5 of the draft future code contains the requirements for their use and operation. This is primarily via reference to the relevant provisions in chapters 4.3 and 6.1, both of which are still being drafted. It's expected that requirements relating to the design and construction of tank vehicles will continue to be based on AS 2809.

Discussion

Incorporating the requirements for vacuum operated waste tanks into the future code will provide several benefits, including transparency of requirements and consistency with requirements for other dangerous goods tanks and vehicles. Aligning the structure and layout of the requirements with the ADR will also enable the requirements to be maintained for currency.

Using a determination can be an appropriate way for mandating requirements that are missing from the code. However, the need for a such a determination generally signifies a

gap in requirements that needs to be addressed. Therefore, a determination therefore should be an interim solution only while the requirements are incorporated into the code.

Question 26: Do you support the inclusion of requirements for vacuum operated waste tanks in the future code? Please provide your reasons.

Question 27: What benefits do you envisage from having the requirements for vacuum operated waste tanks in the code?

8 Use of Mobile Explosives Manufacturing Units (MEMUs) (Chapter 4.7)

Key points

- Requirements relating to the use of mobile manufacturing units (also known as mobile explosives processing units) are omitted from the current code.
- The draft code brings the requirements for mobile manufacturing units into the code.

In Australia, mobile explosive manufacturing units (MEMUs) are commonly known as mobile explosives processing units (MPUs). The requirements relating to the design, construction and testing of MPUs currently sit outside both the ADG Code and the Australian Explosives Code (AEC).

Mobile explosive processing units are currently self-regulated under an Industry Code of Practice (CoP). Some states have given legal effect to the CoP via their respective legislation but this is not the case in all Australian jurisdictions.

Bringing MPUs back into the code will provide greater transparency of requirements and ensure the requirements are maintained to be current and aligned to associated requirements.

Chapter 4.7 of the draft future code contains cross references to the provisions of the code that an MPU is required to meet. These requirements cover the use and operation of an MPU. Most of the referenced requirements are contained in chapter 4.3 of the code.

Requirements concerning the constructions, equipment, type-approval, inspection and tests and marking are contained in Part 6 of the code. These will be discussed in detail in a future working group paper.

- **Question 28:** Do you support the inclusion of requirements for MEMUs/MPUs the future code? Please provide your reasons.
- **Question 29:** Should the title of chapter 4.7 of the future code be amended to 'Use of mobile explosives manufacturing units (MPUs)' to reflect current Australian industry terminology?
- **Question 30:** Should the primary requirements be contained in the code and the industry CoP be used as guidance on how to comply?

9 Next steps

Consultation on this paper will end at 5:00 pm Thursday 25 January 2024.

Submissions received will help inform the final draft of Part 5 of the code.

Opportunities to comment on other provisions in the code will be provided over the coming months. A complete draft code will be released for public comment in 2024.

Appendix A 4.1.1.21 of the draft code

4.1.1.21 Verification of the chemical compatibility of plastics packagings, including IBCs, by assimilation of filling substances to standard liquids

4.1.1.21.1 Scope

For polyethylene packagings as specified in 6.1.5.2.6, and for polyethylene IBCs as specified in 6.5.6.3.5, the chemical compatibility with filling substances may be verified by assimilation to standard liquids following the procedures, as set out in 4.1.1.21.3 to 4.1.1.21.5 and using the list in table 4.1.1.21.6, provided that the particular design types have been tested with these standard liquids in accordance with 6.1.5 or 6.5.6, taking into account 6.1.6 and that the conditions in 4.1.1.21.2 are met. When assimilation in accordance with this sub-section is not possible, the chemical compatibility needs to be verified by design type testing in accordance with 6.1.5.2.5 or by laboratory tests in accordance with 6.1.5.2.7 for packagings, and in accordance with 6.5.6.3.3 or 6.5.6.3.6 for IBCs, respectively.

NOTE: Irrespective of the provisions of this sub-section, the use of packagings, including IBCs, for a specific filling substance is subject to the limitations of Table A of Chapter 3.2, and the packing instructions in Chapter 4.1.

4.1.1.21.2 *Conditions*

The relative densities of the filling substances shall not exceed that used to determine the height for the drop test performed successfully according to 6.1.5.3.5 or 6.5.6.9.4 and the mass for the stacking test performed successfully according to 6.1.5.6 or where necessary according to 6.5.6.6 with the assimilated standard liquid(s). The vapour pressures of the filling substances at 50 °C or 55 °C shall not exceed that used to determine the pressure for the internal pressure (hydraulic) test performed successfully according to 6.1.5.5.4 or 6.5.6.8.4.2 with the assimilated standard liquid(s). In case that filling substances are assimilated to a combination of standard liquids, the corresponding values of the filling substances shall not exceed the minimum values derived from the applied drop heights, stacking masses and internal test pressures.

Example: UN 1736 Benzoyl chloride is assimilated to the combination of standard liquids "Mixture of hydrocarbons and wetting solution". It has a vapour pressure of 0.34 kPa at 50 °C and a relative density of approximately 1.2. Design type tests for plastics drums and jerricans were frequently performed at minimum required test levels. In practice this means that the stacking test is commonly performed with stacking loads considering only a relative density of 1.0 for the "Mixture of hydrocarbons" and a relative density of 1.2 for the "Wetting solution" (see definition of standard liquids in 6.1.6). As a consequence chemical compatibility of such tested design types would not be verified for benzoyl chloride by reason of the inadequate test level of the design type with the standard liquid "mixture of hydrocarbons". (Due to the fact that in the majority of cases the applied internal hydraulic test pressure is not less than 100 kPa, the vapour pressure of benzoyl chloride would be covered by such test level according to 4.1.1.10).

All components of a filling substance, which may be a solution, mixture or preparation, such as wetting agents in detergents and disinfectants, irrespective whether dangerous or non-dangerous, shall be included in the assimilation procedure.

4.1.1.21.3 Assimilation procedure

The following steps shall be taken to assign filling substances to listed substances or groups of substances in table 4.1.1.21.6 (see also scheme in Figure 4.1.1.21.1):

- (a) Classify the filling substance in accordance with the procedures and criteria of Part 2 (determination of the UN number and packing group);
- (b) If it is included there, go to the UN number in column (1) of table 4.1.1.21.6;
- (c) Select the line that corresponds in terms of packing group, concentration, flashpoint, the presence of non-dangerous components etc. by means of the information given in columns (2a), (2b) and (4), if there is more than one entry for this UN number.

If this is not possible, the chemical compatibility shall be verified in accordance with 6.1.5.2.5 or 6.1.5.2.7 for packagings, and in accordance with 6.5.6.3.3 or 6.5.6.3.6 for IBCs (however, in the case of aqueous solutions, see 4.1.1.21.4);

- (d) If the UN number and packing group of the filling substance determined in accordance with (a) is not included in the assimilation list, the chemical compatibility shall be proved in accordance with 6.1.5.2.5 or 6.1.5.2.7 for packagings, and in accordance with 6.5.6.3.3 or 6.5.6.3.6 for IBCs;
- (e) Apply the "Rule for collective entries", as described in 4.1.1.21.5, if this is indicated in column (5) of the selected line;
- (f) The chemical compatibility of the filling substance may be regarded as verified taking into account 4.1.1.21.1 and 4.1.1.21.2, if a standard liquid or a combination of standard liquids is assimilated in column (5) and the design type is approved for that/those standard liquid(s).

Figure 4.1.1.21.1: Scheme for the assimilation of filling substances to standard liquids



4.1.1.21.4 Aqueous solutions

Aqueous solutions of substances and groups of substances assimilated to specific standard liquid(s) in accordance with 4.1.1.21.3 may also be assimilated to that (those) standard liquid(s) provided the following conditions are met:

- (a) the aqueous solution can be assigned to the same UN number as the listed substance in accordance with the criteria of 2.1.3.3, and
- (b) the aqueous solution is not specifically mentioned by name otherwise in the assimilation list in 4.1.1.21.6, and
- (c) no chemical reaction is taking place between the dangerous substance and the solvent water.

Example: Aqueous solutions of UN 1120 tert-Butanol:

- Pure tert-Butanol itself is assigned to the standard liquid "acetic acid" in the assimilation list.
- Aqueous solutions of tert-Butanol can be classified under the entry UN 1120 BUTANOLS in accordance with 2.1.3.3, because the aqueous solution of tert-Butanol does not differ from the entries of the pure substances relating to the class, the packing group(s) and the physical state. Furthermore, the entry "1120 BUTANOLS" is not explicitly limited to the pure substances, and aqueous solutions of these substances are not specifically mentioned by name otherwise in Table A of chapter 3.2 as well as in the assimilation list.
- UN 1120 BUTANOLS do not react with water under normal conditions of carriage.

