



ADR 90/01 - Steering System

Explanatory information

This document outlines the operation of draft Australian Design Rule (ADR) 90/01. Though it continues to cover conventional steering systems, the key focus is Appendix B which contains a new Statement of Compliance (SoC) for Automated Vehicles and provides a pathway for supply of vehicles featuring automated steering systems. For context, the purpose and function of ADRs is also outlined.

Please note: Draft ADR 90/01 contains instances of text referenced as “[text]”, which remain to be confirmed.

Legislative Provisions

ADRs are legislative instruments made under Section 7 of the *Motor Vehicle Standards Act 1989*, and Section 12 of the *Road Vehicle Standards Act 2018 (C’th)* (RVSA) which the Department will be transitioning to. The RVSA enables the Australian Government to establish nationally uniform standards that apply to new road vehicles when they are provided to the market in Australia. The RVSA applies to road vehicles whether they are manufactured in Australia or imported.

ADRs are mainly technical standards relating to the performance of vehicles supplied to the market in Australia. Their content generally includes quantitative and qualitative performance requirements that a road vehicle/component must meet, is directed at achieving a relevant purpose (e.g. to make road vehicles safe), or to impose obligations on road vehicle manufacturers, as they relate to the design of a vehicle model. Successive Australian governments have continued a policy of harmonising the ADRs with international standards where possible. This provides the highest levels of vehicle safety while reducing cost to industry and consumers.

Harmonising Australian requirements with those in other major markets minimises costs associated with system development and provides manufacturers the flexibility to incorporate or adapt systems that have already been developed, manufactured and tested in (or for) other markets. Where SoC requirements utilise UN requirements, it also enables leveraging of testing and certification frameworks already conducted in those markets where the vehicles are manufactured.

Harmonisation also enables consistency in operator expectations of system capability and usage (including, for example, by standardising engagement requirements and the provision of driver warnings/feedback). As with other technologies covered by UN regulations, harmonisation with internationally agreed requirements will enhance the usability and effectiveness of Automated Driving Systems (ADS) independent of manufacturer or drivers’ brand familiarity.

Under Australia’s system of vehicle type approval, new vehicle types must meet all applicable ADRs. For example, a passenger vehicle must meet standards relating to occupant protection, lighting, braking and emissions. This means that in addition to demonstrating compliance with ADR 90/01, a passenger vehicle must also have demonstrated that it meets ADRs 4, 31, 46, 49, 69, 72, 73, 79, 85, and 88 amongst others (see Figure 1).

Australia is a signatory to the Technical Barriers to Trade Agreement under the World Trade Organization (WTO). This Agreement aims to ensure that technical regulations, standards and conformity assessment procedures are non-discriminatory and do not create unnecessary obstacles to trade. Under the WTO Agreement, members are strongly encouraged to base their measures on international standards as a means to facilitate trade. With specific regard to the manufacture and supply of road vehicles, Australia is also a Contracting Party to two treaties (the 1958 Agreement on UN

Regulations and 1998 Agreement on Global Technical Regulations) that oblige Australia to harmonise with and develop vehicles standards through the World Forum for Harmonization of Vehicle Standards (known as WP.29).

Development of ADR 90/01

In 2019, ADR 90/00 was created to separate steering system requirements from ADR 42/04 - General Safety Requirements into a stand-alone ADR which parallels the requirements of United Nations (UN) Regulation No. 79 – Uniform provisions concerning the approval of vehicles with regard to steering equipment. This initiative forms part of the ADR harmonisation program whereby individual ADRs are established to correspond with separate UN regulations. UN Regulation No. 79 covers conventional steering systems, including Advanced Driver Assistance Systems (ADAS). ADR 90/01 extends ADR 90/00 to cover ADSs designed to perform sustained steering control without operator input. These ADSs will need to meet the requirements set out in ADR 90/01 Appendix B, which are based on the SoC criteria developed through consultation led by the National Transport Commission (NTC). In line with Council’s decision, ADR 90/01 also allows ADSs to meet equivalent UN requirements in lieu of Appendix B SoC requirements, where available.

The development focus of ADR 90/01 currently provides for ADSs that can conform to Australian road rules and the 1968 Vienna Convention on Road Traffic, within their Operational Design Domain (ODD). These ADSs generally have an Operator present and are capable of allowing the Operator to resume control. This means they generally have driver aids and control interfaces such as a steering wheel and brake/accelerator pedals. Like other ADRs, it is expected that subsequent ADR 90 versions and amendments will provide for additional functionalities as harmonised with UN developments, and/or as use cases and regulatory risks emerge.

ADR 90/01 Appendix B – Statement of Compliance for Automated Vehicles

In order to be granted an approval to supply road vehicles fitted with ADSs to the Australian market, Automated Driving System Entities (ADSEs) must declare compliance with all ADR 90/01 Appendix B SoC requirements (see Annex A, Figure 2), including those where evidence must be submitted or retained. By declaring ADS capabilities and/or retaining documentation in support of declarations, ADSEs are adhering to the decision by the Transport and Infrastructure Council (November 2017) that manufacturers supplying an ADS will be responsible for meeting safety criteria based in part on mandatory self-certification.

