

Bull bar tolerances and conditions

Applicable in NSW during the two-year exemption period

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1 Introduction

Vehicle frontal protection systems (VFPS) – which includes bull bars, nudge bars and similar devices – fitted to vehicles in NSW must comply with vehicle safety standards specified in the Australian Design Rules and the Road Transport (Vehicle Registration) Regulation 2007. Among general requirements for protrusions, the Regulation requires that VFPS fitted to vehicle models first manufactured after 31 December 2002 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").

A difficulty in applying AS 4876.1 is that it only provides general guidance for the design of VFPS, but no detailed specifications for them; instead, it relies on drawings to demonstrate how VFPS comply with the intent of the standard.

Because of this, a number of vehicle owners have fitted non-complying bull bars to their vehicles. An enforcement campaign in August 2014 on bull bars that do not comply with AS 4876.1 has identified that many people fitted an offending bull bar because the manufacturer or the supplier sold it on the basis that it did comply with AS 4876.1. This has highlighted problems in interpreting the intent of AS 4876.1.

In September 2014, the NSW Minister for Roads and Freight released a Ministerial Exemption Order to allow vehicles fitted with bull bars that do not necessarily comply with applicable NSW vehicle standards, including AS 4876.1, to be continued be used on NSW roads.

The Exemption will be in place for a two year period that will enable people to have their bull bars checked and, if necessary, modified or replaced. During this two-year period, the standards for bull bars in NSW will be reviewed and amended to provide clearer guidance on what constitutes a complying bull bar, and manufacturers can use this period to amend their products.

The Exemption includes a Schedule that identifies tolerances that will apply to bull bars to ensure they do not pose an unacceptable risk to road users, including pedestrians; bull bars that do not meet the Australian Standard or the specified tolerances will not be covered by the Exemption and may be subject to on-road enforcement by NSW Police.

This document gives clear advice and illustrated examples of the tolerances specified in the Schedule. The document is intended to be used by NSW Police and RMS officers, and may also be used by vehicle owners, to determine if a bull bar is covered by the Exemption Order.

The tolerances in the Schedule and the associated guide were developed in conjunction with a focus group convened by the NSW Vehicle Standards Working Group that included representatives from the Roads and Maritime Services, NSW Police, NSW Farmers, Australian Aftermarket Automotive Association, 4WD Industry Council, 4WD NSW & ACT Inc and the Bull Bar Council.

A summary of the tolerances and conditions as incorporated in the Ministerial Exemption Order is given in Appendix A, and a checklist that can be used to assess a bull bar is given in Appendix B.

Note: Although the scope of AS 4876.1 covers all types of VFPS, this paper focuses on bull bars and common attachments. The use of "bull bar" may also apply to other types of VFPS.

2 Documents referenced:

2.1 Australian Design Rules (ADRs):

- ADR 8/01 Safety glazing
- ADR 42/04 General safety requirements
- ADR 43/04 Vehicle configuration and dimensions
- ADR 69/00 Full Frontal Impact Occupant Protection
- ADR 73/00 Frontal Impact Occupant Protection

2.2 Regulations:

- Road Transport (Vehicle Registration) Regulation 2007
- Road Rules 2008

2.3 Australian Standards:

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

2.4 National Codes of Practice

- Vehicle Standards Bulletin 14 National Code of Practice for Light Vehicle Modification and Construction.
- National Guidelines for the Construction and Modification of Street Rods in Australia.

3 Rules that apply to bull bars

3.1 General safety requirements:

ADR 42/04 states that "no vehicle must 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". "Technically essential" relates to the vehicle's function, not its operation. The main purpose of bull bars is to protect a vehicle's occupants in the event of a collision with large animals, such as kangaroos and cattle, and they also help reduce the damage such a collision causes to the vehicle. If the risk of colliding with a large animal is negligible, such as for vehicles that operate solely in an urban environment, bull bars are not "technically essential" to the vehicle's function and should not be fitted to them.

Fitting bull bars to vehicles can also affect other ADRs, such as ADR 69 and ADR 73 as these specify performance requirements for vehicles to protect front seat occupants in a front-on crash. In modern vehicles, compliance with these ADRs can be dependent on the vehicle's airbags deploying in a crash as intended by the manufacturers, and there is some evidence that large bull bars fitted in front of the vehicle can influence this deployment. However, it is recognised that it is not possible to assess individual vehicles against ADRs 69 and 73 as these require destructive testing of the vehicle.

