

National Road Vehicle Standard (Australian Design Rule 108/00 – Reversing Technologies) 2022

Made under section 12 of the *Road Vehicle Standards Act 2018*

Explanatory Statement

Approved by the Hon [name of relevant minister] [title of relevant minister]

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1. LEGISLATIVE AUTHORITY

1.1. National Road Vehicle Standards

National Road Vehicle Standard (Australian Design Rule 108/00 – Reversing Technologies) 2022, also referred to as ADR 108/00, is made under section 12 of the *Road Vehicle Standards Act 2018* (the Act). Section 12 of the Act allows the Minister to determine National Road Vehicle Standards.

1.2. Exemption from Sunsetting

ADR 108/00 is exempt from the sunsetting provisions of the *Legislation Act 2003*.

Source of the Exemption

A standard made under section 12 of the Act is not subject to the sunsetting provisions of section 50 of the *Legislation (Exemptions and Other Matters) Act 2003* through section 12 of the *Legislation (Exemptions and Other Matters) Regulation 2015* (table item 56C). A similar exemption was previously granted in respect of national road vehicle standards made under section 7 of the *Motor Vehicle Standards Act 1989* (MVSA) (item 40, section 12 of the *Legislation (Exemptions and Other Matters) Regulation 2015*). This exemption is important to ensure that ADR 108/00 continues to remain in force, and available to regulators and industry.

1.2.1. Justification

It is appropriate that standards made under section 12 of the Act, also known as the Australian Design Rules (ADRs), remain enduring and effective to regulate ongoing road worthiness of vehicles throughout their useful life and reduce regulatory burden on vehicle manufacturers.

1.2.1.1. Intergovernmental dependencies

The exemption concerns ADRs which facilitate the establishment and operation of the intergovernmental vehicle standard regime that Commonwealth, State and Territory governments rely on to regulate the safety of vehicles on public roads.

The Commonwealth uses the ADRs as the basis on which approvals to supply types of road vehicles to the market are granted under the *Road Vehicle Standards Rules 2019*. States and territories use the ADRs as the primary criteria on which vehicles are assessed for road worthiness. This ‘in-service’ aspect is dependent on the date of manufacture, which determines the applicable version of the ADRs against which the vehicle can be assessed. The ability to rely on national standards is particularly relevant given the long service life of vehicles – the average age of vehicles in Australia is 12.1 years.

While the ADRs are regularly updated to reflect changes in technology, it is not possible to apply these new standards retrospectively to vehicles that are already in use. With former ADRs kept on the Federal Register of Legislation, State and Territory governments can use them to ensure vehicles continue to comply with the ADRs that were in force when they were first supplied to the market.

In the event that the Commonwealth could not justify the maintenance of the ADRs, State and Territory governments would be compelled to create their own vehicle standards. Whilst this could mean adopting the substance of the lapsed ADRs as an interim measure, the differing needs and agendas of each State and Territory government may result in variations

to in-service regulations. Having different vehicle standards across the states and territories would make the scheme operate contrary to the underlying policy intent of the Act which is to set nationally consistent performance based standards.

1.2.1.2. Commercial dependencies

The effect on vehicle manufacturers to redesign existing models to comply with new ADRs would present a burden and be a costly and onerous exercise. Manufacturers should not be expected to continually go back to redesign existing vehicles. Furthermore, ongoing product recalls to comply with new ADRs would undermine consumer confidence with significant financial impact to manufacturers. This exemption allows vehicle manufacturers to focus their efforts to ensure new models supplied to the market continue to comply.

1.2.2. Effect on parliamentary oversight

Despite exemption from sunseting, ADRs are subject to regular reviews, when developments in vehicle technology necessitate updates to requirements. Comprehensive parliamentary scrutiny is available through these reviews.

Reviews of the ADRs ensure the ongoing effectiveness of a nationally consistent system of technical regulations for vehicle design, which are closely aligned, wherever appropriate with leading international standards such as United Nations regulations. Aligning with such standards facilitates the rapid introduction of the latest safety devices and technological advances into the Australian market, reducing regulatory burden.