As a consequence, aqueous solutions of UN 1120 tert-Butanol may be assigned to the standard liquid "acetic acid".

4.1.1.21.5 *Rule for collective entries*

For the assimilation of filling substances for which "Rule for collective entries" is indicated in column (5), the following steps shall be taken and conditions be met (see also scheme in Figure 4.1.1.21.2):

- (a) Perform the assimilation procedure for each dangerous component of the solution, mixture or preparation in accordance with 4.1.1.21.3 taking into account the conditions in 4.1.1.21.2. In the case of generic entries, components may be neglected, that are known to have no damaging effect on high density polyethylene (e.g. solid pigments in UN 1263 PAINT or PAINT RELATED MATERIAL);
- (b) A solution, mixture or preparation cannot be assimilated to a standard liquid, if:
 - (i) the UN number and packing group of one or more of the dangerous components does not appear in the assimilation list; or
 - (ii) "Rule for collective entries" is indicated in column (5) of the assimilation list for one or more of the components; or
 - (iii) (with the exception of UN 2059 NITROCELLULOSE SOLUTION, FLAMMABLE) the classification code of one or more of its dangerous components differs from that of the solution, mixture or preparation.
- (c) If all dangerous components are listed in the assimilation list, and its classification codes are in accordance with the classification code of the solution, mixture or

preparation itself, and all dangerous components are assimilated to the same standard liquid or combination of standard liquids in column (5), the chemical compatibility of the solution, mixture or preparation may be regarded as verified taking into account 4.1.1.21.1 and 4.1.1.21.2;

- (d) If all dangerous components are listed in the assimilation list and its classification codes are in accordance with the classification code of the solution, mixture or preparation itself, but different standard liquids are indicated in column (5), the chemical compatibility may only be regarded as verified for the following combinations of standard liquids taking into account 4.1.1.21.1 and 4.1.1.21.2:
 - water/nitric acid 55 %; with the exception of inorganic acids with the classification code C1, which are assigned to standard liquid "water";
 - (ii) water/wetting solution;
 - (iii) water/acetic acid;
 - (iv) water/mixture of hydrocarbons;
 - (v) water/n-butyl acetate n-butyl acetate-saturated wetting solution;
- (e) In the scope of this rule, chemical compatibility is not regarded as verified for other combinations of standard liquids than those specified in (d) and for all cases specified in (b). In such cases the chemical compatibility shall be verified by other means (see 4.1.1.21.3 (d)).

<u>Example 1</u>: Mixture of UN 1940 THIOGLYCOLIC ACID (50 %) and UN 2531 METHACRYLIC ACID, STABILIZED (50 %); classification of the mixture: UN 3265 CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.

- Both the UN numbers of the components and the UN number of the mixture are included in the assimilation list;
- Both the components and the mixture have the same classification code: C3;
- UN 1940 THIOGLYCOLIC ACID is assimilated to standard liquid "acetic acid", and UN 2531 METHACRYLIC ACID, STABILIZED is assimilated to standard liquid "n-butyl acetate/n-butyl acetate-saturated wetting solution". According to paragraph (d) this is not an acceptable combination of standard liquids. The chemical compatibility of the mixture has to be verified by other means.

<u>Example 2</u>: Mixture of UN 1793 ISOPROPYL ACID PHOSPHATE (50%) and UN 1803 PHENOLSULPHONIC ACID, LIQUID (50%); classification of the mixture: UN 3265 CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.

- Both the UN numbers of the components and the UN number of the mixture are included in the assimilation list;
- Both the components and the mixture have the same classification code: C3;
- UN 1793 ISOPROPYL ACID PHOSPHATE is assimilated to standard liquid "wetting solution", and UN 1803 PHENOLSULPHONIC ACID, LIQUID is assimilated to standard liquid "water". According to paragraph (d) this is one of the acceptable combinations of standard liquids. As a consequence the chemical compatibility may be regarded as verified for this mixture, provided the packaging design type is approved for the standard liquids "wetting solution" and "water".



Figure 4.1.1.21.2: Scheme "Rules for collective entries"

Acceptable combinations of standard liquids:

- water/nitric acid (55 %), with the exception of inorganic acids of classification code C1 which are assigned to standard liquid "water";
- water/wetting solution;
- water/acetic acid;
- water/mixture of hydrocarbons;
- water/n-butyl acetate n-butyl acetate saturated wetting solution

4.1.1.21.6 Assimilation list

In the following table (assimilation list) dangerous substances are listed in the numerical order of their UN numbers. As a rule, each line deals with a dangerous substance, single entry or collective entry covered by a specific UN number. However, several consecutive lines may be used for the same UN number, if substances belonging to the same UN number have different names (e.g. individual isomers of a group of substances), different chemical properties, different physical properties and/or different transport conditions. In such cases the single entry or collective entry within the particular packing group is the last one of such consecutive lines.

Columns (1) to (4) of table 4.1.1.21.6, following a structure similar to that of Table A of Chapter 3.2, are used to identify the substance for the purpose of this sub-section. The last column indicates the standard liquid(s) to which the substance can be assimilated.

Explanatory notes for each column:

Column (1) UN No.

Contains the UN number:

- of the dangerous substance, if the substance has been assigned its own specific UN number, or
- of the collective entry to which dangerous substances not listed by name have been assigned in accordance with the criteria ("decision trees") of Part 2.

Column (2a) Proper shipping name or technical name

Contains the name of the substance, the name of the single entry, which may cover various isomers, or the name of the collective entry itself.

The indicated name can deviate from the applicable proper shipping name.

Column (2b) Description

Contains a descriptive text to clarify the scope of the entry in those cases when the classification, the transport conditions and/or the chemical compatibility of the substance may be variable.

Column (3a) Class

Contains the number of the class, whose heading covers the dangerous substance. This class number is assigned in accordance with the procedures and criteria of Part 2.

Column (3b) Classification code

Contains the classification code of the dangerous substance in accordance with the procedures and criteria of Part 2.

Column (4) Packing group

Contains the packing group number(s) (I, II or III) assigned to the dangerous substance in accordance with the procedures and criteria of Part 2. Certain substances are not assigned to packing groups.

Column (5) Standard liquid

This column indicates, as definite information, either a standard liquid or a combination of standard liquids to which the substance can be assimilated, or a reference to the rule for collective entries in 4.1.1.21.5.

UN	Proper shipping	Description	Class	Classif	Packin	Standard liquid
No.	name			i-	g	
	Or technical name			Code	group	
	312	312	22	22	2113	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
1090	Acetone		3	F1	II	Mixture of hydrocarbons Remark : applicable
						only, if it is proved that the permeability of the substance out of the package intended for
						carriage has an acceptable level
1093	Acrylonitrile, stabilized		3	FT1	I	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
1104	Amyl acetates	pure isomers and isomeric mixture	3	F1	111	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
1105	Pentanols	pure isomers and isomeric mixture	3	F1	11/111	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
1106	Amylamines	pure isomers and isomeric mixture	3	FC	11/111	Mixture of hydrocarbons and
1100	Amyl formates	pure isomers and	3	F1		n-Butyl acetate/
1103	Anyrionnates	isomeric mixture	5			n-butyl acetate- saturated
1120	Butanols	pure isomers and isomeric mixture	3	F1	11/111	Acetic acid
1123	Butyl acetates	pure isomers and isomeric mixture	3	F1	11/111	n-Butyl acetate/ n-butyl acetate- saturated
1125	n-Butylamine		3	FC	II	Wetting solution Mixture of hydrocarbons and wetting solution
1128	n-Butyl formate		3	F1	II	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
1129	Butyraldehyde		3	F1	Ш	Mixture of hydrocarbons
1133	Adhesives	containing flammable liquid	3	F1	1/11/111	Rule for collective entries
1139	Coating solution	includes surface treatments or coatings used for industrial or other purposes such as vehicle under coating, drum or barrel lining	3	F1	1/11/111	Rule for collective entries

