

Vehicle Standards Guide 15 (VSG-15) - Front underrun protection design and installation guidance

This guide provides information for the heavy vehicle industry about the design and installation requirements of front underrun protection (FUP) systems and devices.

Background

Front underrun protection systems (FUP-S) and front underrun protection devices (FUP-D) are structures fitted to heavy vehicles that provide an additional barrier between other road users and the underneath of the heavy vehicle. FUP is designed to absorb and distribute some of the forces during impact and help to ensure that safety features such as airbags are deployed in the other vehicle.

FUP also helps reduce damage to steering, and other front axle components. This helps the driver maintain control of the vehicle after a collision.

All new heavy motor vehicles produced after January 2012 are required to be fitted with FUP in accordance with *Australian Design Rule 84 - Front Underrun Impact Protection (ARD 84)*. Due to the safety benefits of FUP, and the regulatory benefits offered in some jurisdictions, many vehicle operators retrofit FUP to vehicles built before ARD 84 was in effect.

Additionally, some operators may choose to customise their vehicles by fitting an alternate FUP-D. VSG15 provides guidance on how this should occur.

ADR requirements

Any FUP fitted to a heavy vehicle must comply with the requirements outlined in ARD 84 and can be satisfied by fitting either:

FUP device (FUP-D)	A standalone device installed at the front of a vehicle that meets FUP requirements. The device may meet all the requirements by itself or may rely on the design of the vehicle.
FUP system (FUP-S)	A solution that is integrated into the design of the vehicle front or cabin to address FUP requirements without the need for additional external fittings or devices.

ARD 84 mandates fitting of a FUP-D or FUP-S on all new-model NC category vehicles built from 1 January 2011 and all NC vehicles with a date of manufacture on or after 1 January 2012. For these vehicles, certification of compliance with ARD 84 is indicated on the vehicle's RAV

entry or identification plate approval. This includes new vehicles fitted with a FUP-D by an authorised representative of the vehicle manufacturer, such as a dealer who fits one of the OEMs approved options of FUP-D picked by the customer.

For vehicles certified as complying with FUP requirements, anything added to the front of the vehicle that increases its length must be a FUP compatible component. Examples of such might be non-FUP bullbars, nudge bars, bumpers, lights or light mounting bars (see 'compatible components' below).

Compatible components

Under test conditions specified by ARD 84, the FUP must not deform more than 400 mm from the front of the vehicle. If the deformed distance is less than 400 mm, components such as bumpers, bullbars and lamps/lights may be fitted to the front of the vehicle if they:

- are entirely within the allowable 400 mm from the deformed state of the FUP (see Figure 1); and
- are not a protrusion (as per ARD 43/.. or ARD 92/.. and the relevant heavy vehicle standards regulation).

The vehicle, with FUP and compatible components, must continue to meet all applicable dimensional requirements, including vehicle and combination length.

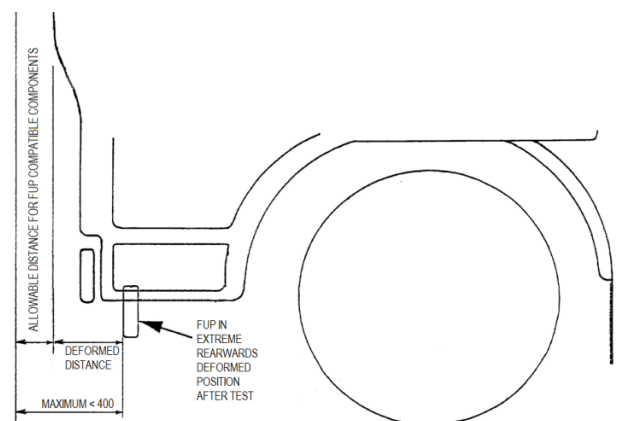


Figure 1: Allowable FUP compatible component distance

If the deformed distance is unknown and cannot be confirmed by the vehicle or FUP manufacturer, it is assumed to be the entire 400 mm. Therefore, no components may be fitted to the vehicle ahead of the FUP.

Design

A FUP must meet certain requirements to ensure it performs as expected during a frontal impact. These design requirements can be found in [ADR 84](#).

✎ Ensure the FUP design considers any optional advanced safety system fitted to the vehicle, including lane departure warning, active cruise control or autonomous emergency braking.

Once a FUP is designed and approved, an engineering report must be compiled, which includes the following:

- name and signature of the certifying person
- approval type, e.g., FUP-D
- name and address of the manufacturer
- make, model and year range of the vehicle which the approval applies to (include specific information)
- date on which the device or vehicle was submitted for approval tests
- name and address of the test facility
- test report reference number and the date (if applicable)
- clear statement about whether approval was granted, extended or refused by the certifying person
- position of any required approval markings on the FUP-D
- a list of the test reports and any other supporting documentation relevant to the design and certification
- a statement that the FUPs complies with the requirements of ADR 84
- the distance that FUP compatible components may be fitted (i.e., 400 mm less the distance the FUP deformed during testing), and
- location of each of the test points (e.g., P1: 200 mm from edge, P2: 1100 mm apart, P3: centre) (see Figure 2).

