



Transport
for NSW

Centre for Road Safety

Technical Specification

Requirements for vehicle frontal protection systems fitted to light vehicles

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1 Introduction

PURPOSE

To inform drivers, owners, manufacturers, suppliers, installers and retailers of the requirements for vehicle frontal protection systems (VFPS) which include bull bars and similar devices to ensure the VFPS and the vehicles to which they are fitted comply with the applicable light vehicle standards in Schedule 2 to the Road Transport (Vehicle Registration) Regulation 2017 (the Regulation) and are otherwise safe to be used on NSW roads.

GENERAL

Vehicles fitted with a frontal protection system, which include bull bars, nudge bars and similar devices, must be suitable for safe use. The vehicle must continue to comply with the safety standards specified in the Regulation, including the applicable national safety standards known as the Australian Design Rules (ADRs), and in-service Light Vehicle Standards Rules.

Note: From here-on in, the term “bull bar” used in this Technical Specification applies to all types of vehicle frontal protective systems unless otherwise stated.

Until September 2014, the Regulation required that vehicle frontal protective systems fitted to certain vehicles had to comply with the Australian Standard AS 4876.1–2002 *Motor vehicle frontal protection systems Part 1: Road user protection (except Clause 3.2, “Road user protection criterion”)*. However, this standard provided no technical specifications or dimensions, and other features for designing and manufacturing bull bars, but instead had a series of drawings showing bull bars that are “acceptable” or “not acceptable”.

This Technical Specification is intended to provide clarity to vehicle owners to ensure they can fit a bull bar to their vehicle in the knowledge that the vehicle will continue to comply with the Regulation. It –

- incorporates the general requirements for bull bars that were specified in AS 4876.1;
- includes criteria for assessing against relevant vehicle standards not covered in AS 4876.1; and
- covers all light vehicles.

Although this Technical Specification was first published in September 2019, it retains the specifications first introduced in September 2014 to support the *Minister Declaration (Bull Bar) Exemption Order 2014*. As it includes general safety standards, it applies to all bull bars and light vehicles regardless of their date of manufacture.

2 General

2.1 Scope and application

This Technical Specification is published under subclause 29(3) of Schedule 2 of the Road Transport (Vehicle Registration) Regulation 2017.

This Technical Specification applies to all light vehicles, which are vehicles with a gross vehicle mass of 4.5 tonnes or less. It incorporates the general requirements for bull bars that are specified in AS 4876.1, as well as criteria for assessing against relevant vehicle standards not covered in AS 4876.1, including specific requirements of Schedule 2 to the Regulation and relevant Australian Design Rules (ADRs).

2.2 Definitions

The following terms are used in this document:

Australian Design Rules (ADRs) – mandatory national standards for vehicle safety, anti-theft and emissions, including occupant protection, structures, lighting, noise, engine exhaust emissions, braking and a range of miscellaneous items.

Bull bar – a structure fitted to the front of a vehicle primarily to reduce damage to the vehicle in the event of frontal collision or an animal strike, and includes –

Heavy duty bar – a bull bar that does not wrap around front of the vehicle; typically steps up in its middle section; has large, vertical elements; and tends to lean forward from its point of attachment. Heavy duty bull bars are also known as “five post” bull-bars.

Low profile bull-bar – a bull bar that follows the general shape of the host vehicle in plan, front and side view; and wrap around its front and sides; is uniform across the front with only small steps along its top edge; and is manufactured from cylindrical sections.

An example of a heavy duty bull bar and a low profile bull bar are shown in Figure 1.

Ground clearance – the minimum distance to the ground from a point on the underside of the vehicle, except a point on a tyre, wheel, wheel hub, brake backing plate, or flexible mudguard or mudflap of the vehicle.

Light Vehicle Standards Rules – standards that apply to light vehicles registered in NSW, and which comprise Schedule 2 to the Regulation.



1.1 Heavy duty bull bar fitted to a 4WD

1.2 Low profile bull bar fitted to a sedan

Fig 1: Examples of bull bar

2.3 Referenced documents

The following documents are referenced in this document:

Australian Design Rules (ADRs):

- ADR 6/00 Direction Indicators
- ADR 8/01 Safety Glazing Material
- ADR 13/00 Installation of Lighting and Light Signalling Devices on other than L-Group Vehicles
- ADR 43/04 Vehicle Configuration and Dimensions
- ADR 45/01 Lighting and Light Signalling Devices not Covered by ECE Regulations
- ADR 46/00 Headlamps
- ADR 49/00 Front and Rear Position (Side) Lamps, Stop Lamps and End Outline Marker Lamps
- ADR 50/00 Front Fog Lamps
- ADR 69/00 Full Frontal Impact Occupant Protection
- ADR 73/00 Frontal Impact Occupant Protection
- ADR 92/00 External Projections
- ADR 93/00 Forward Field of View

Regulations:

- Road Transport (Vehicle Registration) Regulation 2017
- Road Rules 2014

Australian Standards:

- AS 4876.1–2002 Motor vehicle frontal protection systems Part 1: Road user protection

2.4 Compatibility

In addition to the dimensions and tolerances described in this document, the following applies:

- The bull bar must be compatible with the vehicle to which it is fitted.
- The bull bar must be fitted in accordance with the manufacturer's instructions.

If these requirements are not observed, the bull bar may not perform as intended and the amount of protection afforded to the vehicle could be

reduced. An incorrectly fitted bull bar can do more damage to a vehicle in an animal strike than the animal would cause if there were no bull bar fitted.

NB Research carried out by Transport for NSW found that a heavy duty bull bar fitted to a sedan-type vehicle can exacerbate the damage caused in a high-speed (80km/h) crash into a kangaroo. It is recommended that heavy duty bull bars are not fitted to sedan-type vehicles or their derivatives (including utilities, such as the Holden Commodore Ute or the Ford Falcon Ute), so none of the drawings in this document illustrate this combination.

2.4.1 Applicable standards

- ADR 69/00 Full Frontal Impact Occupant Protection
- ADR 73/00 Frontal Impact Occupant Protection
- Clause 60(1) to the Regulation
- Clause 25C to Schedule 2 of the Regulation
- Clause 1.4 to AS 4876.1

2.4.2 Critical features

- The vehicle must provide a certain minimum level of protections to its occupants.
- The vehicle and its parts and equipment must be suitable for safe use.
- A registrable vehicle and equipment must be kept in good order so that it will not cause a danger to any person.
- All bull bars must be permanently marked with the following information in English:
 - details of the bull bar’s manufacturer, supplier or importer as applicable.
 - the make, model, type and year(s) of manufacture of the vehicle(s) to which the bull bar is intended to be fitted, and that it must not be fitted to any other motor vehicle.
 - advice that –
 - the bull bar or its fixing must not be modified; and
 - no accessory or device is to project forward of the bull bar’s forward profile.