Table 4.1.1.21.6: Assimilation list

UN No	Proper shipping	Description	Class	Classif i-	Packin	Standard liquid
	Or technical name			cation	group	
	3.1.2	312	22	22	2113	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
1145	Cueleboxene		· ,	С / Г1		Mixture of bydrocorbone
1145	Cyclonexane		3			Mixture of hydrocarbons
1153	Ethylene alvcol		3	F1		n-Butyl acetate/
1100	diethvl ether		0			n-butyl acetate-
						saturated
						wetting solution
						and mixture of hydrocarbone
1154	Diethylamine		З	FC	п	Mixture of hydrocarbons
1134	Dietriyianine		0	10		and
						wetting solution
1158	Diisopropylamine		3	FC	П	Mixture of hydrocarbons
						and
1160	Dimothylomino		2	FC		Wetting solution
1100	aqueous solution		5	10		and
						wetting solution
1165	Dioxane		3	F1		Mixture of hydrocarbons
1170	Ethanol or Ethanol	aqueous solution	3	F1	11/111	Acetic acid
	solution			= 1		D
1171	Ethylene glycol		3	F1	- 111	n-Butyl acetate/
						saturated
						wetting solution
						and
1170	Ethylono glygol		0	E1		mixture of hydrocarbons
1172	monoethvl ether		3	ГІ		n-butyl acetate-
	acetate					saturated
						wetting solution
						and mixture of bydrocerbone
1173	Ethyl acetate		3	F1		n-Butyl acetate/
1170			0			n-butyl acetate-
						saturated
						wetting solution
1177	2-Ethylbutyl acetate		3	F1	111	n-Butyl acetate/
						n-bulyi acelale-
						wetting solution
1178	2-Ethylbutyraldehyde		3	F1	П	Mixture of hydrocarbons
1180	Ethyl butyrate		3	F1	111	n-Butyl acetate/
						n-butyl acetate-
						wetting solution
1188	Ethvlene alvcol		3	F1	ш	n-Butvl acetate/
	monomethyl ether		-	-		n-butyl acetate-
						saturated
						wetting solution
						ailu mixture of hydrocarbons
1	1	1	1	I	I	

UN	Proper shipping	Description	Class	Classif	Packin	Standard liquid
No.	name			i-	g	
	technical name			Code	group	
	3.1.2	3.1.2	2.2	2.2	2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
1189	Ethylene glycol monomethyl ether acetate		3	F1	111	n-Butyl acetate/ n-butyl acetate- saturated
1190	Ethyl formate		3	F1		wetting solution and mixture of hydrocarbons n-Butyl acetate/ n-butyl acetate- saturated
1191	Octyl aldehydes	pure isomers and	3	F1	Ш	wetting solution Mixture of hydrocarbons
1192	Ethyl lactate	isomeric mixture	3	F1	III	n-Butyl acetate/ n-butyl acetate- saturated
1195	Ethyl propionate		3	F1	II	wetting solution n-Butyl acetate/ n-butyl acetate- saturated wetting solution
1197	Extracts, liquid, for flavour or aroma		3	F1	11/111	Rule for collective entries
1198	Formaldehyde solution, flammable	aqueous solution, flashpoint between 23 °C and 60 °C	3	FC	III	Acetic acid
1202	Diesel fuel	complying with EN 590:2013 + A1:2017 or with a flashpoint not more than 100 °C	3	F1	III	Mixture of hydrocarbons
1202	Gas oil	flashpoint not more than 100 °C	3	F1		Mixture of hydrocarbons
1202	Heating oil, light	extra light	3	F1		Mixture of hydrocarbons
1202	Heating oil, light	complying with EN 590:2013 + AC:2014 or with a flashpoint not more than 100 °C	3	F1	III	Mixture of hydrocarbons
1203	Motor spirit, or gasoline, or petrol		3	F1	II	Mixture of hydrocarbons
1206	Heptanes	pure isomers and isomeric mixture	3	F1	II	Mixture of hydrocarbons
1207	Hexaldehyde	n-Hexaldehyde	3	F1	III	Mixture of hydrocarbons
1208	Hexanes	pure isomers and isomeric mixture	3	F1	II	Mixture of hydrocarbons
1210	Printing ink or Printing ink related	flammable, including printing ink thinning or reducing compound	3	F1	1/11/111	Rule for collective entries
1212	material Isobutanol		3	F1		Acetic acid

UN	Proper shipping	Description	Class	Classif	Packin	Standard liquid
No.	name			i-	g	
	Or technical name			cation	group	
		0.4.0	0.0	Code	0110	
(4)	3.1.2	3.1.2	2.2	2.2	2.1.1.3	(5)
(1)	(2a)	(2b)	(3a)	(36)	(4)	(5)
1213	Isobutyl acetate		3	F1	П	n-Butyl acetate/
						n-butyl acetate-
						saturated
1014	la a haata da maina a		0	50		Wetting solution
1214	isobutyiamine		3	FC	11	mixture of hydrocarbons
						wetting solution
1216	Isooctenes	pure isomers and	3	F1	11	Mixture of hydrocarbons
		isomeric mixture	Ũ			
1219	Isopropanol		3	F1	П	Acetic acid
1220	Isopropyl acetate		3	F1	П	n-Butyl acetate/
						n-butyl acetate-
						saturated
1001			•	50		wetting solution
1221	Isopropylamine		3	FC	I	Mixture of hydrocarbons
						and wetting solution
1223	Kerosene		3	F1	ш	Mixture of hydrocarbons
1224	3 3-Dimethyl-2-		3	F1		Mixture of hydrocarbons
	butanone		Ũ			
1224	Ketones, liquid,		3	F1	11/111	Rule for collective
	n.o.s.					entries
1230	Methanol		3	FT1	П	Acetic acid
1231	Methyl acetate		3	F1	П	n-Butyl acetate/
						n-butyl acetate-
						saturated
1022	Mothylamyl acotato		2	E1		n Butyl acotato/
1200	weinyianiyi acelale		5		111	n-butyl acetate-
						saturated
						wetting solution
1235	Methylamine,		3	FC	П	Mixture of hydrocarbons
	aqueous solution					and
			-			wetting solution
1237	Methyl butyrate		3	⊢1	II	n-Butyl acetate/
						n-butyl acetate-
						wetting solution
1247	Methyl methacrylate		3	F1	П	n-Butyl acetate/
	monomer, stabilized		-			n-butyl acetate-
						saturated
						wetting solution
1248	Methyl propionate		3	F1	II	n-Butyl acetate/
						n-butyl acetate-
						wetting solution
1262	Octanes	pure isomers and	3	F1	11	Mixture of hydrocarbons
02		isomeric mixture	Ŭ			

UN	Proper shipping	Description	Class	Classif	Packin	Standard liquid
NO.	or			I- cation	g aroup	
	technical name			Code	group	
	3.1.2	3.1.2	2.2	2.2	2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
1263	Paint or Paint related material	including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base	3	F1	1/11/111	Rule for collective entries
		including paint thinning and reducing compound				
1265 1266	Pentanes Perfumery products	n-Pentane with flammable solvents	3 3	F1 F1	 /	Mixture of hydrocarbons Rule for collective
						entries
1268	Coal tar naphtha	vapour pressure at 50 °C not more than 110 kPa	3	F1	II	Mixture of hydrocarbons
1268	Petroleum distillates, n.o.s.		3	F1	1/11/111	Rule for collective entries
	Petroleum products, n.o.s.					
1274	n-Propanol		3	F1	11/111	Acetic acid
1275	Propionaldehyde		3	F1	II	Mixture of hydrocarbons
1276	n-Propyl acetate		3	F1	II	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
1277	Propylamine	n-Propylamine	3	FC	II	Mixture of hydrocarbons and
1001	Drenul formates	nure icomore and	0	F1		wetting solution
1281	Propyl formates	pure isomers and isomeric mixture	3	F1	11	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
1282	Pyridine		3	F1	II	Mixture of hydrocarbons
1286	Rosin oil		3	F1	11/111	Rule for collective entries
1287	Rubber solution		3	F1	11/111	Rule for collective entries
1296	Triethylamine		3	FC	II	Mixture of hydrocarbons and
1297	Trimethylamine, aqueous solution	not more than 50 % trimethylamine, by mass	3	FC	1/11/111	wetting solution Mixture of hydrocarbons and wetting solution
1301	Vinvl acetate		3	F1		n-Butyl acetate/
1001	stabilized		0			n-butyl acetate- saturated
1306	Wood preservatives,		3	F1	11/111	wetting solution Rule for collective
1547	niquia Aniline		61	Т1	П	entries Acetic acid
1041			0.1			