The Road Transport (Vehicle Registration) Regulation 2007 has general requirements to ensure a vehicle complies with standards and is safe – Clause 52(1)(a) specifies that a person can only use a vehicle if the vehicle and its parts and equipment are suitable for safe use; and Clause 21(b) to Schedule 2 requires that a registrable vehicle and equipment must be kept in good order so that it will not cause a danger to any person. The Regulation also specifically requires bull bars to comply with AS 4876.1, and this is discussed in the sections below.

Compliance with AS 4876.1 and the ADRs		
Complying	Non-complying	Exemption tolerance
The bull bar manufacturer provides a statement that the bull bar complies with AS 4876.1. The bull bar manufacturer has assessed the effect of the bull bar on the intended vehicle's compliance with the relevant ADRs, and can confirm ongoing compliance with the ADRs once the bull bar is fitted. The bull bar manufacturer identifies the vehicle model for which it has been designed to be fitted.	The bull bar has not been designed to AS 4876.1. The bull bar has not been assessed against the relevant ADRs. The bull bar has not been designed for a particular vehicle model.	The features of the bull bar are within the tolerances specified in this paper for the applicable item. Providing these tolerances and conditions are met, the vehicle and bull bar combination do not require assessment and certification by a Licensed Certifier registered on the Roads and Maritime's Vehicle Safety Compliance Certification Scheme.

3.2 Sharp edges and projections:

ADR 42/04 states that 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. It also states that the bumper bar must be turned towards the body of the vehicle to a sufficient extent to avoid any risk of hooking or grazing.

Clause 25 to Schedule 2 of the Road Transport (Vehicle Registration) Regulation 2007 requires that 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. It also states that vehicle frontal protection system – which includes bull bars – that is fitted on a motor vehicle that has a GVM not over 3.5 tonnes, and is a model of a kind first manufactured on or after 1 January 2003, must comply with AS 4876.1–2002 *Motor vehicle frontal protection systems—Road user protection* (except clause 3.2).

Specifically, AS 3876.1 requires bull bars be designed with a profile that generally conforms to the shape, in plan view, front view and side view, of the front of the vehicle to which it is fitted; the VFPS must not increase the overall width of the vehicle (excluding mirrors); and to prevent the VFPS from hooking or grazing other road users, 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 particular safety problem exists with forward sloping bull bars. An analysis of injury profile shows that the critical element that contributes to the risk these bull bars pose pedestrians in a crash is the relative offset between the bottom member that contacts the lower leg, and the top horizontal member that contacts the pelvis/torso, and about which the person rotates. In most vehicles, large, rigid items, such as the radiator supporting structure, are placed to the front of the bonnet, and there is comparatively less room between the bonnet's surface and the support structure for the bonnet to compress and absorb the energy from a person striking it. The further the point of rotation is away from the front of the vehicle, the lower down the bonnet the head will strike, and the more likely it will be impacted by the radiator support structure or the rigid vehicle structure located there. This problem is compounded because as the gap between the top of the bull bar and the bonnet increases, a person's shoulder is less likely to cushion the impact and the person's head will absorb more of the force against the bonnet. These are the reasons why AS 4876.1 requires the VFPS to follow as close as possible the vehicle's front contours. It is therefore necessary to minimise this offset and push a head's point of contact further up the bonnet.

The Exemption Order allows a bull bar to slope forward from the front of the vehicle but for road safety purposes limits the offset to 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".)

The offset limit only applies to forward sloping bull bars; it does not apply to vertical or rearward sloping bull bars even if the bumper/horizontal channel is recessed behind the bull bar. The offset limit applies across the width of the bull bar, and if a bull bar has a stepped profile, the offset may need to be measured from the upper horizontal bar in each section.

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.

Complying Non-complying Exemp	ption tolerance
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.The bull bar does not conform in any way to the shape of the front of the vehicle with gaps between it and the body.If the the vehicle manufactured from 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.The bull bar does not conform in any way to the shape of the front of the yehicle with gaps between it and the body.If the the vehicle manufactured from flat sections with chamfered edges and forward facing edges are not rounded.If the bull bar sections with sharp edges. There are no open frames ends incorporated in the bull bar.If the bull bar sections with sharp edges and are fitted rearward of the front face of the bull bar.If the su the front of the face of the bull bar.If the su sections with sharp edges and are fitted rearward of the front face of the bull bar.If the su the front of the face of the bull bar, or project above the top of the bull bar.If the su sectionsThere are op of the bull bar.Flange constr must h roundedFlange constr must h roundedThe top of the bull bar.Flange constr must h roundedFlange constr must h roundedThe top of the bull bar.Flange constr must h roundedFlange constr must h roundedThere are open frames fitted rearward of the front face of the bull bar.Flange constr must h roundedThe top openFlange constrThe top ope	bull bar is fitted to a e of a model type first factured after 31 nber 2002, the forward must not exceed 75mm egrees. The forward at any point along the ar must be measured en the front face of the ost horizontal member and ost forward point of either all bar's supporting ber (which can be the er or the horizontal el where the bull bar has ed the bumper), or a ontal member whose base more than 100mm above upporting member. op and bottom ends of all al members must be d rearwards. must be no sharp edges ward facing members. es of members fucted from I-sections have chamfered or ed edges. bull bar incorporates the pumper or a horizontal per, the ends must go at partially around the side vehicle or be capped. frames ends are not