2. PURPOSE AND OPERATION

2.1. Overview of the Regulatory Framework

The Act establishes a framework to regulate the importation and first provision of road vehicles to the market in Australia. The core principle of this framework is that vehicles which comply with appropriate standards are suitable for provision to the market in Australia. The Australian Design Rules (ADRs) have set out those standards since the early 1970s. At that time, they were applied cooperatively by the Australian Motor Vehicle Certification Board representing the Commonwealth and state and territory governments. In 1989, this arrangement was replaced by the *Motor Vehicle Standards Act 1989* (the MVSA) and the Australian Design Rules were determined as national standards. As of 2018, the MVSA has been replaced by the Act.

A majority of Australian road vehicle standards such as ADR 108/00 harmonise closely with international regulations. This is so that manufacturers can more easily comply with regulation, and so that regulations capture the well-developed views of the international community. This ultimately leads to safer and cheaper products for Australians.

ADRs often directly incorporate United Nations (UN) Regulations as an appendix, where the appendix provides the technical requirements of the ADR and the rest of the ADR facilitates its application to Australia. To this end, Section 6 creates exemptions and alternate procedures. For instance, manufacturers are exempt from requirements that pertain to UN type approvals, and instead, need to comply with the approvals process set out in the Act. Likewise, Section 7 provides for the acceptance of certain alternate standards that have

equivalent requirements to the appendix. For instance, a vehicle covered by a type approval under the UN Regulation would comply with the ADR.

Under the Act, the ADRs are National Road Vehicle Standards intended to make vehicles safe to use, control the emission of gas, particles or noise, secure vehicles against theft, provide for the security marking of vehicles and promote the saving of energy. The ADRs are applied to vehicles as criteria for approval under various regulatory pathways set out in the Road Vehicle Standards legislation. Vehicles approved under these regulatory pathways can be provided to the market in Australia for use in transport. ADRs apply equally to imported and locally manufactured vehicles.

2.2. Overview of the ADR

The purpose of ADR 108/00 is to specify requirements for Reversing Aids for new passenger vehicles (ADR vehicle categories MA, MB, and MC), new omnibuses (ADR vehicle categories MD and ME) and new goods vehicles (ADR vehicle categories NA, NB and NC), to reduce deaths or injuries from reversing vehicles. The ADR achieves this by increasing the driver's awareness or vision of vulnerable road users behind a vehicle.

ADR 108/00 specifies the requirements for the fitment of reversing technologies such as mirrors, cameras or sensors and includes performance and installation requirements to maximise the effectiveness of the technology.

2.3. Reversing Technologies

Reversing collisions primarily target crashes involving pedestrians or vulnerable road users (VRUs) such as cyclists. It is particularly concerning that reversing collisions often affect small children and the elderly who may be less aware of their surroundings and are particularly vulnerable to death and severe or permanent injury when hit. These crashes typically occur in low speed locations and on private properties, where vehicles perform low-speed manoeuvres such as entering or leaving parking spaces, turning corners and other situations where the view behind reversing vehicles may be obstructed.

Factors contributing to reversing collisions include the pedestrian's failure to see the reversing vehicle, anticipate its manoeuvres, or get out of the vehicle's path: in all of these scenarios the driver is generally unable to see the pedestrian before the collision. With young children, they often fail to recognise and respond to potential risks in their environment and due to their size are less likely to be seen by the driver.

The introduction of ADR 108/00 and its incorporated United Nations Regulation No. 158 – UN REGULATION ON UNIFORM PROVISIONS CONCERNING THE APPROVAL OF DEVICES AND MOTOR VEHICLES WITH REGARD TO THE DRIVER'S AWARENESS OF VULNERABLE ROAD USERS BEHIND VEHICLES WHEN REVERSING (UN R158) ensures the benefits provided through these technologies are spread across the whole vehicle fleet. This standard provides manufacturers with minimum performance requirements for reversing technologies to be installed on new model vehicles. Harmonisation with international regulations minimises costs associated with reversing technologies development, provides manufacturers the flexibility to incorporate or adapt systems that have already been developed and tested for markets with similar requirements. It also enables testing and certification frameworks in other markets to be leveraged.

2.4. Performance Requirements

ADR 108/00 prescribes requirements for fitment of at least one means of rear visibility or detection to the driver when reversing. Devices for means of rear visibility includes direct vision, close-proximity rear-view mirrors, rear-view camera systems or devices for indirect vision, where devices for detection may be a sensor system.