UN	Proper shipping	Description	Class	Classif	Packin	Standard liquid
NO.	or			I- cation	g aroup	
	technical name			Code	9.000	
	3.1.2	3.1.2	2.2	2.2	2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
1590	Dichloroanilines, liquid	pure isomers and isomeric mixture	6.1	T1	II	Acetic acid
1602	Dye, liquid, toxic, n.o.s. or Dye intermediate,		6.1	T1	1/11/111	Rule for collective entries
1604	liquid, toxic, n.o.s. Ethylenediamine		8	CF1	II	Mixture of hydrocarbons and wetting solution
1715	Acetic anhvdride		8	CF1	11	Acetic acid
1717	Acetyl chloride		3	FC	II	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
1718	Butyl acid phosphate		8	C3		Wetting solution
1719	Hydrogen sulphide	aqueous solution	8	C5	III	Acetic acid
1719	Caustic alkali liquid, n.o.s.	inorganic	8	C5	11/111	Rule for collective entries
1730	Antimony pentachloride, liquid	pure	8	C1	II	Water
1736	Benzoyl chloride		8	C3	II	Mixture of hydrocarbons and
1750	Chleresstic said		<u> </u>	TO1		wetting solution
1750	solution	aqueous solution	6.1		11	Acetic acid
1750	Chloroacetic acid solution	mixtures of mono- and dichloroacetic acid	6.1	TC1	II	Acetic acid
1752	Chloroacetyl chloride		6.1	TC1	I	n-Butyl acetate/ n-butyl acetate- saturated
1755	Chromic acid solution	aqueous solution with not more than 30 % chromic acid	8	C1	11/111	Nitric acid
1760	Cyanamide	aqueous solution with not more than 50 % cvanamide	8	C9	II	Water
1760	O,O-Diethyl- dithiophosphoric acid	oyunumuo	8	C9	II	n-Butyl acetate/ n-butyl acetate- saturated
1760	O,O-Diisopropyl- dithiophosphoric acid		8	C9	11	wetting solution n-Butyl acetate/ n-butyl acetate- saturated
1760	O,O-Di-n-propyl- dithiophosphoric acid		8	C9	II	wetting solution n-Butyl acetate/ n-butyl acetate- saturated
1760	Corrosive liquid, n.o.s.	flashpoint more than 60 °C	8	C9	1/11/111	wetting solution Rule for collective entries

UN	Proper shipping	Description	Class	Classif	Packin	Standard liquid
No.	name			i-	g	
	or technical name			Code	group	
	3.1.2	3.1.2	2.2	2.2	2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
1761	Cupriethylenediamin e solution	aqueous solution	8	CT1	11/111	Mixture of hydrocarbons and
				_		wetting solution
1764	Dichloroacetic acid		8	C3		Acetic acid
1775	Fluoroboric acid	aqueous solution with not more than 50 % fluoroboric acid	8	C1		Water
1778	Fluorosilicic acid		8	C1	П	Water
1779	Formic acid	with more than 85 % acid by mass	8	C3	II	Acetic acid
1783	Hexamethylenediami ne solution	aqueous solution	8	C7	11/111	Mixture of hydrocarbons and
			_			wetting solution
1787	Hydriodic acid	aqueous solution	8	C1	11/111	Water
1788	Hydrobromic acid	aqueous solution	8	C1		Water
1789	Hydrochloric acid	aqueous solution	8	61		Water
1790	Hydrofluoric acid	with not more than	8	CI1	11	Water
						of use:
						not more than 2 years
1791	Hypochlorite	aqueous solution,	8	C9	11/111	Nitric acid
	solution	containing wetting agents as customary in				and wetting solution *
		trade				
1791	Hypochlorite solution	aqueous solution	8	C9	11/111	Nitric acid *
Fo	r UN 1791: Test to be o standard liquid, an ac	carried out only with ver id-resistant vent and or	nt. If the asket st	e test is nall be u	carried	out with nitric acid as be test is carried out
wit	h hypochlorite solution	ns themselves, vents a	nd gask	ets of th	ie same	design type, resistant
to	hypochlorite (e.g. of si	licone rubber) but not r	esistan	t to nitri	c acid, a	are also permitted.
1793	Isopropyl acid phosphate		8	C3		Wetting solution
1802	Perchloric acid	aqueous solution with not more than 50 % acid, by mass	8	CO1	II	Water
1803	Phenolsulphonic acid, liquid	isomeric mixture	8	C3	II	Water
1805	Phosphoric acid, solution		8	C1	111	Water
1814	Potassium hydroxide solution	aqueous solution	8	C5	11/111	Water
1824	Sodium hydroxide solution	aqueous solution	8	C5	11/111	Water
1830	Sulphuric acid	with more than 51 % pure acid	8	C1	II	Water
1832	Sulphuric acid, spent	chemical stable	8	C1	П	Water
1833	Sulphurous acid		8	C1	П	Water
1835	Tetramethylammoniu	aqueous solution,	8	C7	П	Water
	m hydroxide, solution	flashpoint more than 60 °C				

UN	Proper shipping	Description	Class	Classif	Packin	Standard liquid
No.	name			i-	g	
	or technical name			Code	group	
	3.1.2	3.1.2	2.2	2.2	2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
1840	Zinc chloride	aqueous solution	8	C1		Water
1848	Propionic acid	with not less than 10 % and less than 90 % acid by mass	8	C3	111	n-Butyl acetate/ n-butyl acetate- saturated
1862	Ethyl crotonate		3	F1	II	n-Butyl acetate/ n-butyl acetate- saturated
1863	Fuel, aviation, turbine engine		3	F1	1/11/111	wetting solution Mixture of hydrocarbons
1866	Resin solution	flammable	3	F1	1/11/111	Rule for collective entries
1902	Diisooctyl acid phosphate		8	C3		Wetting solution
1906	Sludge acid		8	C1	II	Nitric acid
1908	Chlorite solution	aqueous solution	8	C9	11/111	Acetic acid
1914	Butyl propionates		3	F1	III	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
1915	Cyclohexanone		3	F1		Mixture of hydrocarbons
1917	Ethyl acrylate, stabilized		3	F1	II	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
1919	Methyl acrylate, stabilized		3	F1	11	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
1920	Nonanes	pure isomers and isomeric mixture, flashpoint between 23 °C and 60 °C	3	F1	III	Mixture of hydrocarbons
1935	Cyanide solution, n.o.s.	inorganic	6.1	T4	1/11/111	Water
1940	Thioglycolic acid		8	C3	П	Acetic acid
1986	Alcohols, flammable, toxic, n.o.s.		3	FT1	1/11/111	Rule for collective entries
1987	Cyclohexanol	technical pure	3	F1	Ш	Acetic acid
1987	Alcohols, n.o.s.		3	F1	11/111	Rule for collective entries
1988	Aldehydes, flammable, toxic, n.o.s.		3	FT1	1/11/111	Rule for collective entries
1989	Aldehydes, n.o.s.		3	F1	1/11/111	Rule for collective entries
1992	2,6-cis-Dimethyl- morpholine		3	FT1		Mixture of hydrocarbons

UN	Proper shipping	Description	Class	Classif	Packin	Standard liquid
NO.	or			I- cation	g	
	technical name			Code	group	
	3.1.2	3.1.2	2.2	2.2	2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
1992	Flammable liquid, toxic, n.o.s.		3	FT1	1/11/111	Rule for collective entries
1993	Propionic acid vinyl ester		3	F1	II	n-Butyl acetate/ n-butyl acetate- saturated
1993	(1-Methoxy-2-propyl) acetate		3	F1	III	wetting solution n-Butyl acetate/ n-butyl acetate- saturated wetting solution
1993	Flammable liquid, n.o.s.		3	F1	1/11/111	Rule for collective entries
2014	Hydrogen peroxide, aqueous solution	with not less than 20 % but not more than 60 % hydrogen peroxide, stabilized as necessary	5.1	OC1	II	Nitric acid
2022	Cresylic acid	liquid mixture containing cresols, xylenols and methyl phenols	6.1	TC1	II	Acetic acid
2030	Hydrazine aqueous solution	with not less than 37 % but not more than 64 % hydrazine by mass	8	CT1	II	Water
2030	Hydrazine hydrate	aqueous solution with 64 % hydrazine	8	CT1	II	Water
2031	Nitric acid	other than red fuming, with not more than 55 % pure acid	8	CO1	II	Nitric acid
2045	Isobutyraldehyde		3	F1	П	Mixture of hydrocarbons
2050	Diisobutylene isomeric compounds		3	F1	II	Mixture of hydrocarbons
2053	Methyl isobutyl carbinol		3	F1	111	Acetic acid
2054	Morpholine		8	CF1	I	Mixture of hydrocarbons
2057	Tripropylene		3	F1	11/111	Mixture of hydrocarbons
2058	Valeraldehyde	pure isomers and isomeric mixture	3	F1	II	Mixture of hydrocarbons
2059	Nitrocellulose solution, flammable		3	D	1/11/111	Rule for collective entries:
						Deviating from the general procedure this rule may be applied to solvents of classification code F1
2075	Chloral, anhydrous, stabilized		6.1	T1	II	Wetting solution
2076	Cresols, liquid	pure isomers and isomeric mixture	6.1	TC1	II	Acetic acid
2078	Toluene diisocyanate	liquid	6.1	T1	II	n-Butyl acetate/ n-butyl acetate- saturated wetting solution