Vehicle compatibility	
Allowed	Not allowed
<p>The bull bar is compatible with the intended vehicle model.</p> <p>The bull bar manufacturer provides a statement to this effect.</p> <p>The bull bar manufacturer provides all necessary information to ensure the bull bar can be fitted correctly to the intended vehicle model.</p>	<p>The bull bar is not compatible with the intended vehicle model.</p> <p>The bull bar manufacturer does not confirm compatibility with the intended vehicle model.</p> <p>The bull bar manufacturer does not provide information for fitting the bull bar to the intended vehicle model.</p>

3 Rules that apply to bull bars

3.1 Sharp edges and projections

3.1.1 Applicable standards

- Section 5 to ADR 92/00 External projections
- Clause 29(1) to Schedule 2 of the Regulation
- Clause 2.3 to AS 4876.1

3.1.2 Critical features

- The bumper bar must be turned towards the body of the vehicle to a sufficient extent to avoid any risk of hooking or grazing.
- No vehicle can be equipped with any object or fitting, not technically essential to such vehicle, which protrudes from any part of the vehicle so that it is likely to increase the risk of bodily injury to any person
- Any object or fitting that is technically essential must only be fitted if its design, construction and conditions and the manner in which it is affixed to the vehicle are such as to reduce to a minimum the risk of bodily injury to any person; and such object or fitting must not have a pointed or sharp edge that is likely to increase the risk of bodily injury to any person.
- An object fitted to a vehicle must be designed, built and fitted to the vehicle in a way that minimises the likelihood of injury to a person making contact with the vehicle.
- To help achieve this, all exposed edges must be chamfered and free of burrs or sharp edges, forward facing edges must have a radius of at least 5 mm, there must be no open-ended frame members, and small components, such as brackets, must be free of burrs and sharp edges and be rearward of the front face of the bull bar.
- A bull bar may slope forward from the front of the vehicle with a maximum offset of 75mm or an angle of nine degrees. The offset is the distance or angle between the horizontal member across the top of the bull bar and either the bumper or the horizontal channel where the bull bar has replaced the bumper, or a horizontal member whose base is not more than 100mm above the supporting member. (This horizontal member is frequently used to support additional lights and is often called the “the spot light tube”.)

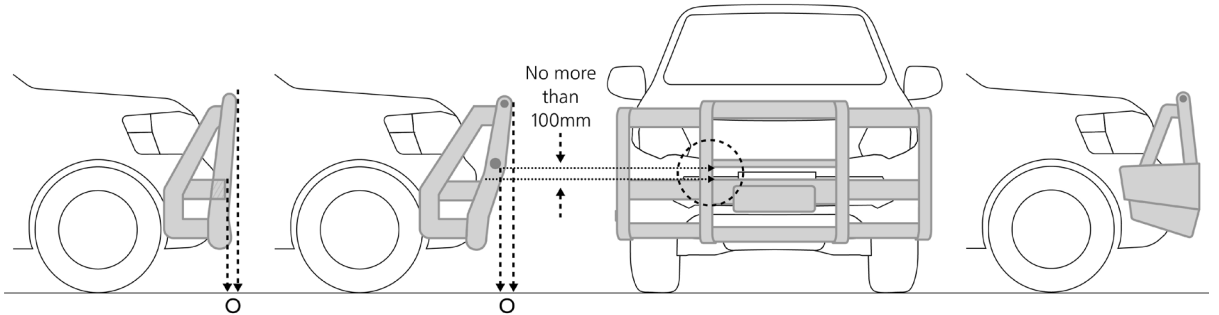
Note: For the purpose of this requirement, the forward offset can be measured by dropping a plumb-line from the outermost point of the top horizontal bar and measuring the horizontal distance between the line and the front face of the bumper, channel or horizontal member. Alternatively, it can be measured as the forward projection angle measured back from the top horizontal member to the front face of the bumper, channel or horizontal member.

General profile and sharp edges	
Allowed	Not allowed
<p>The bull bar generally conforms to the shape of the front of the vehicle with no excessive gaps between the body and the bull bar.</p> <p>The bull bar is manufactured either from tubular sections or flat sections with chamfered edges and forward facing edges that have a radius of at least 5 mm. All burrs have been removed from the bull bar.</p> <p>There are no open frames incorporated in the bull bar.</p> <p>Brackets and other components are free of burrs and sharp edges.</p> <p>If the bull bar is offset forward from its point of connection, the offset does not exceed 75mm or 9 degrees. The forward offset is measured between the front face of the topmost horizontal member and the most forward point of either the bull bar's supporting member (which can be the bumper or the horizontal channel where the bull bar has replaced the bumper), or a horizontal member whose base is not more than 100mm above the supporting member. (This horizontal member is frequently used to support additional lights and is often called the "the spot light tube".)</p> <p>The top and bottom ends of all vertical members are curved rearwards.</p> <p>There are no sharp edges on forward facing members.</p> <p>Flanges of members constructed from I-sections have chamfered or rounded edges.</p> <p>If the bull bar incorporates the front bumper or a horizontal member, the ends go at least partially around the side of the vehicle or be capped.</p>	<p>The bull bar does not conform in any way to the shape of the front of the vehicle with excessive gaps between it and the body.</p> <p>It is manufactured from flat sections with sharp edges. There are burrs left on the bull bar. Forward facing edges are not rounded.</p> <p>If the bull bar incorporates the front bumper, the edges do not wrap around the side of the vehicle.</p> <p>There are open frames ends incorporated in the bull bar.</p> <p>Brackets have sharp edges and fit flush with or in front of the face of the bull bar.</p> <p>The bull bar projects forward from its point of connection by more than 75mm or 9 degrees.</p>

✓ Offset

Acceptable

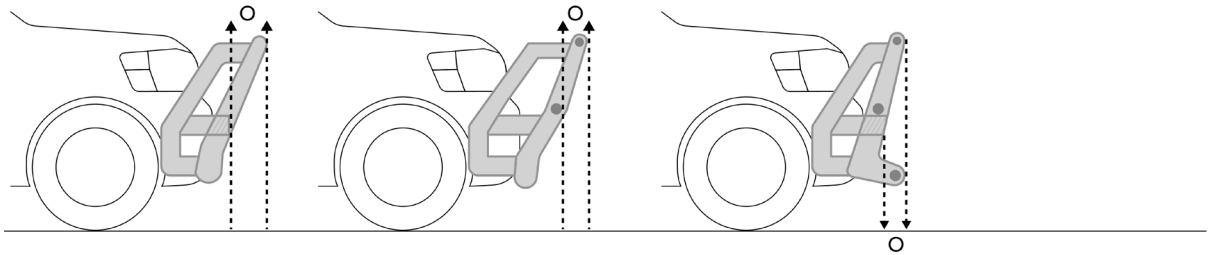
Offset 'O' does not exceed 75mm (approx. 9°)