Appendix B gives effect to the set of SoC safety assurance content (established through NTC-led stakeholder consultation) that can be regulated within the scope of an ADR (see Figure 2). It also draws on internationally agreed requirements for automated vehicles, including UN R157 on Automated Lane Keep Systems. The ADSE must adopt processes that identify and mitigate residual safety risks, as well as justify that any residual safety risks do not compromise the ADS’s capability to be fit for purpose. Appendix B ensures that thorough consideration of functional and operational safety will be undertaken by the ADSE during design and development processes and will continue to be considered throughout the ADS’s design life.

New UN Regulations covering some aspects of the SoCs have been incorporated into Appendix B where relevant, ensuring consistency with international standards. These include requirements from:

- UN R157 on Automated Lane Keep Systems;
- UN R155 on Cyber Security;
- UN R156 on Software Updates;
- the draft UN regulations on Event Data Recorders (EDR) and Data Storage Systems for Automated Driving (DSSAD);
- the UN Resolution on the Construction of Vehicles (R.E.3); and,
- the UN annex on Complex Electronic Systems.

Appendix B requirements are structured according to the following themes:

- processes and obligations that an ADSE must fulfil in establishing safe design and accountability processes in developing and supporting an ADS;
- performance requirements that an ADS must meet at the time of supply to market; and,

- driving competencies that the ADS must perform instead of a driver when engaged in service.

Appendix B sets requirements according to these logical stages in the ADS development lifecycle. It also specifies documentation that must be provided or retained in support of SoC declarations. As the SoC topic areas interleave ADS and ADSE requirements, this structure clarifies which clauses place requirement upon the ADSE organisation, and which clauses set a performance or technical requirement that the ADS vehicle must meet. It also removes repetition and interdependencies between SoC topic areas, and maps more directly to the usual structure of UN Regulations. This will assist manufacturers when they use the ADR for certification purposes.

Documentation in Support of Appendix B Declarations

ADR 90/01 Appendix B includes a description of documentation that an ADSE must provide at the time of application and/or retain in accordance with record keeping requirements under the RVSA. In this context, they are used to verify (through partial or full audits) that the claims and supporting reasoning of an ADSE are sufficiently robust. At the same time, documentation requirements ensure that the design and processes they contain are duly implemented by the ADSE. Audits form an important part of the compliance activities supporting the type approval system in Australia.

Through meeting the documentation requirements of section 4, the ADSE must also identify residual safety risks and justify that any residual safety risks do not compromise that the ADS is fit for purpose. The claims and reasoning contained in the documentation must be both concise and sufficiently specific to demonstrate that the design and development processes called upon appropriate expertise in all the system fields involved.

Applicability of ADR 90/01

Vehicles are divided into different categories according to their design features and weight and/or load bearing capacity; passenger vehicles, for example, are vehicle category MA. ADR 90/01 will apply to all vehicle categories in the same manner that ADR 90/00 does. In accordance with usual ADR applicability practice, ADR 90/01 will first be applicable to new model vehicles produced on or after a specified date of manufacture. It would then apply to all vehicles produced on or after a subsequent date of manufacture. This staggered approach is standard for the implementation of any ADR and ensures that manufacturers have time to incorporate updated requirements into their production time lines.



Figure 1 - Australian Design Rules (ADRs)

- The Commonwealth mandates around 70 ADRs covering safety, environmental and anti-theft performance.
- Transport ministers agreed to a program to harmonise the ADRs with United Nations (UN) Regulations. The ADRs are over 95% harmonised.
- ADR 90/01 covers steering control and will be used to regulate Automated Vehicles (AVs).
- AVs must continue to meet all applicable ADRs.