UN	Proper shipping	Description	Class	Classif	Packin	Standard liquid
No.	name	-		i-	g	
	Or			cation	group	
		0.1.0	0.0	Code	0110	
(1)	3.1.2	3.1.2 (2h)	(2.2	2.2 (2h)	2.1.1.3	(5)
(1)	(2a)	(20)	(3a)	(30)	(4)	(5)
2079	Diethylenetriamine		8	C7	Ш	Mixture of hydrocarbons
2209	Formaldehyde	aqueous solution with	8	C9	111	Acetic acid
	solution	37 % Form-aldenyde,				
		10 %				
2209	Formaldehyde	aqueous solution, with	8	C9	III	Water
	solution	not less than 25 %				
2218	Acrylic acid		8	CE1		n-Butyl acetate/
2210	stabilized		0			n-butyl acetate-
						saturated
						wetting solution
2227	n-Butyl methacrylate,		3	F1	III	n-Butyl acetate/
	stabilized					n-butyl acetate-
						saturated
0005	Chlorobonzyl	nora Chlarahanzul	6.1	то		Wetting solution
2235	chlorides liquid	chloride	0.1	12	111	Mixture of Hydrocarbons
2241	Cyclohentane	chionae	3	F1	П	Mixture of hydrocarbons
2242	Cyclohentene		3	F1		Mixture of hydrocarbons
2243	Cyclohexyl acetate		3	F1		n-Butyl acetate/
2210	e yololloxyl acolato		Ũ			n-butyl acetate-
						saturated
						wetting solution
2244	Cyclopentanol		3	F1	III	Acetic acid
2245	Cyclopentanone		3	F1	III	Mixture of hydrocarbons
2247	n-Decane		3	F1		Mixture of hydrocarbons
2248	Di-n-butylamine		8	CF1		Mixture of hydrocarbons
2258	1,2-		8	CF1	II	Mixture of hydrocarbons
	Propylenediamine					and wetting solution
2259	Triethylenetetramine		8	C7	П	Water
2260	Tripropylamine		3	FC		Mixture of hydrocarbons
			Ū			and
						wetting solution
2263	Dimethylcyclohexane	pure isomers and	3	F1	II	Mixture of hydrocarbons
2264	- N.N-Dimethvl-		8	CF1		Mixture of hydrocarbons
	cyclohexylamine		-			and
						wetting solution
2265	N,N-Dimethyl-		3	F1	III	n-Butyl acetate/
	formamide					n-butyl acetate-
						saturated
2266	Dimothyl N		2	FC	п	Welling solution
2200	propylamine		3	FU	11	and
	P. 0PJ 1011110					wetting solution
2269	3,3'-Imino-		8	C7		Mixture of hydrocarbons
	dipropylamine		_			and
						wetting solution

UN	Proper shipping	Description	Class	Classif	Packin	Standard liquid
No.	name			i-	g	
	technical name			Code	group	
	3.1.2	3.1.2	2.2	2.2	2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
2270	Ethylamine, aqueous solution	with not less than 50 % but not more than 70 % ethylamine, flashpoint	3	FC	=	Mixture of hydrocarbons and wetting solution
		below 23 °C, corrosive or slightly corrosive				
2275	2-Ethylbutanol		3	F1	111	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
2276	2-Ethylhexylamine		3	FC	III	Mixture of hydrocarbons and wotting solution
2277	Ethyl methacrylate, stabilized		3	F1	II	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
2278	n-Heptene		3	F1		Mixture of hydrocarbons
2282	Hexanols	pure isomers and isomeric mixture	3	F1	III	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
2283	Isobutyl methacrylate, stabilized		3	F1	III	n-Butyl acetate/ n-butyl acetate- saturated
2286	Pentamethylheptane		3	F1	ш	Mixture of hydrocarbons
2287	Isoheptenes		3	F1	II	Mixture of hydrocarbons
2288	Isohexenes		3	F1	П	Mixture of hydrocarbons
2289	Isophoronediamine		8	C7		Mixture of hydrocarbons and
2293	4-Methoxy-4-methyl- pentan-2-one		3	F1	111	wetting solution Mixture of hydrocarbons
2296	Methylcyclohexane		3	F1	II	Mixture of hydrocarbons
2297	Methylcyclohexanon e	pure isomers and isomeric mixture	3	F1	III	Mixture of hydrocarbons
2298	Methylcyclopentane		3	F1	П	Mixture of hydrocarbons
2302	5-Methylhexan-2-one		3	F1	III	Mixture of hydrocarbons
2308	Nitrosylsulphuric acid, liquid		8	C1	Ш	Water
2309	Octadienes		3	F1		Mixture of hydrocarbons
2313	Picolines	pure isomers and isomeric mixture	3	F1	111	Mixture of hydrocarbons
2317	Sodium cuprocyanide solution	aqueous solution	6.1	T4	I	Water
2320	Tetraethylenepentam ine		8	C7	III	Mixture of hydrocarbons and wetting solution

UN	Proper shipping	Description	Class	Classif	Packin	Standard liquid
No.	name			i-	g	
	Or technical name			Code	group	
	3.1.2	312	22	22	2113	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
2324	Triisobutylene	mixture of C12-mono- olefines, flashpoint between 23 °C and 60 °C	3	F1	III	Mixture of hydrocarbons
2326	Trimethyl- cyclohexylamine		8	C7	III	Mixture of hydrocarbons and
2327	Trimethylhexamethyl ene-diamines	pure isomers and isomeric mixture	8	C7	III	wetting solution Mixture of hydrocarbons and
2330	Undecane		3	E1	ш	Mixture of hydrocarbons
2336	Allyl formate		3	FT1	1	n-Rutyl acetate/
2000	Allyi formate		5		I	n-butyl acetate- saturated wetting solution
2348	Butyl acrylates, stabilized	pure isomers and isomeric mixture	3	F1	III	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
2357	Cyclohexylamine	flashpoint between 23 °C and 60 °C	8	CF1	II	Mixture of hydrocarbons and
2361	Diisobutylamine		3	FC	111	Mixture of hydrocarbons and
2366	Diethyl carbonate		3	F1	III	wetting solution n-Butyl acetate/ n-butyl acetate- saturated wetting solution
2367	alpha-Methyl- valeraldehyde		3	F1	=	Mixture of hydrocarbons
2370	1-Hexene		3	F1	II	Mixture of hydrocarbons
2372	1,2-Di- (dimethylamino)-		3	F1	II	Mixture of hydrocarbons and wotting solution
2379	1,3- Dimethylbutylamine		3	FC	II	Mixture of hydrocarbons and
2383	Dipropylamine		3	FC	Ш	wetting solution Mixture of hydrocarbons and
2385	Ethyl isobutyrate		3	F1	II	wetting solution n-Butyl acetate/ n-butyl acetate- saturated wetting solution
2393	Isobutyl formate		3	F1	II	n-Butyl acetate/ n-butyl acetate- saturated wetting solution

UN No	Proper shipping	Description	Class	Classif	Packin	Standard liquid
110.	Or toobnical name			cation	group	
	a 1 2	312	22	2.2	2113	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
(1)			(04)	(00)	(1)	
2394	Isobutyi propionate	flashpoint between 23 °C and 60 °C	3	F1		n-Butyl acetate/ n-butyl acetate- saturated wetting solution
2396	Methacrylaldehyde, stabilized		3	FT1	II	Mixture of hydrocarbons
2400	Methyl isovalerate		3	F1	II	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
2401	Piperidine		8	CF1	I	Mixture of hydrocarbons and
2403	Isopropenyl acetate		3	F1	II	wetting solution n-Butyl acetate/ n-butyl acetate- saturated
2405	Isopropyl butyrate		3	F1	Ш	wetting solution n-Butyl acetate/ n-butyl acetate- saturated
2406	Isopropyl isobutyrate		3	F1	II	wetting solution n-Butyl acetate/ n-butyl acetate- saturated wetting solution
2409	Isopropyl propionate		3	F1	II	n-Butyl acetate/ n-butyl acetate- saturated
2410	1,2,3,6-Tetrahydro-		3	F1	II	wetting solution Mixture of hydrocarbons
2427	Potassium chlorate,		5.1	O1	11/111	Water
2428	Sodium chlorate, aqueous solution		5.1	O1	11/111	Water
2429	Calcium chlorate, aqueous solution		5.1	O1	11/111	Water
2436	Thioacetic acid		3	F1	П	Acetic acid
2457	2,3-Dimethylbutane		3	F1	11	Mixture of hydrocarbons
2491	Ethanolamine		8	C7	Ш	Wetting solution
2491	Ethanolamine	aqueous solution	8	C7	Ш	Wetting solution
	solution					-
2496	Propionic anhydride		8	C3	111	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
2524	Ethyl orthoformate		3	F1	III	n-Butyl acetate/ n-butyl acetate- saturated wetting solution