✗ Offset

Unacceptable

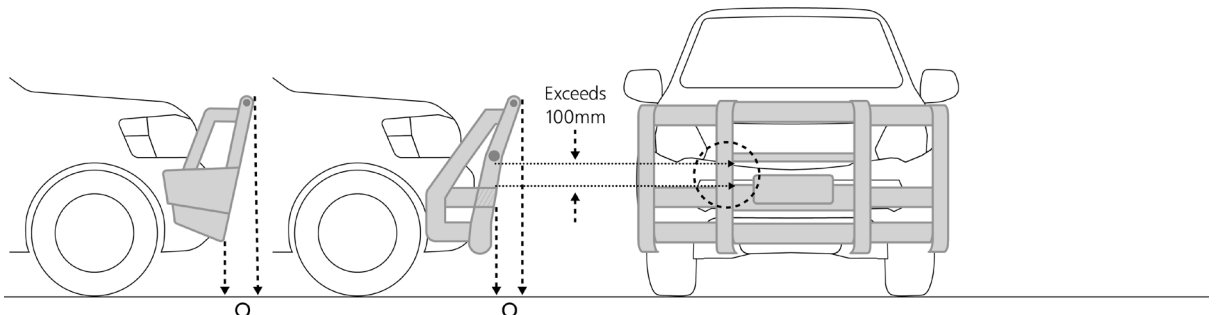
Offset 'O' exceeds 75mm (greater than 9°)



✗ Offset

Unacceptable

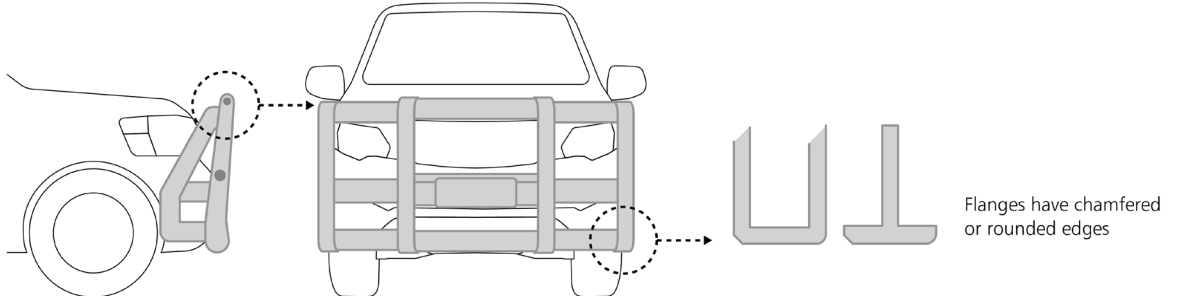
Offset 'O' exceeds 75mm (greater than 9°)



✓ Corners and Edges

Acceptable

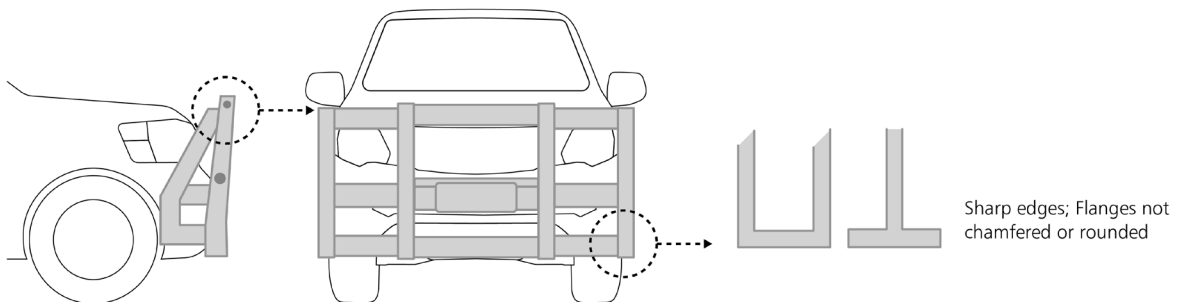
Rounded frame ends; rounded corners and edges



✗ Corners and Edges

Unacceptable

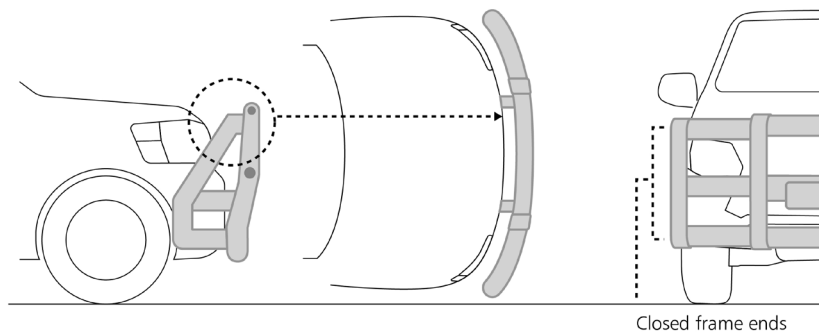
Square or angled frame members; sharp corners or edges



✓ End shape

Acceptable

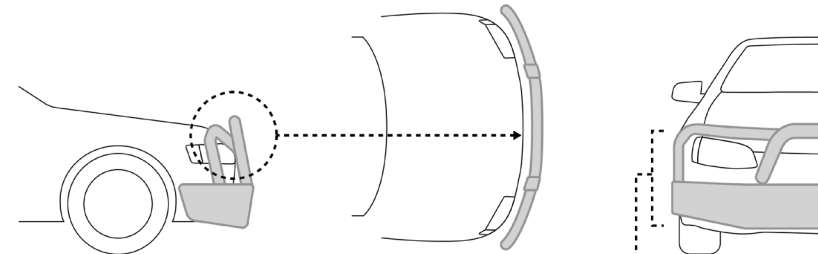
Frame generally follows vehicle shape;
bumper bar wrapped around side of vehicle