Clause 5.1 requires that all applicable vehicles be fitted with reversing technologies and meet the requirements set out in Appendix A of ADR 108/00, as varied by Section 6 Exemptions and Alternative Procedures. Appendix A is the UN R158.

2.4.1. Backing event

Reversing aids are to be operational during a backing event. A backing event commences when the vehicle is engaged in reverse, and ends when one of the following forward motion conditions is met; the vehicle speed is less than 16 km/h, distance travelled is less than 10 meters, continuous duration is less than 10 seconds or if the vehicle's direction selector is not placed in reverse.

2.4.2. Rear-view Camera System Requirements

Rear-view camera systems are intended to display an image of the outside world to provide the driver with a clear view of what is behind the vehicle. It usually consists of a rear-view camera and a monitor inside the vehicle cabin.

Some vehicles may have cameras other than those used for rear-view mounted at the front and the sides of the vehicle. These cameras may use the same monitor as the rear-view camera system with changes to the system's field of view settings making it possible to view the other cameras. The rear-view camera system must default to the rear-view image at the beginning of each backing event regardless of any changes to the field of view settings that have previously been made.

The rear-view camera system must show the defined field of vision within two seconds of the start of the backing event and remain visible until either; the driver modifies the view, or the vehicle direction selector is no longer in the reverse position. The rear-view image can be manually switched off when the vehicle detects that a trailer is being towed.

The monitor shall be visible without any obstruction from the driving position. Whilst reversing, the overlays on the monitor shall only display rearward driving-related visual information or safety-related information. Overlays for other purposes in the required field of vision are not allowed.

Manually activated overlays are allowed only when the driver needs to activate a rearward driving-related function or safety-related function (e.g. cleaning of the lens or activation of trailer hitch view) or requires specific information in such an environment. The driver may have an option to close the overlay.

2.4.3. Detection systems

Detection systems use signals to alert the driver when objects are close to the vehicle using at least two types of signal from audible, optical, and haptic. Within 0.6 seconds of a backing event starting, audible or haptic feedback must be given to the driver so they are aware that the system is active.

The detection system shall be activated when the backing event starts and remain active as long as the vehicle direction selector is in the reverse position. If the system is unable to properly function, the system must automatically shut off or the driver must be able to deactivate the system manually. As long as one-information signal remains active, the driver is able to de-activate the other information signals. The detection system can be switched off when the vehicle detects a coupling by means of a coupling device.

2.4.4. Rear-View Field of Vision Performance and Limitations

This National Road Vehicle Standard requires that devices for means of vision are tested to provide a close-proximity rear-view field of vision through detection of nine equally spaced circular cylinders 0.8m high and 0.3m in external diameter, placed in three rows at the rear of the vehicle. Using a test object height of 0.8m is advantageous for the detection of children at the rear of the vehicle as their average height is between 66 cm and 104 cm.

The minimum performance field of vision covers a rectangular area from 0.3m to 3.5m behind the vehicle in a parallel direction relative to the vehicle width. This provides visibility for objects in the rear at a close-proximity and at a distance.

Demonstration of meeting the requirements for 'field of vision' can be achieved via:

- the direct view from the driver's position;
- the driver's looking back ocular points combined with a close-proximity rear-view mirror installed at the rear end of the vehicle supporting this direct view;
- a device of indirect vision approved to UN Regulation No. 46;
- a device of indirect vision complying with this Regulation;
- a device of detection system that complies with this Regulation except for the field of detection (e.g. very short range); or
- a combination of devices except a combination of rear-view camera systems and mirror(s) or close-proximity rear-view mirror.

"Field of vision" means the section of the space above ground level which is monitored with the help of a device for indirect vision. Unless otherwise stated, this is based on the view offered by a device and/or devices other than mirrors.

2.4.5. Field of Detection Requirements

This National Road Vehicle Standard requires that the detection system is tested to provide information other than vision, through the detection of an even or odd number poles, placed in various locations to the rear of the vehicle. The minimum performance field of detection covers a rectangular area from 0.2m to 1.0m behind the vehicle in a parallel direction relative to the vehicle width. The minimum detection rate required is 90% of the area from 0.2m to 0.6m behind the vehicle and 87% of the area from 0.6m to 1.0m behind the vehicle.