UN No.	Proper shipping name	Description	Class	Classif i-	Packin a	Standard liquid
	or technical name			cation Code	group	
	3.1.2	3.1.2	2.2	2.2	2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
2526	Furfurylamine		3	FC		Mixture of hydrocarbons
2527	Isobutyl acrylate, stabilized		3	F1	111	wetting solution n-Butyl acetate/ n-butyl acetate- saturated wetting solution
2528	Isobutyl isobutyrate		3	F1		n-Butyl acetate/ n-butyl acetate- saturated
2529	Isobutyric acid		3	FC	111	wetting solution n-Butyl acetate/ n-butyl acetate- saturated
2531	Methacrylic acid, stabilized		8	C3	II	wetting solution n-Butyl acetate/ n-butyl acetate- saturated
2542	Tributylomino		61	Τ1		Welling solution
2560 2560	2-Methylpentan-2-ol		3	F1		n-Butyl acetate/ n-butyl acetate- saturated
2564	Trichloroacetic acid	aqueous solution	8	C3	11/111	wetting solution Acetic acid
2565	Dicyclohexylamine		8	C7	111	Mixture of hydrocarbons and
2571	Ethylsulphuric acid		8	C3	II	wetting solution n-Butyl acetate/ n-butyl acetate- saturated
2571	Alkylsulphuric acids		8	C3	II	Rule for collective
2580	Aluminium bromide solution	aqueous solution	8	C1	Ш	Water
2581	Aluminium chloride solution	aqueous solution	8	C1	111	Water
2582	Ferric chloride solution	aqueous solution	8	C1	111	Water
2584	Methane sulphonic acid	with more than 5 % free sulphuric acid	8	C1	II	Water
2584	Alkylsulphonic acids, liquid	with more than 5 % free sulphuric acid	8	C1	II	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
2584	Benzene sulphonic acid	with more than 5 % free sulphuric acid	8	C1	II	Water
2584	Toluene sulphonic acids	with more than 5 % free sulphuric acid	8	C1	II	Water

UN No.	Proper shipping name or technical name	Description	Class	Classif i- cation	Packin g group	Standard liquid
	312	312	22	22	2113	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
2584	Arylsulphonic acids, liquid	with more than 5 % free sulphuric acid	8	C1		n-Butyl acetate/ n-butyl acetate- saturated
2586	Methane sulfonic acid	with not more than 5 % free sulphuric acid	8	C1	III	Water
2586	Alkylsulphonic acids, liquid	with not more than 5 % free sulphuric acid	8	C1	III	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
2586	Benzene sulphonic acid	with not more than 5 % free sulphuric acid	8	C1		Water
2586	Toluene sulphonic acids	with not more than 5 % free sulphuric acid	8	C1		Water
2586	Arylsulphonic acids, liquid	with not more than 5 % free sulphuric acid	8	C1	III	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
2610	Triallylamine		3	FC	III	Mixture of hydrocarbons and
2614	Methallyl alcohol		3	F1	ш	
2617	Methylcyclohexanols	nure isomers and	3	F1		Acetic acid
2017	inetry is your example.	isomeric mixture, flashpoint between 23 °C and 60 °C	0			
2619	Benzyldimethylamine		8	CF1	II	Mixture of hydrocarbons and wetting solution
2620	Amyl butyrates	pure isomers and isomeric mixture, flashpoint between 23 °C and 60 °C	3	F1		n-Butyl acetate/ n-butyl acetate- saturated wetting solution
2622	Glycidaldehyde	flashpoint below 23 °C	3	FT1	П	Mixture of hydrocarbons
2626	Chloric acid, aqueous solution	with not more than 10 % chloric acid	5.1	O1	II	Nitric acid
2656	Quinoline	flashpoint more than 60 °C	6.1	T1		Water
2672	Ammonia solution	relative density between 0.880 and 0.957 at 15 °C in water, with more than 10 % but not more than 35 % ammonia	8	C5	III	Water
2683	Ammonium sulphide solution	aqueous solution, flashpoint between 23 °C and 60 °C	8	CFT	II	Acetic acid
2684	3-Diethylamino- propylamine		3	FC		Mixture of hydrocarbons and wetting solution

No.	Proper shipping name	Description	Class	Classif i-	Packin g	Standard liquid
	or technical name			Code	group	
	3.1.2	3.1.2	2.2	2.2	2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
2685	N,N-Diethylethylene- diamine		8	CF1	Π	Mixture of hydrocarbons and
2693	Bisulphites, aqueous solution, n.o.s.	inorganic	8	C1	III	Water
2707	Dimethyldioxanes	pure isomers and isomeric mixture	3	F1	11/111	Mixture of hydrocarbons
2733	Amines, flammable, corrosive, n.o.s. or Polyamines, flammable,		3	FC	1/11/111	Mixture of hydrocarbons and wetting solution
2734 2734	Di-sec-butylamine Amines, liquid, corrosive, flammable, n.o.s. or Polyamines, liquid,		8 8	CF1 CF1	11 1/11	Mixture of hydrocarbons Mixture of hydrocarbons and wetting solution
	corrosive, flammable, n.o.s.					
2735	Amines, liquid, corrosive, n.o.s. or Polyamines, liquid,		8	C7	1/11/111	Mixture of hydrocarbons and wetting solution
2739	corrosive, n.o.s. Butyric anhydride		8	C3	III	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
2789	Acetic acid, glacial or Acetic acid solution	aqueous solution, more than 80 % acid, by mass	8	CF1	II	Acetic acid
2790	Acetic acid solution	aqueous solution, more than 10 % but not more than 80 % acid, by mass	8	C3	11/111	Acetic acid
2796	Sulphuric acid	with not more than 51 % pure acid	8	C1	Ш	Water
2797	Battery fluid, alkali	Potassium/Sodium hydroxide, aqueous solution	8	C5	II	Water
2810	2-Chloro-6- fluorobenzvl chloride	stabilized	6.1	T1	111	Mixture of hydrocarbons
2810	2-Phenylethanol		6.1	T1	III	Acetic acid
2810	Ethylene glycol		6.1	T1	III	Acetic acid
2810	monohexyl ether Toxic liquid, organic, n.o.s.		6.1	T1	1/11/111	Rule for collective entries
2815	N- Aminoethylpiperazin		8	CT1		Mixture of hydrocarbons and

UN No.	Proper shipping name	Description	Class	Classif i-	Packin	Standard liquid
110.	Or technical name			cation	group	
	3.1.2	3.1.2	2.2	2.2	2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
2818	Ammonium polysulphide solution	aqueous solution	8	CT1	11/111	Acetic acid
2819	Amyl acid phosphate		8	C3		Wetting solution
2820	Butyric acid	n-Butyric acid	8	C3	111	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
2821	Phenol solution	aqueous solution, toxic, non-alkaline	6.1	T1	11/111	Acetic acid
2829	Caproic acid	n-Caproic acid	8	C3	111	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
2837	Bisulphates, aqueous solution		8	C1	11/111	Water
2838	Vinyl butyrate, stabilized		3	F1	II	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
2841	Di-n-amylamine		3	FT1	III	Mixture of hydrocarbons and
2850	Propylene tetramer	mixture of C12- monoolefines, flashpoint between 23 °C and 60 °C	3	F1	III	wetting solution Mixture of hydrocarbons
2873	Dibutylaminoethanol	N,N-Di-n- butvlaminoethanol	6.1	T1	Ш	Acetic acid
2874	Furfuryl alcohol	,	6.1	T1		Acetic acid
2920	O,O-Diethyl- dithiophosphoric acid	flashpoint between 23 °C and 60 °C	8	CF1	II	n-Butylacetate/ n-Butylacetate- saturated wetting solution
2920	O,O-Dimethyl- dithiophosphoric acid	flashpoint between 23 °C and 60 °C	8	CF1	II	Wetting solution
2920	Hydrogen bromide	33 % solution in glacial acetic acid	8	CF1	II	Wetting solution
2920	Tetramethylammonium hydroxide	aqueous solution, flashpoint between 23 °C and 60 °C	8	CF1	II	Water
2920	Corrosive liquid, flammable, n.o.s.		8	CF1	1/11	Rule for collective entries
2922	Ammonium sulphide	aqueous solution, flashpoint more than 60 °C	8	CT1	II	Water
2922	Cresols	aqueous alkaline solution, mixture of sodium and potassium cresolate,	8	CT1	II	Acetic acid