✓ End shape

Acceptable

Frame generally follows vehicle shape;
bumper bar wrapped around side of vehicle

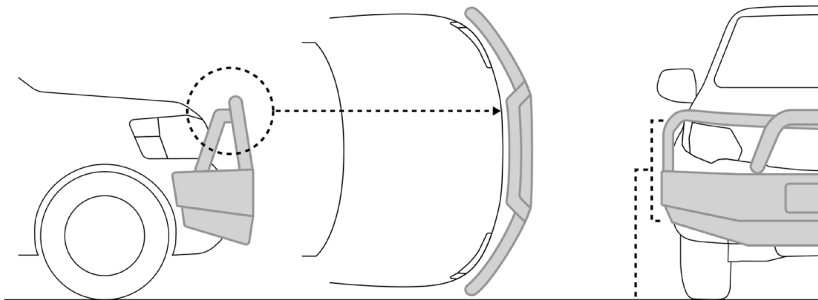


Closed frame ends

✓ End shape

Acceptable

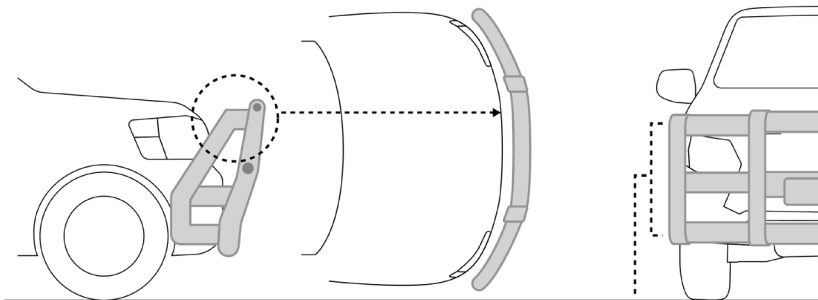
Frame generally follows vehicle shape;
bumper bar wrapped around side of vehicle



Closed frame ends

✓ End shape

Acceptable



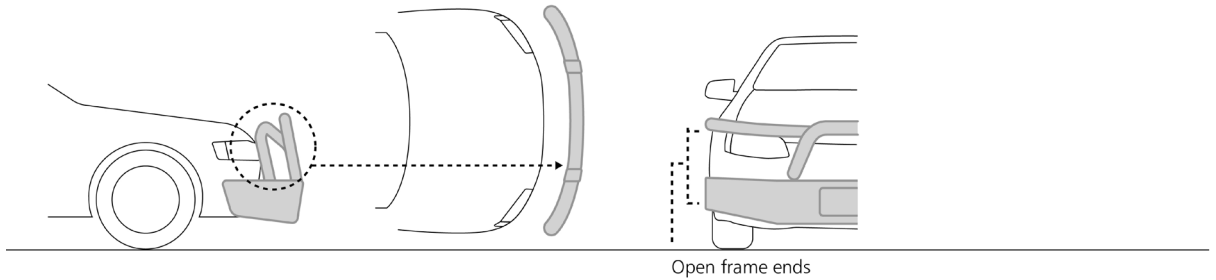
Bull bar does not wrap
around vehicle but ends
are capped and have no
sharp edges

Closed frame ends

✘ End shape

Unacceptable

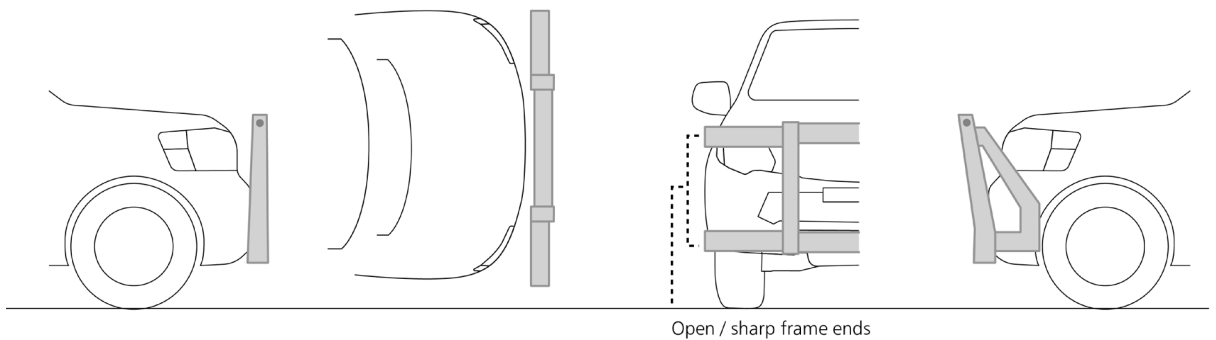
Space between car and bumper bar excessive



✘ End shape

Unacceptable

Frame does not generally follow vehicle shape



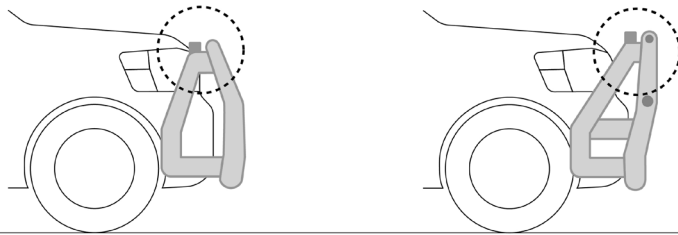
Projections	
Allowed	Not allowed
<p>The bull bar is manufactured without stepped members, or circular tube or pipe is used to achieve the change in profile.</p> <p>Where members intersect, there are no extensions beyond the tops and sides, or the members do not project more than 50mm beyond the point of intersection with another member.</p> <p>Steps greater than 100mm are achieved using circular tube or pipe.</p> <p>Brackets and other components are fitted rearward of the front face of the bull bar. Brackets, items attached to the brackets and other components that protrude above the top of the bull bar have no exposed sharp edges. All item connected to a bracket (e.g. a driving light or fairleads</p>	<p>The bull bar's profile steps more than 100mm using non-circular members.</p> <p>Joining members extend more than 50mm beyond the top or side of their intersection.</p> <p>There are brackets or other components fitted forward of the bull bar.</p> <p>Brackets, items attached to brackets or other components that protrude above the top of the bull bar have exposed sharp edges.</p> <p>An item attached to a bracket protrudes excessively beyond the front face, or has an exposed sharp edge.</p>

required for the operation of a winch) only protrude forward of the bull bar by the minimum amount necessary and is blunt or protected to minimise risk of injury to vulnerable road users.

✓ Brackets

Acceptable

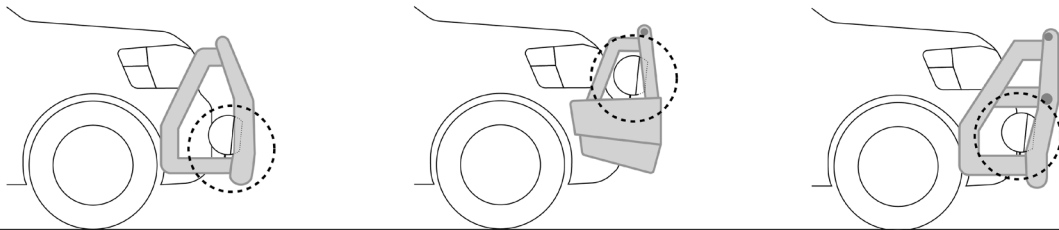
Unexposed bracket/s



✓ Brackets

Acceptable

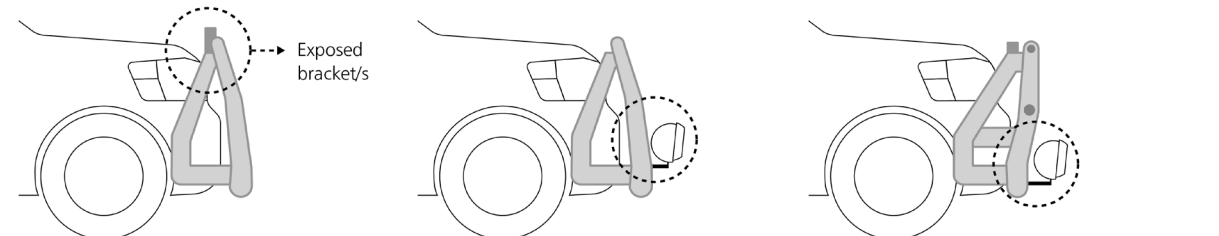
Brackets that do not project beyond front face of VFPS