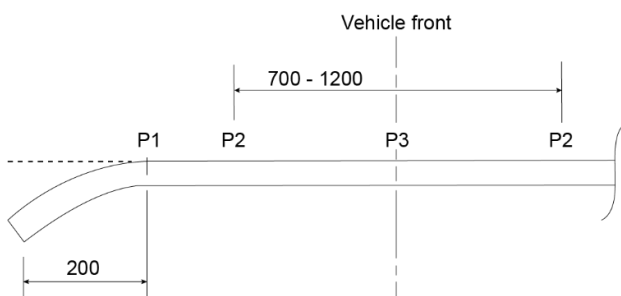


Figure 2: FUP testing points

If a FUP-D is to be supplied as an aftermarket product for installation by anyone other than the person who certified or manufactured it, provide installation instructions that include:

- manufacturer name
- part numbers and parts inventory
- vehicle make, model, body shape and year range for which the device or system is suitable for detailed fitting instructions.

Installation

When installing a FUP-D to a vehicle it must be fitted as per the following requirements:

- Only install a FUP-D that meets one of the following:
 - has been designed and certified with a component registration number (CRN) or component type approval (CTA) in accordance with ADR 84
 - is otherwise approved under ADR 84 via an alternative standard
 - has been designed and certified in accordance with ADR 84.
- Perform the installation in accordance with the instructions provided by the manufacturer of the FUP-D.
- Ensure the installation does not remove or weaken the vehicle sub-frame, chassis, cross-members or body-members unless instructed otherwise by the FUP-D manufacturer.

✎ Any other modifications required to the vehicle to accommodate the FUP-D must be certified under VSB6.

- Ensure the FUP certification assessed the vehicle with any removal or weakening present during the testing of the FUP and the vehicle continues to comply with ADR 84.
- Ensure the modified vehicle is free from protrusions in accordance with the relevant ADR and heavy vehicle standards regulation.
- Ensure the FUP-D complies with the dimension requirements of ADR 84.
- Ensure the vehicle when fitted with the FUP-D complies with the dimension requirements of ADR 43/.. and the relevant in-service heavy vehicle regulations.
- Ensure the FUP-D provides a maximum ground clearance below that is no more than 400 mm, and that the clearance on either side of it is within 200 mm (measured from outside of the tyre).

Approval plate

When an approved FUP-D is installed on a vehicle, an approval plate of at least a similar size to an identification plate (100 mm x 50 mm) should also be affixed. This approval plate should list the following:

- the words: FRONT UNDERRUN PROTECTION (FUP)
- the words as applicable: ADR 84 FUP-D or ADR 84 FUP-S
- the device manufacturer’s name
- make/model of vehicle with which the device is compatible
- the certifier approval number that relates to the device
- the authorisation number of those who certified the device.

Approved FUP-D or FUP-S plates can also contain the following information (see Figure 5):

- Deformation distance at each of the three test points.
- Location of each of the test points (e.g., P1: 200 mm from edge, P2: 1100 mm apart, P3: centre).

The following are examples of approval plates and markings for FUPD and FUPS:

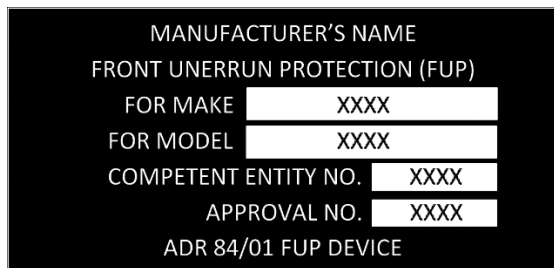


Figure 3: Example approval plate for a FUPD

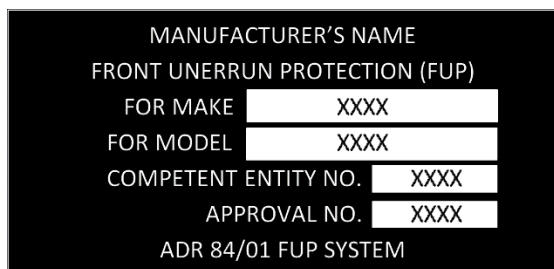


Figure 4: Example approval plate for a FUPD or FUPS

MANUFACTURER'S NAME	APPROVAL NO. XXXX		
Point	P1	P2	P3
Available Space	XXXmm	XXXmm	XXXmm
Point Location	XXXmm inboard	XXXmm apart	centre

Figure 5: Example FUP component compatibility plate

Complying with the Heavy Vehicle National Law

The operator of a heavy vehicle must ensure that their vehicle complies with the Australian Design Rules, Heavy Vehicle National Law and heavy vehicle safety standards. Using or permitting another person to use a defective heavy vehicle, or a heavy vehicle with unapproved modifications on a road, is an offence.

Penalties can include on-the-spot fines or prosecution. Formal warnings or a defect notice may also be issued. For more information about vehicle defects, see the [Heavy vehicle defects](#).

Chain of Responsibility

Under the Chain of Responsibility (CoR) laws, relevant parties in the transport supply chain have a duty to ensure the safety of their transport activities.

Parties in the chain have an obligation to eliminate or minimise potential harm or loss (risk) by doing all that is reasonably practicable in their business to ensure safety.

Implementing a system to ensure you are informed of changes to the vehicle safety standards and apply these to your business can support transport safety.

For more information:

Visit: <http://www.nhvr.gov.au/hvmodifications>
 Email: vehiclestandards@nhvr.gov.au
 Phone: 13 NHVR (13 64 87)*

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VSG15 Revision history		
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