UN No.	Proper shipping name or	Description	Class	Classif i- cation	Packin g group	Standard liquid
		210	2.2	Code	2112	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
2922	Phenol	aqueous alkaline solution, mixture of sodium and potassium phenolate	8	CT1		Acetic acid
2922	Sodium hydrogen difluoride	aqueous solution	8	CT1		Water
2922	Corrosive liquid, toxic, n.o.s.		8	CT1	1/11/111	Rule for collective entries
2924	Flammable liquid, corrosive, n.o.s.	slightly corrosive	3	FC	1/11/111	Rule for collective entries
2927	Toxic liquid, corrosive, organic, n.o.s.		6.1	TC1	1/11	Rule for collective entries
2933	Methyl 2-chloro- propionate		3	F1	III	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
2934	Isopropyl 2-chloro- propionate		3	F1	III	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
2935	Ethyl 2- chloropropionate		3	F1	III	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
2936	Thiolactic acid		6.1	T1	II	Acetic acid
2941	Fluoroanilines	pure isomers and isomeric mixture	6.1	T1	III	Acetic acid
2943	Tetrahydrofurfurylam ine		3	F1	III	Mixture of hydrocarbons
2945	N-Methylbutylamine		3	FC	II	Mixture of hydrocarbons and wetting solution
2946	2-Amino-5-diethyl- aminopentane		6.1	T1	III	Mixture of hydrocarbons and
2947	Isopropyl chloroacetate		3	F1	III	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
2984	Hydrogen peroxide, aqueous solution	with not less than 8 % but less than 20 % hydrogen peroxide, stabilized as necessary	5.1	O1	III	Nitric acid
3056	n-Heptaldehyde		3	F1	III	Mixture of hydrocarbons
3065	Alcoholic beverages	with more than 24 % alcohol by volume	3	F1	11/111	Acetic acid

UN No.	Proper shipping name	Description	Class	Classif i- cation	Packin g	Standard liquid
	technical name			Code	group	
	3.1.2	3.1.2	2.2	2.2	2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
3066	Paint ^{or} Paint related material	including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base	8	C9	11/111	Rule for collective entries
		including paint thinning and reducing compound				
3079	Methacrylonitrile, stabilized		6.1	TF1	I	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
3082	sec-Alcohol C6-C17 poly (3-6) ethoxylate		9	M6	III	n-Butyl acetate/ n-butyl acetate- saturated wetting solution and
						mixture of hydrocarbons
3082	(1-3) ethoxylate		9	M6		n-Butyl acetate/ n-butyl acetate- saturated wetting solution and
3082	Alcohol C13-C15 poly (1-6) ethoxylate		9	M6	111	mixture of hydrocarbons n-Butyl acetate/ n-butyl acetate- saturated wetting solution and
3082	Aviation turbine fuel	flashpoint more than	9	M6	111	mixture of hydrocarbons Mixture of hydrocarbons
3082	Aviation turbine fuel JP-7	flashpoint more than 60 °C	9	M6	III	Mixture of hydrocarbons
3082	Coal tar	flashpoint more than 60 °C	9	M6	III	Mixture of hydrocarbons
3082	Coal tar naphtha	flashpoint more than 60 °C	9	M6		Mixture of hydrocarbons
3082	Creosote produced of coal tar	flashpoint more than 60 °C	9	M6	III	Mixture of hydrocarbons
3082	Creosote produced of wood tar	flashpoint more than 60 °C	9	M6		Mixture of hydrocarbons
3082	Cresyl diphenyl phosphate		9	M6		Wetting solution
3082	Decyl acrylate		9	M6	111	n-Butyl acetate/ n-butyl acetate- saturated wetting solution and mixture of hydrocarbons

UN No	Proper shipping	Description	Class	Classif	Packin	Standard liquid
NO.	or			cation	y group	
	technical name			Code		
	3.1.2	3.1.2	2.2	2.2	2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
3082	Diisobutyl phthalate		9	M6	11	n-Butyl acetate/ n-butyl acetate- saturated
3082	Di-n-butyl phthalate		9	M6	III	mixture of hydrocarbons n-Butyl acetate/ n-butyl acetate- saturated
						wetting solution and mixture of hydrocarbons
3082	Hydrocarbons	liquid, flashpoint more than 60 °C, environmentally hazardous	9	M6	111	Rule for collective entries
3082	Isodecyl diphenyl phosphate		9	M6	Ш	Wetting solution
3082	Methylnaphthalenes	isomeric mixture, liquid	9	M6	Ш	Mixture of hydrocarbons
3082	Triaryl phosphates	n.o.s.	9	M6	III	Wetting solution
3082	Tricresyl phosphate	with not more than 3 % ortho-isomer	9	M6	III	Wetting solution
3082	Trixylenyl phosphate		9	M6	Ш	Wetting solution
3082	Zinc alkyl dithiophosphate	C3-C14	9	M6	===	Wetting solution
3082	Zinc aryl dithiophosphate	C7-C16	9	M6	==	Wetting solution
3082	Environmentally hazardous substance, liquid, n.o.s.		9	M6	111	Rule for collective entries
3099	Oxidizing liquid, toxic, n.o.s.		5.1	OT1	1/11/111	Rule for collective entries
3101 3103 3105 3107	Organic Peroxide, Type B, C, D, E or F, liquid or		5.2	P1		n-Butyl acetate/ n-butyl acetate- saturated wetting solution
3109 3111 3113	Type B, C, D, E or F, liquid, temperature					mixture of hydrocarbons and
3115 3117 3119						THUIG AGO
hydr org col	** For UN Nos. 3101, operoxide with more tl ganic peroxides in a te npatibility is concerne	3103, 3105, 3107, 3109, nan 40 % peroxide cont chnically pure form or i d, are covered by the s	3111, 3 ent and n soluti tandard	113, 311 peroxy on in so liquid "	5, 3117 acetic a olvents v mixture	, 3119 (tert-butyl cids are excluded): All which, as far as their of hydrocarbons'' in
t	his list. Compatibility o	f vents and gaskets wi	th orgar	nic pero	xides m	ay be verified, also
01.45	Independently o	t the design type test, t	by labor	atory te	sts with	nitric acid.
3145	Butyipnenois	IIquia, n.o.s.	8	C3	1/11/111	Acetic acid

UN No.	Proper shipping name or	Description	Class	Classif i- cation	Packin g group	Standard liquid
	technical name			Code	9 p	
	3.1.2	3.1.2	2.2	2.2	2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
3145	Alkylphenols, liquid, n.o.s.	including C2 to C12 homologues	8	C3	1/11/111	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
3149	Hydrogen peroxide and peroxyacetic acid mixture, stabilized	with UN 2790 acetic acid, UN 2796 sulphuric acid and/or UN 1805 phosphoric acid, water and not more than 5 % peroxyacetic acid	5.1	OC1	II	Wetting solution and nitric acid
3210	Chlorates, inorganic, aqueous solution, n.o.s.		5.1	O1	11/111	Water
3211	Perchlorates, inorganic, aqueous solution. n.o.s.		5.1	O1	11/111	Water
3213	Bromates, inorganic, aqueous solution, n.o.s.		5.1	O1	11/111	Water
3214	Permanganates, inorganic, aqueous		5.1	O1	II	Water
3216	Persulphates, inorganic, aqueous solution, n.o.s.		5.1	O1	III	Wetting solution
3218	Nitrates, inorganic, aqueous solution, n.o.s.		5.1	O1	11/111	Water
3219	Nitrites, inorganic, aqueous solution, n.o.s.		5.1	O1	11/111	Water
3264	Cupric chloride	aqueous solution, slightly corrosive	8	C1	III	Water
3264	Hydroxylamine sulphate	25 % aqueous solution	8	C1	III	Water
3264	Phosphorous acid	aqueous solution	8	C1		Water
3264	Corrosive liquid, acidic, inorganic, n.o.s.	flashpoint more than 60 °C	8	C1	1/11/111	Rule for collective entries; not applicable to mixtures having components of UN Nos.: 1830, 1832, 1906 and 2308
3265	Methoxyacetic acid		8	C3	Ι	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
3265	Allyl succinic acid anhydride		8	C3	II	n-Butyl acetate/ n-butyl acetate- saturated wetting solution

UN No.	Proper shipping name or	Description	Class	Classif i- cation	Packin g group	Standard liquid
	technical name			Code	3.000	
	3.1.2	3.1.2	2.2	2.2	2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
3265 3265	Dithioglycolic acid Butyl phosphate	mixture of mono- and	8	C3 C3		n-Butyl acetate/ n-butyl acetate- saturated wetting solution Wetting solution
3265	Caprylic acid	di-butyl phosphate	8	C3	111	n-Butyl acetate/ n-butyl acetate-
3265	Isovaleric acid		8	C3	111	saturated wetting solution n-Butyl acetate/ n-butyl acetate- saturated wetting solution
3265	Pelargonic acid		8	C3		n-Butyl acetate/ n-butyl acetate- saturated
3265	Pyruvic acid		8	C3	111	wetting solution n-Butyl acetate/ n-butyl acetate- saturated
0005			•	00		wetting solution
3265 3265	Corrosive liquid,	flashpoint more than	8 8	C3 C3	 / /	Acetic acid Rule for collective entries
3266	Sodium hvdrosulphide	aqueous solution	8	C5	П	Acetic acid
3266	Sodium sulphide	aqueous solution, slightly corrosive	8	C5	III	Acetic acid
3266	Corrosive liquid, basic, inorganic, n o s	flashpoint more than 60 °C	8	C5	1/11/111	Rule for collective entries
3267	2,2'-(Butylimino)- bisethanol		8	C7	II	Mixture of hydrocarbons and
0007	O a mua a la cara di musi al	flaating interviewe die een		07		wetting solution
3267	basic, organic, n.o.s.	nashpoint more than 60 °C	8	07	1/11/111	entries
3271	Ethylene glycol monobutyl ether	flashpoint 60 °C	3	F1	III	Acetic acid
3271	Ether, n.o.s.		3	F1	11/111	Rule for collective entries
3272	Acrylic acid tert-butyl ester		3	F1	II	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
3272	Isobutyl propionate	flashpoint below 23 °C	3	F1	II	n-Butyl acetate/ n-butyl acetate- saturated wetting solution
3272	Methyl valerate		3	F1		n-Butyl acetate/ n-butyl acetate- saturated wetting solution