✘ Brackets

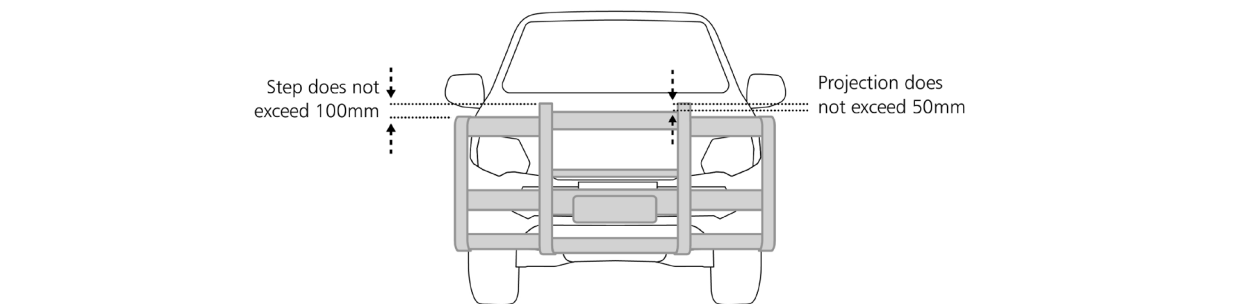
Unacceptable

Brackets projecting forward of VFPS



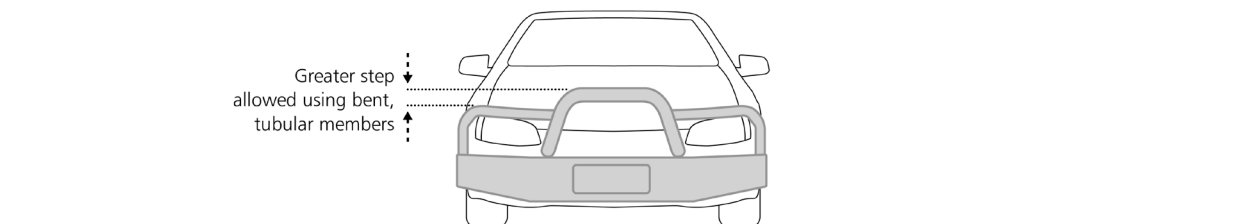
✔ Frame members

Acceptable

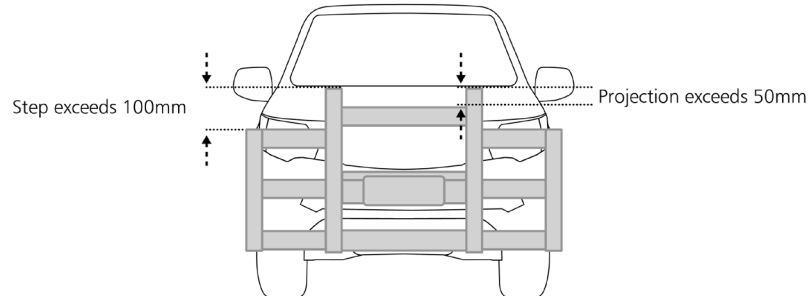


✔ Frame members

Acceptable



✘ Frame members
Unacceptable



3.2 Increased vehicle width

3.2.1 Applicable standards

- Clause 6.5 to ADR 43/04 Vehicle configuration and dimensions
- Clause 66 to Schedule 2 of the Regulation
- Clause 2.3 to AS 4876.1

3.2.2 Critical features

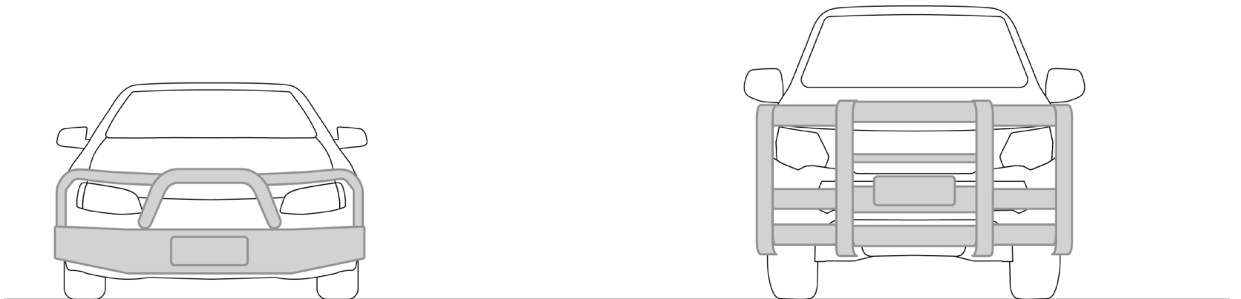
- The width of a vehicle must not exceed 2.5m.
- The bull bar must not increase the overall width of the vehicle (excluding mirrors)

Increased vehicle width	
Allowed	Not allowed
<p>The bull bar does not project beyond the sides of the vehicle to the extent that it increases its overall width (excluding mirrors).</p> <p>OR</p> <p>The bull bar and attachments extend beyond the original width of the vehicle but not beyond the standard mirrors on either side or, if there are no side mirrors, 150mm each side provided the overall width of the vehicle and attachments is less than 2.5m.</p>	<p>The bull bar increases the overall width of the vehicle beyond the side mirrors, or if no mirrors are fitted, by more than 150mm on either side or the overall width to more than 2.5m.</p>