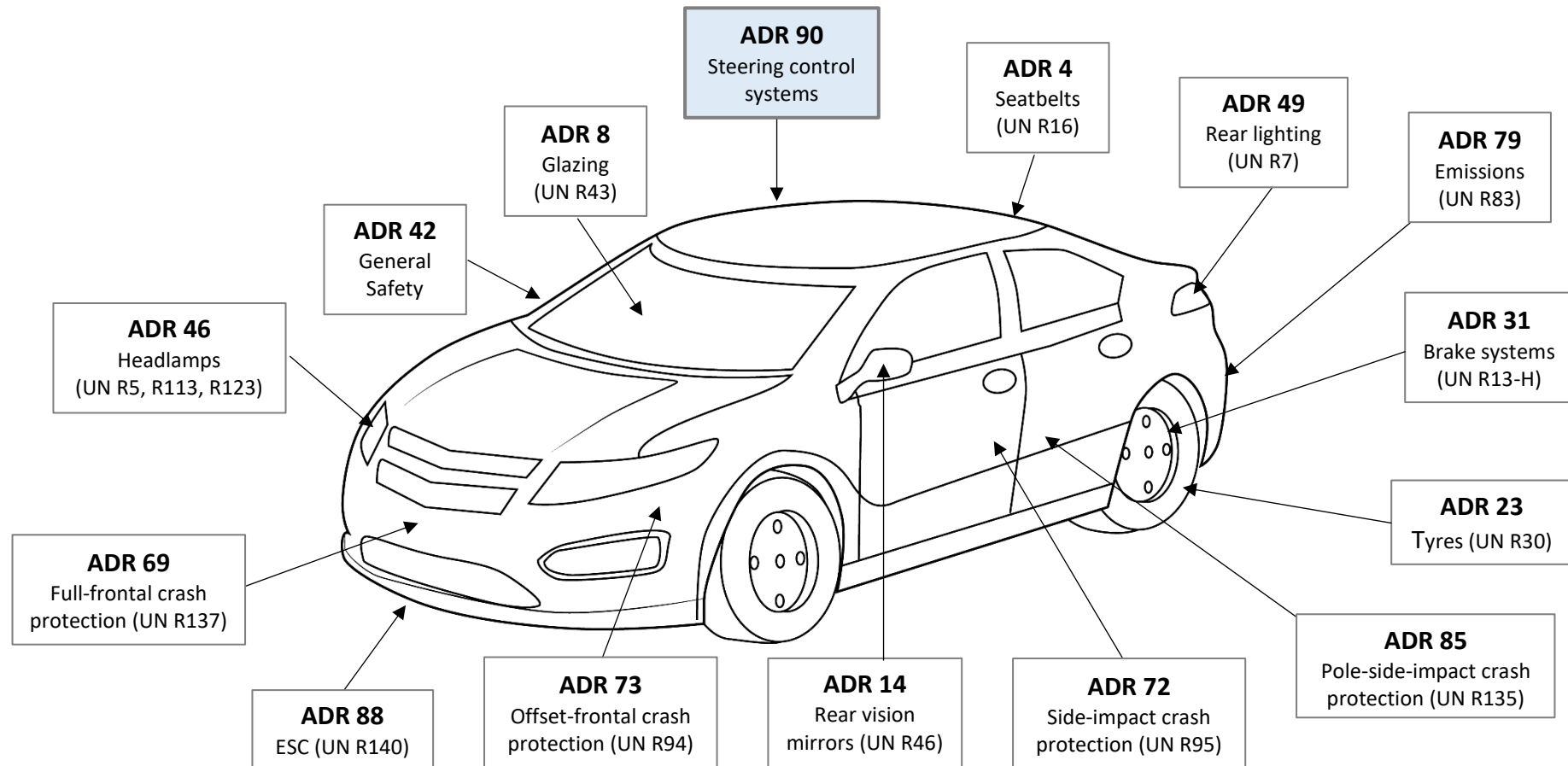


Figure 2: Supply of Automated Vehicles - ADR 90/01

- Australian Design Rule (ADR) 90/01 Appendix B sets requirements for the supply of vehicles fitted with Automated Driving Systems (ADSs) under the Road Vehicle Standards Act 2018 (RVSA).
- Appendix B establishes agreed Statement of Compliance (SoC) criteria that ADSs must meet.
- Some SoC overlap with existing United Nations (UN) Regulations (UNRs) and guidelines, approvals to which can be used towards SoC requirements, including:
 - UN R157 covering Automated Lane Keeping Systems (ALKS)
 - UN R156 covering software updates
 - UN R155 covering cyber security
 - the draft UNRs covering Event Data Recorders (EDR) and Data Storage Systems for Automated Driving (DSSAD)
 - the UN Consolidated Resolution on the Construction of Vehicles (known as 'R.E.3')
 - annexed UN requirements for Complex Electronic systems (C.EL).
- UN R157 specifies requirements for the specific ADS Operational Design Domain (ODD) and Minimum Risk Manoeuvre (MRM) for ALKS, as well as additional UN requirements listed above. Its content overlaps with several (but not all) Australian SoC. The additional Australian SoC requirements must also be met.
- ADR 90/01 continues to cover conventional and Advanced Driver Assistance System (ADAS) steering components (as ADR 90/00 does) through Appendix A (UN R79).

Definitions:

- ADAS - Advanced Driver Assistance System
- ADR - Australian Design Rule
- ADS - Automated Driving System
- ALKS - Automated Lane Keeping Systems
- C.EL - UN Annexed Requirements for Complex Electronics
- DSSAD - Data Storage System for Automated Driving
- EDR – Event Data Recorder
- MRM - Minimum Risk Manoeuvre
- ODD - Operational Design Domain
- R.E.3 - UN Resolution on the Construction of Vehicles
- RVSA - Road Vehicle Standards Act 2018
- SAS - Safety Assurance System
- SoC - Statement of Compliance
- UN - United Nations
- UNR – UN Regulation