An alternative simplified method is also provided where 10 poles are evenly spaced within the field of detection area at 0.05m from the edges, to which the minimum detection rate required is 100%.

The high detection rate of the two methodologies prescribed in this National Road Vehicle Standard mitigates disadvantages associated with detection systems (i.e. ultrasonic-sensors/radars) where the system might fail to detect objects or detect "ghost targets" and misinterpret the surroundings.

Demonstration of meeting the requirements using audible signals requires the provision of audible information in accordance to ISO 15006:2011 whilst an object is detected in the ‘field of detection’. The rear distance of the object relative to the vehicle is identified at two or more levels. These zones differentiated by levels (distance) and detection width may be indicated by changing the frequency of intermittent sound, where a faster intermittent sound or continuous sound shall be used as the distance becomes closer.

The audible signal must sound for as long as the object is detected, and can only cease when the object is no longer detected or when the system is deactivated. To reduce the driver’s discomfort, the audible signal can be automatically suspended temporarily after a certain time set by the manufacturer has elapsed, provided that the system remains activated. If, while the audible signal is automatically suspended temporarily, the distance to the object becomes short, the audible signal shall be automatically resumed. If the distance to the object becomes long, the audible signal may remain suspended.

Demonstration of meeting the requirements for ‘field of detection’ using optical signals requires that information to be placed on a monitor, where the monitor can also be used for other information such as meter cluster displays. Overlay of optical information is allowed in accordance with the overlay requirements of the rear-view camera system.

A driver must be able to recognise non-operation of the detection system (i.e. detection system failure by either warning indication, display information, black screen and absence of status indicators). Other information for the driver should be made available and explained in the operator’s manual.

"Field of detection" means the section of the tri-dimensional space above ground level.

2.5. Exemptions and Alternative Procedures

2.5.1. Exemptions

Section 6 creates exemptions from some requirements of Appendix A (UN R158) which pertain to gaining a Type Approval in the UN context. This is because they are not required in the Australian context where the Commonwealth administers approvals through the Act and the ADRs. Consequently, manufacturers supplying new vehicles to Australia are exempt from most administrative (non-technical) requirements of UN R158.

Clause 6.1 states that, sections 3, 5, 7, 8, 9, 10, 11, 13, 14, 18, 19, 20, 21, 22 and annexes 3 and 4 of UN R158 are not required for the purposes of complying with ADR 108/00. This is because they refer to gaining a Type Approval in the UN context.

Vehicles where installation of means of rear visibility or detection is incompatible with their on-road use may be partly or fully exempt from the regulation.

2.5.2. Alternative Procedures

Section 6 identifies procedures to which vehicles may comply, which are acceptable alternatives to those created by UN R158. These have been adapted for the Australian market to enable vehicle manufacturer to demonstrate compliance to ADR 108/00 where they have not gained a type approval in the UN context.

Clause 6.2 clarifies where Appendix A refers to “Technical Service”, it is to be substituted with “Testing Facility”. The purpose of this clause is to replace language in Appendix A,

which originally referred to the UN application process with language accurate to the Australian context.

Clause 6.3 clarifies where Annex 3 of Appendix A refers to “Type Approval Authority”, it is to be substituted with “Secretary” or “Administrator”. The purpose of this clause is to replace language in Appendix A, which originally referred to the UN application process with language accurate to the Australian context.

Clause 6.4 clarifies where in the Introduction and paragraphs 15.1 and 15.2.1.3 of Appendix A refers to “UN Regulation No. 46”, it is to be substituted by “Australian Design Rule 14/02 – Rear Vision Mirrors”. The purpose of this clause is ensure compliance with the ADR that incorporates the mentioned UN Regulation.

2.6. Alternative Standards

Section 7 sets out standards which are considered to be equivalent to ADR 108/00. If a vehicle meets the requirements of one of these standards, it also complies with ADR 108/00. These alternative standards are acceptable because they do not compromise the performance requirements set out in UN R158. Vehicle manufacturers have the flexibility to demonstrate compliance to ADR 108/00 through clause 5.1 and Appendix A as varied by Section 6 Exemptions and Alternative Procedures, or through Section 7 Alternative Standards.

Clause 7.1 identifies UN R158, as an acceptable alternate standard and is applicable for the purposes of this national standard as they relate to technical requirements with respect to the performance of reversing technologies.