✓ Vehicle width

Acceptable

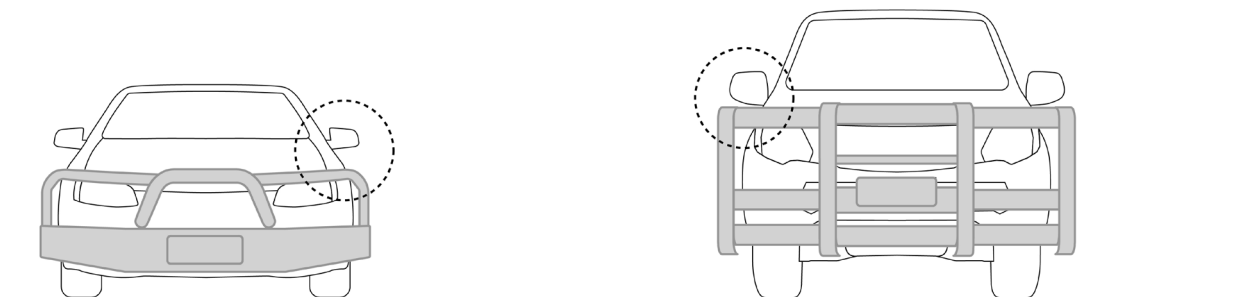
Within overall width of vehicle including mirrors



✗ Vehicle width

Unacceptable

Exceeds overall width of vehicle including mirrors



3.3 Obscured lights

3.3.1 Applicable standards

- ADR 13/00 Installation of Lighting and Light Signalling Devices on other than L-Group Vehicles
- ADR 6/00 Direction Indicators
- ADR 45/01 Lighting and Light Signalling Devices not Covered by ECE Regulations
- ADR 46/00 Headlamps
- ADR 49/00 Front and Rear Position (Side) Lamps, Stop Lamps and End Outline Marker Lamps
- ADR 50/00 Front Fog Lamps
- Part 7 to Schedule 2 of the Regulation

3.3.2 Critical features

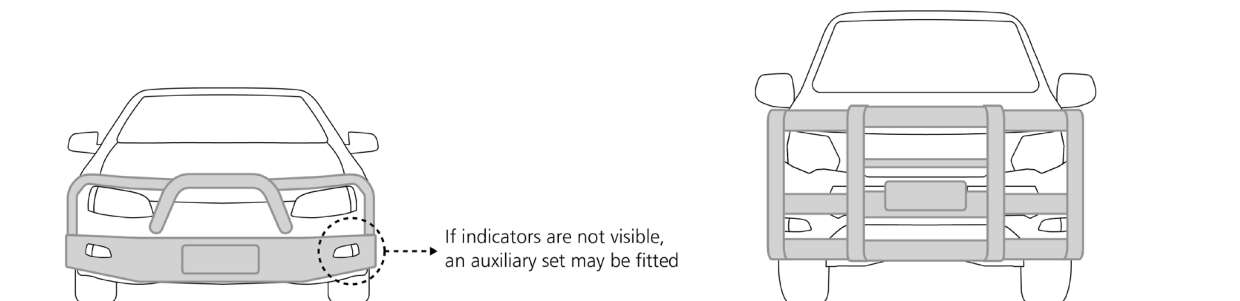
- A range of standards covering the positioning and the performance requirements and effective range for lights and signalling devices fitted to a vehicle

Obscured lights	
Allowed	Not allowed
<p>The bull bar is designed and fitted so its constituent members fit around the front light clusters;</p> <p>OR</p> <p>The bull bar incorporates additional lights and indicators where the originals are obstructed.</p> <p>Additional lights are not required where mesh is fitted to a frame in front of or beside the light cluster provided the field of view is only interrupted by the mesh.</p>	<p>The bull bar obscures the light clusters with no additional lights/indicators fitted to the bull bar.</p>

✓ Lights

Acceptable

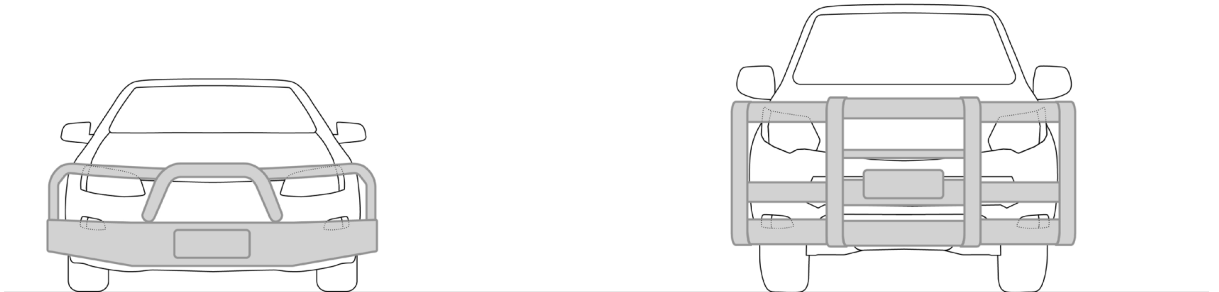
All of the vehicle's mandatory front lights are visible



✘ Lights

Unacceptable

Any of the vehicle's mandatory front lights, including indicators, are obscured (no auxiliary added)



3.4 Obscured number-plates

3.4.1 Applicable standards

- Clause 25 of the Regulation

3.4.2 Critical features

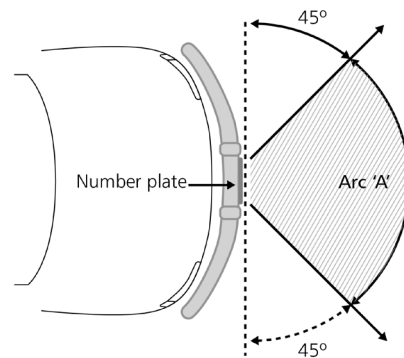
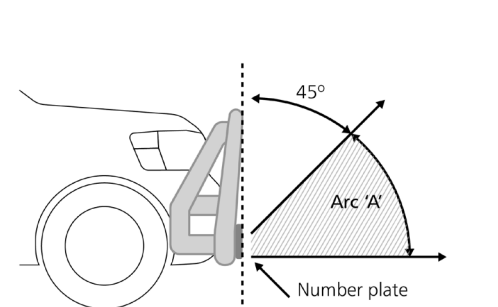
- The number plate must be affixed to the vehicle so it is at all times in an upright position that is substantially parallel to the vehicle's axles, and the numbers on the number-plate are clearly visible from a distance of 20 metres at any point within an arc of 45 degrees from the surface of the number-plate above or to either side of the vehicle.