UN No.	Proper shipping name or	Description	Class	Classif i- cation	Packin g group	Standard liquid
	technical name			Code	3.000	
	3.1.2	3.1.2	2.2	2.2	2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
3272	Trimethyl ortho-		3	F1		n-Butyl acetate/
	formate					n-butyl acetate-
						saturated
2070	Ethyl valorato		2	E1		n Butyl acotato/
5212			5			n-butyl acetate-
						saturated
						wetting solution
3272	Isobutyl isovalerate		3	F1	- 111	n-Butyl acetate/
						n-butyl acetate-
						saturated
0070	A		•	-4		wetting solution
3272	n-Amyi propionate		3	F1	111	n-Butyl acetate/
						saturated
						wetting solution
3272	n-Butylbutyrate		3	F1		n-Butyl acetate/
Ē			_			n-butyl acetate-
						saturated
			-			wetting solution
3272	Methyl lactate		3	F1	111	n-Butyl acetate/
						n-butyl acetate-
						wetting solution
3272	Ester. n.o.s.		3	F1	11/111	Rule for collective
			-			entries
3287	Sodium nitrite	40 % aqueous solution	6.1	T4	- 111	Water
3287	Toxic liquid,		6.1	T4	1/11/111	Rule for collective
	inorganic, n.o.s.					entries
3291	Clinical waste,	liquid	6.2	13		Water
	unspecified, n.o.s.	The sector se				
3293	Hydrazine, aqueous	With not more than	6.1	14	- 111	Water
	Solution	mass				
3295	Heptenes	n.o.s	3	F1	П	Mixture of hydrocarbons
3295	Nonanes	flashpoint below 23 °C	3	F1	II	Mixture of hydrocarbons
3295	Decanes	nos	3	F1		Mixture of hydrocarbons
5235	Decanes	11.0.5	5	-		
3295	1,2,3-		3	F1		Mixture of hydrocarbons
2205	Inmethylbenzene		2	E1	1/11/111	Dula far collective
3295	liquid nos		3		1/11/111	entries
3405	Barium chlorate.	aqueous solution	51	OT1	11/111	Water
0.00	solution		0.1	011		Viator
3406	Barium perchlorate,	aqueous solution	5.1	OT1	11/111	Water
	solution					
3408	Lead perchlorate,	aqueous solution	5.1	OT1	11/111	Water
	solution			_		
3413	Potassium cyanide,	aqueous solution	6.1	T4	1/11/111	Water
0444	Solution		C 1	T 4	1/11/11	Matar
3414	solution	aqueous solution	0.1	14	1/11/111	vvaler
UN No.	Proper shipping name or technical name	Description	Class	Classif i- cation Code	Packin g group	Standard liquid
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	3.1.2	3.1.2	2.2	2.2	2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
3415	Sodium fluoride, solution	aqueous solution	6.1	T4		Water
3422	Potassium fluoride, solution	aqueous solution	6.1	T4	111	Water

Appendix B Table 4.1.6.15.1: Standards for UN and non-UN pressure receptacles

Applicable	Reference	Title of document
paragraphs		
4.1.6.2	EN ISO 11114-1:2020 EN ISO 11114-2:2013	Gas cylinders – Compatibility of cylinder and valve materials with gas contents – Part 1: Metallic materials Gas cylinders – Compatibility of cylinder and valve
		materials with gas contents – Part 2: Non-metallic materials
	AS 2030.1	Gas cylinders requirements
4.1.6.4	ISO 11621:1997 or EN ISO 11621:2005	Gas cylinders – Procedures for change of gas service
	AS 2030.1	Gas cylinders requirements
4.1.6.8 Valves with inherent	Clause 4.6.2 of EN ISO 10297:2006 or clause 5.5.2 of EN ISO	Gas cylinders – Cylinder valves – Specification and type testing
protection	10297:2014 or clause 5.5.2 of EN ISO 10297:2014 + A1:2017	
	Clause 5.3.8 of EN 13152:2001 + A1:2003	Testing and specifications of LPG cylinder valves – Self- closing
	Clause 5.3.7 of EN 13153:2001 + A1:2003	Specifications and testing of LPG cylinder valves – Manually operated
	Clause 5.9 of EN ISO 14245:2010, clause 5.9 of EN ISO 14245:2019 or clause 5.9 of EN ISO 14245:2021	Gas cylinders – Specifications and testing of LPG cylinder valves – Self-closing
	Clause 5.10 of EN ISO 15995:2010, clause 5.9 of EN ISO 15995:2019 or clause 5.9 of EN ISO 15995:2021	Gas cylinders – Specifications and testing of LPG cylinder valves – Manually operated
	Clause 5.4.2 of EN ISO 17879:2017	Gas cylinders – Self-closing cylinder valves – Specification and type testing
	Clause 7.4 of EN 12205:2001 or clause 9.2.5 of EN ISO 11118:2015 or clause 9.2.5 of EN ISO 11118:2015 + A1:2020	Gas cylinders – Non-refillable metallic gas cylinders – Specification and test methods
4.1.6.8 (b)	ISO 11117:1998 or EN ISO 11117:2008 + Cor 1:2009 or EN ISO 11117:2019	0BGas cylinders – Valve protection caps and guards – Design, construction and tests
	EN 962:1996 + A2:2000	Transportable gas cylinders – Valve protection caps and valve guards for industrial and medical gas cylinders – Design, construction and tests
4.1.6.8 (c)	Requirements for shrouds a protection under 4.1.6.8 (c) standards (see 6.2.2.3 for L receptacles).	and permanent protection attachments used as valve are given in the relevant pressure receptacle shell design IN pressure receptacles and 6.2.4.1 for non-UN pressure

Applicable paragraphs	Reference	Title of document
4.1.6.8 (b)	ISO 16111:2008 or	Transportable gas storage devices – Hydrogen absorbed
and (c)	ISO 16111:2018	in reversible metal hydride

Double click in the document to open in full.

REQUIREMENTS FOR DANGEROUS GOODS VACUUM TANKERS

Vacuum tanker designs submitted for approval for various classes of dangerous goods must demonstrate compliance with particular clauses in the following, as well as other requirements:

- Australian Standards (AS....)
- · European Agreement for International Carriage of DG by Road (ADR)
- American Petroleum Institute Recommended Practice 2219 (API)

Part 1 of this document sets out the clauses, and other requirements, that ALL vacuum tanker designs must comply with.

Part 2 of this document sets out the additional clauses that vacuum tankers intended for the transport of flammable liquids must ALSO comply with.

Note: there is some overlap of provisions (ie some clauses in AS2809.2 and AS2809.4 are the same).

Australian Standards AS1210 and AS2809 are available from http://infostore.saiglobal.com/store/.

The full text of relevant ADR and API clauses is included at appendix A.

The requirements set out in this document have been endorsed by the Dangerous Goods Competent Authorities Panel as acceptable *other criteria* under 6.9.2.1.3 (a) of the ADG Code edition 7.3.

PART 1 - REQUIREMENTS FOR ALL VACUUM TANKERS

AS1210

Tanks on vacuum tank vehicles must comply with AS1210 and must have a design registration certificate

AS2809.1

2.1.1	Stability
2.1.2	Road clearance
2.1.3	Tank attachment
2.1.4	Attachments
2.1.5	Cabin-to-tank clearance
2.1.6	Rear impact protection
2.1.7	Guarding
2.1.8	Tail shafts
2.1.9	Battery
2.1.10	Battery isolation switch
2.1.12	Drive away protection
2.1.13	Spillage hazards
2.2.1	Trailers – attachments and support
2.2.2	Trailers – axles and stability
2.4.1	Pumps – general
2.4.2	Pumps – pressure regulation
2.5.1	Engines – general
2.5.2	Engine intake and exhaust
2.6.3	Pressure testing
272	Signs – valve operation

Glossary

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
WHS	Work Health and Safety
MEGC	Multiple-element gas container
MEMU	Mobile explosives manufacturing unit (known in Australia as a mobile processing unit (MPU))
UN MR	United Nations Model Regulations on the Transport of Dangerous Goods

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