Projections		
Complying	Non-complying	Exemption tolerance
The bull bar is manufactured without stepped members, or circular tube or pipe is used to achieve the change in profile. Where members intersect, there are no extensions beyond the tops and sides.	The bull bar has a stepped profile. Joining members extend beyond the top or side of their intersection.	The bull bar profile may be stepped vertically up to 100mm using non-circular members. Greater steps are only allowed using circular tube or pipe formed to achieve the change in profile. A member can only project a maximum of 50mm beyond the point of intersection with another member. Brackets and other components connected to the bull bar must be fitted rearward of the front face and not protrude above the
		Brackets and other components connected to the bull bar must be fitted rearward of the front face and not protrude above the top of the bull bar.



3.3 Increased vehicle width:

AS 4876.1 states that a VFPS must not increase the overall width of the vehicle [to which it is fitted], excluding mirrors. The Road Transport (Vehicle Registration) Regulation 2007 has no such restriction, but limits the width of a vehicle to 2.5m. Increasing the width of a vehicle has the potential to affect some of its handling characteristics, and could pose problems for a person driving it. As a driver takes account of side mirrors when driving a vehicle, a reasonable allowance is to require the bull bar and its attachments, including brush rails, to be within the overall width of the vehicle including its side mirrors, providing this increase is within the 2.5m limit set by the Regulation.

Increased vehicle width		
Complying	Non-complying	Exemption tolerance
The bull bar does not project beyond the sides of the vehicle to the extent that it increases its overall width (excluding mirrors).	The bull bar increases the overall width of the vehicle.	The bull bar and attachments may extend beyond the original width of the vehicle providing it does not extend beyond the standard mirrors on either side or, if there are no side mirrors, 150mm, and the overall width of the vehicle and attachments is less than 2.5m.



3.4 Obscured lights:

Schedule 2 of the Road Transport (Vehicle Registration) Regulation 2007 specifies the performance requirements and effective range for lights and signalling devices fitted to a vehicle

Obscured lights		
Complying	Non-complying	Exemption tolerance
The bull bar is designed and fitted so its constituent members fit around the front light clusters; or the bull bar incorporates additional lights and indicators where the originals are obstructed.	The bull bar obscures the light clusters with no additional lights/indicators fitted to the bull bar.	This is an important safety feature and no tolerance is allowed. If lights and/or indicators are obscured by the bull bar frame, additional lights and/or indicators must be fitted that meet their necessary performance requirements and effective range. 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.

LIGHTS



3.5 Obscured number plate:

Clause 61 to Schedule 2 of the Road Transport (Vehicle Registration) Regulation 2007 specifies that 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 plate

•		
Complying	Non-complying	Exemption tolerance
The bull bar is designed and fitted with sufficient space above and to the sides of the front number plate. OR The bull bar incorporates an appropriate mounting point for the number plate.	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.	This is an important safety feature and no tolerance is allowed. If the bull bar obscures the number plate to any extent, the number plate must be 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 must not have any exposed sharp edges.
NUMBER PLATE		
✓ Acceptable		
Number plate fully visible from 20 metres within shaded arc 'A' 45°		
Number plate arc 'A'		arc 'A'
X Unacceptable		
Number plate not fully visible from 20 metres at all points within arc 'A'		
Number plate arc 'A'	Reduced arc of visibilty plate	Reduced arc of visibility

3.6 Forward view of the road:

Section 11 of ADR 42/04 deals with "Field of view". It states that a motor vehicle must not be so constructed or equipped nor must anything be affixed thereto in such a manner as to prevent the driver from having an adequate view of traffic on either side of the vehicle and in all directions in front of the vehicle to enable the vehicle to be driven with safety. Although no figure is stated, Clause 7.5.1.2 to ADR 8/01 requires a tall person seated in the driving position with the seat pushed back to its limit, must be able to see the ground 11m ahead of them, and this is used as the basis for limiting protrusions on bonnets in a number of vehicle standards, such as Vehicle Standards Bulletin 14 National Code of Practice for Light Vehicle Modification and Construction and the National Guidelines for the Construction and Modification of Street Rods in Australia. In addition Clause 27(a) to Schedule 2 of the Road Transport (Vehicle Registration) Regulation 2007 requires that 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; and Rule 297(2) to the Road Rules 2008 requires that 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.