3. MATTERS INCORPORATED BY REFERENCE

3.1. Legislative Instruments

Clauses 3.1, and 4.1 includes a reference to the Vehicle Standard (Australian Design Rule Definitions and Vehicle Categories) 2005. This sets out definitions for many terms used in the ADRs, including the vehicle categories used in ADR applicability tables.

Clause 6.4 includes a reference to the Vehicle Standard (Australian Design Rule 14/02 – Rear Vision Mirrors) 2006. This standard specifies requirements for rear vision mirrors and other devices which provide the driver with a clear and reasonably unobstructed view to the rear.

The ADRs may be freely accessed online through the Federal Register of Legislation. The website is www.legislation.gov.au.

In accordance with subsection 12(2)(b) of the Act, ADRs are incorporated as in force or existing from time to time.

3.2. Other Documents

ADR 108/00 incorporates references to a number of technical standards that are routinely accessed by vehicle manufacturers as part of their professional library, including to ensure that vehicles comply with existing vehicle identification requirements in many other countries/regions of the world.

International Organization for Standardization

The footnote of Annex 2 in Appendix A includes a reference to ISO 612:1978. This standard defines terms relating to dimensions of motor vehicles and towed vehicles.

Paragraph 2.1.2.1.1 of Appendix A includes a reference to ISO 9241-302:2008. This standard covers ergonomics of human-computer interaction and includes comprehensive terminology for electronic visual displays and explains the terms and definitions used in the other parts of ISO 9241.

Paragraph 17.2.2 of Appendix A includes a reference to ISO 15006:2011. This standard provides ergonomic specifications for the presentation of auditory information related to transport information and control systems (TICS) through speech or sounds. It applies primarily to the use of auditory displays to the driver when the vehicle is in motion, but it may also be applied when the vehicle is stationary.

Paragraph 1.1, 1.3.1, 1.3.2 and 1.4.3 of Annex 10 in Appendix A includes references to ISO 17386:2010. This standard specifies minimum functionality requirements in light-duty vehicles fitted with MALSO (Manoeuvring Aids for Low Speed Operation) systems.

ISO 612:1978, ISO 9241-302:2008, ISO 15006:2011 and ISO 17386:2010 are available for purchase only from the International Organization for Standardization (ISO) and various associated national standards bodies. While not freely available, these ISO standards are all readily accessible and widely used by vehicle manufacturers and test facilities. Section 49 of the explanatory memorandum for the Road Vehicle Standards Bill 2018 explains the importance of being able to incorporate technical standards that are not available free of charge and this arrangement was accepted by the Parliament through the passing of the Road Vehicle Standards Bill 2018.

In accordance with subsections 14(1)(b) and 14(2) of the *Legislation Act 2003*, each of these ISO standards are incorporated as in force on the date this national road vehicle standard is made.

Section 12 of the Act allows the Minister to incorporate a broad range of documents, both as in force at a particular time and as in force from time to time, when making national vehicle standards. This ensures that Australia's legislative framework is well-prepared for future developments in the international road vehicle space.

United Nations Regulations and / or Resolutions

Clause 6.4. of this standard includes a reference to United Nations Regulation No. 46 – UNIFORM PROVISIONS CONCERNING THE APPROVAL OF DEVICES FOR INDIRECT VISION OF MOTOR VEHICLES WITH REGARD TO THE INSTALLATION OF THESE DEVICES (Australian Design Rule 14/02 – Rear Vision Mirrors). This is an international standard for the installation of compulsory and optional devices for indirect vision on passenger vehicles, omnibuses, goods vehicles and 2-wheeled moped with bodywork at least partly enclosing the driver.

Clause 7.1 of this standard includes a reference to United Nations Regulation No. 158 – UN REGULATION ON UNIFORM PROVISIONS CONCERNING THE APPROVAL OF DEVICES AND MOTOR VEHICLES WITH REGARD TO THE DRIVER'S AWARENESS OF VULNERABLE ROAD USERS BEHIND VEHICLES WHEN REVERSING. This is an international standard for the provisions for reversing motion concerning awareness of vulnerable road users' proximity.