Obscured number-plates	
Allowed	Not allowed
<p>The bull bar is designed and fitted with sufficient space above and to the sides of the front number plate.</p> <p>OR</p> <p>The bull bar incorporates an appropriate mounting point for the number plate.</p> <p>If the bull bar obscures the number plate to any extent, the number plate is securely mounted in an upright position that is substantially parallel to the vehicle's axles that will enable the numbers be clearly visible from a distance of 20 metres within a 45 degrees arc above or to either side of the vehicle. The number plate or the mounting point does not have any exposed sharp edges.</p>	<p>The bull bar obscures the number plate with no additional mounting point for the number plate; or the mounting point does not provide the necessary range of visibility; or the mounting point is not upright or substantially parallel to the vehicle's axles.</p>

✓ Number-plate

Acceptable

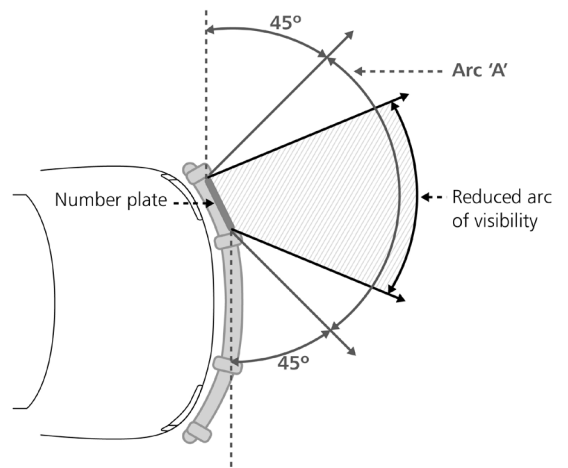
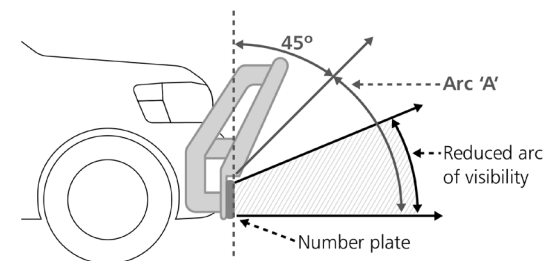
Number-plate fully visible from 20 metres within shaded arc 'A'



✗ Number-plate

Unacceptable

Number-plate not fully visible from 20 metres at all points within arc 'A'



3.5 Forward view of the road

3.5.1 Applicable standards

- Section 5 of ADR 93/00 Forward Field of View
- Clause 7.5.1.2 to ADR 8/01 *Safety glazing*
- Clause 30(a) to Schedule 2 of the Regulation
- Rule 297(2) to the Road Rules 2014

3.5.2 Critical features

- The driver must be able to see the ground at a point 11m in front of the vehicle and beyond.
- A motor vehicle must be built to allow the driver a view of the road and of traffic to the front and sides of the vehicle so the driver can drive the vehicle safely.
- A driver must not drive a motor vehicle unless the driver has a clear view of the road, and traffic, ahead, behind and to each side of the driver.

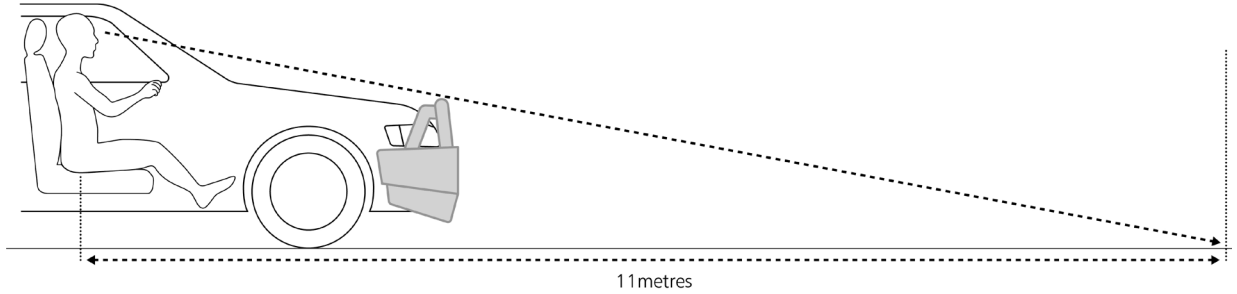
For the purpose of this requirement, the measurement is taken with the vehicle standing on a flat, level surface of sufficient capacity to measure a point at least 11m ahead of the driver’s eye position, and the driver’s eye position is taken as being a point 730mm above and 270mm forward of the junction of the seat cushion and back with the seat in its lowest and rearmost position.

Forward view of the road	
Allowed	Not allowed
The bull bar does not extend beyond the line of the bonnet. OR If the bull bar extends above the line of the bonnet, the driver has an unobstructed view of the surface of the road 11m in front of them when sitting in the normal driving position.	The bull bar extends beyond the line of the bonnet and obstructs the driver’s forward view of the road within 11m ahead of the driver’s position.