To ensure these requirements are met, either the bull bar must not extend above the bonnet, or if the top of the bull bar extends above the bonnet, the driver must have an unobstructed view of the surface of the road 11m at all points in front of the driving position. All tolerances and conditions for steps and protrusions also apply.

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		
Complying bull bar	Non-complying	Exemption tolerance
The bull bar does not extend beyond the line of the bonnet.	The bull bar extends beyond the line of the bonnet and obstructs the driver's forward view of the road.	This is an important safety feature and no tolerance is allowed. If the bull bar extends above the line of the bonnet, the driver have an unobstructed view of the surface of the road 11m in front of them when sitting in the normal driving position.
FORWARD VIEW OF THE ROAD		
Vinacceptable Driver's view obstructed		
◄ 11 metres		

3.7 Ground clearance:

ADR 43/04 specifies that a vehicle must have a minimum running clearance (which is measured with the vehicle unladen) of 100mm. Both ADR 43/04 and Clause 78 to Schedule 2 of the Road Transport (Vehicle Registration) Regulation 2007 have similar requirements for ground clearance (measured with the vehicle laden), and it must be at least one-thirtieth of the distance between the centres of adjacent axles at the midpoint between them; and at any other point, it must be at least the distance that allows the vehicle or combination to pass over a peak in the road with a gradient on either side of 1:15, if the wheels of 1 axle of the vehicle or combination are on the slope on one side of the peak and the wheels of the next axle are on the slope on the other side. The Regulation also specifies a minimum ground clearance of 100 millimetres at any point within 1 metre of an axle.

The Regulation defines the ground clearance of a vehicle to mean 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. 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

Complying	Non-complying	Exemption tolerance
The bull bar does not extend below the front of the original vehicle, or it retains a minimum 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.	This affects a vehicle's ability to safely traverse items commonly found on the road network, such as peaks and troughs, drains, culverts and speed humps; no tolerance is allowed.
GROUND CLEARAN	ICE	

Ground clearance less than 100 mm

4 Appendix A

Item	Condition
General profile and sharp edges	If the bull bar is fitted to a vehicle of a model type first manufactured after 31 December 2002, the forward offset must not exceed 75mm or 9 degrees. The forward offset must be 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.
	The top and bottom ends of all vertical members must be curved rearwards. There must be no sharp edges on forward facing members. Flanges of members constructed from I-sections must have chamfered or rounded edges. If the vehicle frontal protection system incorporates the front bumper or a horizontal member, the ends must go at least partially around the side of the vehicle or be capped. Open frames are not allowed.
Projections	The vehicle frontal protection profile may be stepped vertically up to 100mm using non-circular members. Greater steps are only allowed using circular tube or pipe formed to achieve the change in profile.
	A member can only project a maximum of 50mm beyond the point of intersection with another member.
	Brackets and other components connected to the vehicle frontal protection system must be fitted rearward of the front face and not protrude above the top of the vehicle frontal protection system.
Maximum vehicle width	The vehicle frontal protection system and attachments may extend beyond the original width of the vehicle providing it does not extend beyond the standard mirrors on either side or, if there are no side mirrors, 150mm, and the overall width of the vehicle and attachments do not exceed 2.5m.
Obscured lights	If lights and/or indicators are obscured by the vehicle frontal protection system frame, additional lights and/or indicators must be fitted that meet their necessary performance requirements and effective range to comply with Part 5 of Schedule 2 of the Road Transport (Vehicle Registration) Regulation 2007. Additional lights are not required where mesh is fitted to frame in front of or beside the light cluster provided the field of view is only interrupted by the mesh.
Obscured number plate	If the vehicle frontal protection system obscures the number plate to any extent, the number plate must be securely mounted in a manner that complies with clause 61 of Schedule 2 of the Road Transport (Vehicle Registration) Regulation 2007.
Forward view of the road	If the vehicle frontal protection system extends above the line of the bonnet, the driver must have an unobstructed view of the surface of the road 11m in front of them when sitting in the normal driving position.
Ground clearance	The vehicle and any frontal protection system must continue to comply with clause 78 of Schedule 2 of the Road Transport (Vehicle Registration) Regulation 2007.

Schedule to Ministerial Exemption Order – Summary of Conditions

5 Appendix B

Checklist for Vehicle Frontal Protection System (VFPS) Ministerial Exemption Order.

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

Requirement	(Yes/ No/N A)
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?	

Requirement	(Yes/ No/N A
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 45degree 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 ministerial exemption order (all above answers must be Yes	
or NA)	

Signed