Paragraph 16.4 and 17.4 of Appendix A includes a reference to United Nations Regulation No. 10 – UNIFORM PROVISIONS CONCERNING THE APPROVAL OF VEHICLES WITH REGARD TO ELECTROMAGNETIC COMPATIBILITY. This is an international standard covering electromagnetic compatibility of all vehicles.

Paragraph 15.2.2 of Appendix A includes a reference to United Nations Regulation No. 43 – UNIFORM PROVISIONS CONCERNING THE APPROVAL OF SAFETY GLAZING MATERIALS AND THEIR INSTALLATION OF VEHICLES. This international standard covers the requirements of safety glazing materials intended for installation as windscreens or other panes, or as partitioning in all vehicles.

Paragraph 15.1.2 of Appendix A includes a reference to United Nations Regulation No. 79 – UNIFORM PROVISIONS CONCERNING THE APPROVAL OF VEHICLES WITH REGARD TO STEERING EQUIPMENT. This is an international standard establishing uniform provisions for the layout and performance of steering systems fitted to vehicles used on the road.

Paragraph 12.4 and 15.2.2 of Appendix A and Paragraph 13.3.2 of Annex 9 in Appendix A include references to the Consolidated Resolution on the Construction of Vehicles (R.E.3) (ECE/TRANS/WP.29/78/Rev.6, para. 2.2.5.4.). This international standard provides information on the legal texts under the framework of the 1958 Agreement (UN Regulations, Rules and specific requirements) applicable in the vehicle design, aiming for the improvement of safety and the protection of the environment.

In accordance with subsections 14(1)(b) and 14(2) of the *Legislation Act 2003*, each of these UN documents are incorporated as in force on the date this national road vehicle standard is made.

United Nations Regulations may be freely accessed online through the UN World Forum for the Harmonization of Vehicle Regulations (WP.29) – The WP.29 website is www.unece.org/trans/main/welcwp29.html

4. CONSULTATION

4.1. General Consultation Arrangements

It has been longstanding practice to consult widely on proposed new or amended vehicle standards. For many years, there has been active collaboration between the Commonwealth and the state/territory governments, as well as consultation with industry and consumer groups. Much of the consultation takes place within institutional arrangements established for this purpose. The analysis and documentation prepared in a particular case, and the bodies consulted, depend on the degree of impact the new or amended standard is expected to have on industry or road users.

Proposals that are regarded as significant need to be supported by a Regulation Impact Statement (RIS) meeting the requirements of the Office of Best Practice Regulation (OBPR) as published in the *Australian Government Guide to Regulatory Impact Analysis* or the *Regulatory Impact Analysis Guide for Ministers' Meetings and National Standard Setting Bodies*.

4.2. Specific Consultation Arrangements

[to be completed following consultation]

5. REGULATORY IMPACT

5.1. Benefits and Costs

ADR 108/00 is expected to prevent at least 12 fatalities and 340 serious injuries with this reduction in road trauma providing a net benefit of approximately \$38.5 million to the community.

The Regulatory Burden Measurement shows a total increase in cost of \$4.92 million per annum associated with the additional costs required for fitment of reverse parking sensors (ultrasonic backup sensors are the minimum for manufacturers to ensure compliance with the legislation). The total increase in cost will be \$45.9 million which is outweighed by savings of \$118 million to the community resulting in a Benefit Cost Ratio of 2.0.

5.2. Regulation Impact Statement

A Regulation Impact Statement (RIS) was completed to analyse the policy options for the fitment of reversing technologies in light, medium and heavy vehicles. The best option is implementation of a mandatory standard under the Act, to fit reversing aids technologies to light, medium and heavy vehicles. The OBPR reference number for the RIS is OBPR21-01084.

6. STATEMENT OF COMPATIBILITY WITH HUMAN RIGHTS

The following Statement is prepared in accordance with Part 3 of the *Human Rights (Parliamentary Scrutiny) Act 2011*.

6.1. Overview

ADR 108/00 is a new legislative instrument. It specifies requirements for reversing technologies fitted to light, medium and heavy vehicles.

6.2. Human Rights Implications

ADR 108/00 does not engage any of the human rights and freedoms recognised or declared in the international instruments listed in section 3 of the *Human Rights (Parliamentary Scrutiny) Act 2011*.

6.3. Conclusion

ADR 108/00 is compatible with human rights, as it does not raise any human rights issues.