✓ Forward view of the road

Acceptable

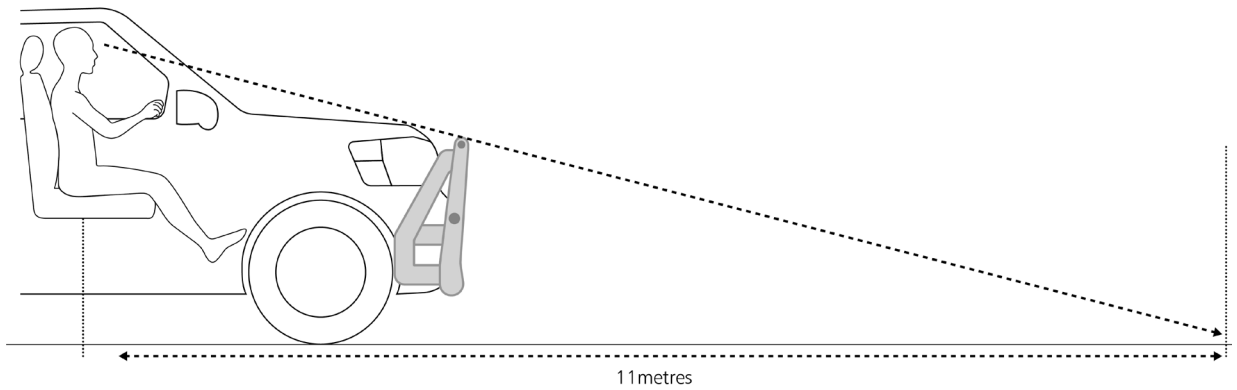
Drivers view unobstructed



✓ Forward view of the road

Acceptable

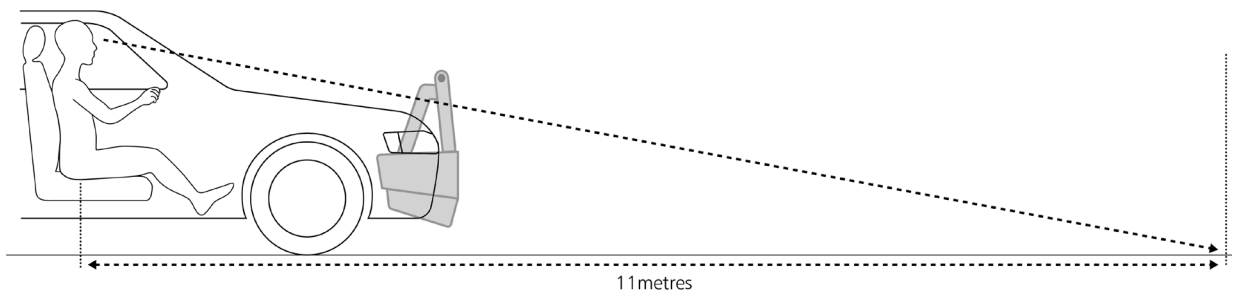
Drivers view unobstructed



✗ Forward view of the road

Unacceptable

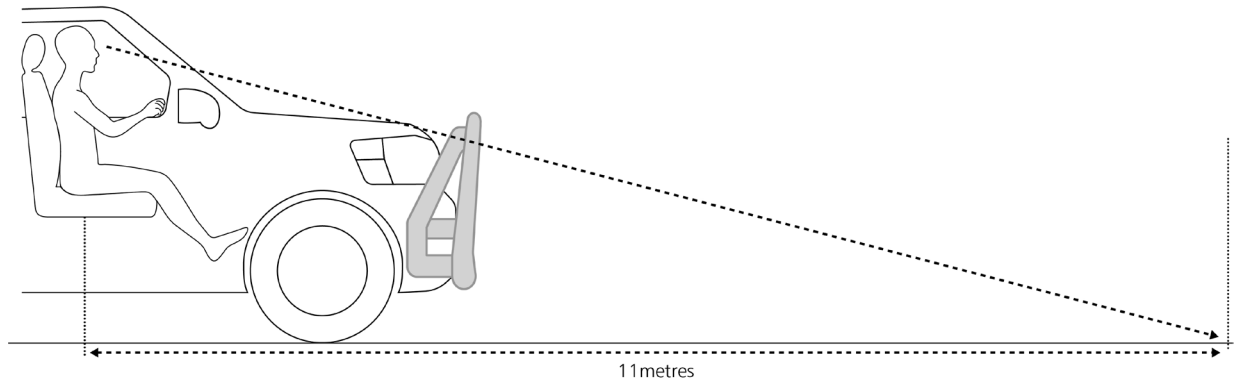
Drivers view obstructed



⊗ Forward view of the road

Unacceptable

Drivers view obstructed



3.6 Ground clearance

3.6.1 Applicable standards

- Clause 6.6 to ADR 43/04 Vehicle configuration and dimensions
- Clause 68 to Schedule 2 of the Regulation

3.6.2 Critical features

- A vehicle must have a minimum running clearance (which is measured with the vehicle unladen) of 100mm.

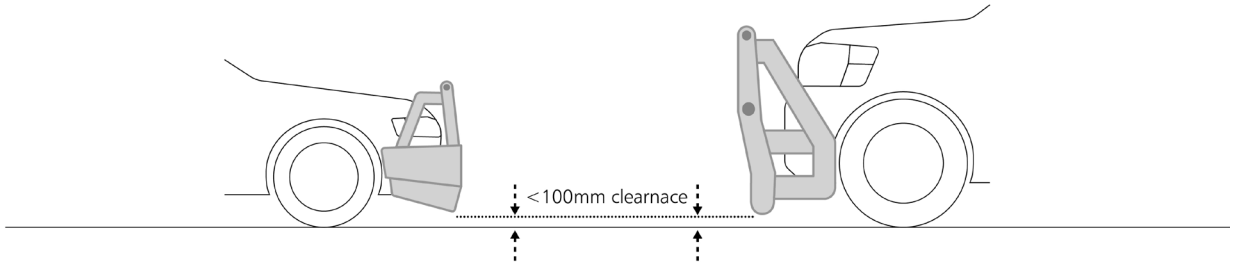
For the purposes of this requirement, the ground clearance should be measured with the vehicle standing on flat, level ground, and is the least distance between the ground and the bottom of the bull bar or the lowest point of the vehicle forward from its front wheels.

Ground clearance	
Allowed	Not allowed
The bull bar does not extend below the front of the original vehicle, OR The bull bar extends below the front of the vehicle but there is still at least 100mm ground clearance.	The bull bar extends beyond the front of the original vehicle to the extent that the ground clearance is reduced to less than 100mm.

✘ Ground clearance

Unacceptable

Less than 100mm ground clearance



Appendix A: Checklist for VFPS

Checklist for Vehicle Frontal Protection System (VFPS): Bull bars, nudge bars and similar devices

Date of Inspection	
Inspection undertaken by	
Vehicle Registration Number	
Year, Make and Model	
Vehicle Identification Number	

Requirement	(Yes/No/NA)
General Profile and Sharp Edges	
Is the topmost member no more than 75mm or 9° in front of the main VFPS supporting member or a horizontal member whose base is not more than 100mm above the supporting member?	
Are the top and bottom ends of all vertical members curved rearwards?	
Are all forward facing members free of sharp edges?	
Do all flanges have chamfered or rounded edges?	
Is the bumper or main horizontal support member capped or wrap around front of vehicle?	
Is the bull bar free of open frames?	
Projections	
If the VFPS is made from non-circular section members, is every vertical step along the top of the VFPS less than 100mm?	
Do all members project less than 50mm past intersections with other members?	
Are all brackets or other rigid components fitted behind the front face and below the top of the VFPS?	
Does any bracket, or device attached to a bracket or directly to the VFPS that protrude above the top of the VFPS, have exposed sharp edges?	
Does any item attached to a bracket protrude excessively beyond the front face of the VFS, or have an exposed sharp edge?	

Requirement	(Yes/No/NA)
Increased Vehicle Width	
If the vehicle has mirrors fitted, as standard, on both sides of the vehicle, is the width of the VFPS less than the width of the vehicle including mirrors?	
If the vehicle does not have standard mirrors fitted on both sides of the vehicle, is the width of the VFPS less than the width of the vehicle plus 300mm?	
Is the width of the VFPS and any attachment less than 2.5m?	
Obscured lights	
Are additional lights fitted to the VFPS, OR, are all vehicle lights unobscured by the VFPS (excluding minor obscuration due to protective mesh)?	
Number Plate	
Is the front number plate visible at all locations within a 45 degree arc?	
Is the number plate and any mounting hardware free of sharp edges?	
Forward view of the road	
Does a tall driver in the rearmost driving position have an unobstructed view of the road at all points beyond 11m in front of them?	
Ground Clearance	
Are all points on the VFPS greater than 100mm above the ground?	
Does the vehicle satisfy every requirement and tolerance contained within the <i>Technical specification: Requirements for vehicle frontal protection systems fitted to light vehicles</i> ?	

For the vehicle to be deemed to comply with the Road Transport (Vehicle Registration) Regulation 2017, all the answers to the above must be either “Yes” or “NA”.

Signed _____