IS 14812 (2005): Automotive Vehicles - Rear Underrun Protective Device - General Requirements [TED 6: Automotive Body, Chassis, Accessories and Garage Equipments]

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स्वचल वाहन — रीयर अंडररन संरक्षी युक्ति — सामान्य अपेक्षाएँ

(पहला पुनरीक्षण)

Indian Standard

AUTOMOTIVE VEHICLES — REAR UNDERRUN PROTECTIVE DEVICE — GENERAL REQUIREMENTS

(First Revision)

ICS 43.040.60

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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Price Group 3

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Automotive Body, Chassis, Accessories and Garage Equipment Sectional Committee had been approved by the Transport Engineering Division Council.

The purpose of this standard is to offer protection against underrunning of M2, M3, N2, N3, T3 and T4 categories of vehicles in the event of rear collision with vehicles of categories M1, N1; two and three wheelers with low height.

In this revision categories of vehicles are identified where protection is offered against underrunning and the term two wheeler have been included in place of scooter and motor cycles.

In the preparation of this standard considerable assistance has been derived from ECE Regulation 58, Revision 1 (Incorporating the 01 series of amendments) — Uniform Provisions concerning the Approval of:

a) Rear Underrun Protective Devices (RUPDs),
b) Vehicles with regard to the Installation of an RUPD of an Approved Type,
c) Vehicles with regard to their Rear Underrun Protection (RUP).

The composition of the Committee responsible for formulation of this standard is given in Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

AUTOMOTIVE VEHICLES — REAR UNDERRUN PROTECTIVE DEVICE — GENERAL REQUIREMENTS

(First Revision)

1 SCOPE

1.1 This standard applies to the rear underrun protection offered by complete vehicles of categories M2, M3, N2, N3, T3 and T4 as defined in IS 14272 (Part 1) : 1995 'Automotive Vehicles — Types — Terminology : Part 1 — Three and four wheelers'.

1.2 This standard is not applicable to the tractive units for articulated vehicles, trailers specially designed and constructed for the carriage of very long loads of indivisible length, such as timber, steel bars, etc, and vehicles where Rear Underrun Protection Device (RUPD) is incompatible with their use.

1.3 This standard applies to:

1.3.1 Rear Underrun Protective Devices which are intended to be fitted to vehicles of categories M2, M3, N2, N3, T3 and T4 as defined in IS 14272 (Part 1).

1.3.2 The installation on vehicles of categories M2, M3, N2, N3, T3 and T4 of Rear Underrun Protective Devices which have been type approved by this standard.

1.3.3 Vehicles of categories M2, M3, N2, N3, T3 and T4 equipped with an RUPD which has not been separately approved by this standard or so designed and/ or equipped that its component parts can be regarded as totally or partially fulfilling the function of RUPD.

1.4 Purpose

The purpose of this standard is to offer effective protection against underrunning of vehicles covered under this standard in the event of rear collision with vehicles of categories M1 and N1; two and three wheelers with low height.

2 TERMINOLOGY

2.1 Vehicle — Means any motor vehicle intended for use on the road, with or without bodywork, having atleast four wheels and a maximum design speed exceeding 25 km/h and its trailers with the exception for vehicles which run on rails, agricultural tractors and construction machinery.

2.2 Vehicle Type — Means a category of vehicles which do not differ with respect to the essential points as the width of the rear axle, the structure, the dimensions, the shape, and the materials of the rear part of the vehicle, the characteristics of the suspension in so far as they have a bearing on the requirements specified in **3**.

2.3 Unladen Vehicle — Means the vehicle in running order, unoccupied and unladen but complete with coolant, lubricant, tools, a spare wheel (if provided as standard equipment by the vehicle manufacturer) and 90 percent fuel.

2.4 Maximum Weight of Vehicle — Means the weight stated by the vehicle manufacturer to be technically permissible.

2.5 Rear Underrun Protective Device — Means components whose combined function satisfies the requirements set out in **3.3** and **3.4**.

3 GENERAL REQUIREMENT

3.1 The vehicles shall be so constructed and/or equipped as to offer effective protection over their whole width against underrunning from the rear by vehicles of categories M1 and N1 and two and three wheelers with low height.

3.2 Any vehicle in the categories M2, M3, N2, N3, T3 or T4 shall be deemed to satisfy the condition set out in **3.1** provided that:

3.2.1 Vehicles in the categories M2 and M3;

3.2.1.1 Satisfies the conditions set out in **3.3** and **3.4**; or

3.2.1.2 If the ground clearance of the rear part of the unladen vehicle does not exceed 550 mm for M2 and 700 mm for M3 category over a width which is not shorter than that of the rear axle by more than 100 mm on either side (excluding any tyre bulging close to the ground).

Where there are more than one rear axle, the width to be considered is that of the widest.

Where the device is contained in or comprised by the vehicle bodywork which itself extends beyond the width of the rear axle the requirement that the RUP shall not exceed that of the rear axle shall not apply.

This requirement shall be satisfied at least on a line at a distance of not more than 400 mm from the rear extremity of the vehicle.

One such recommended RUPD configuration for M3 buses is given in Annex A, as an example.

3.2.2 Vehicle in the categories N2, N3, T3 and T4.

3.2.2.1 Vehicle is equipped with a special rear underrun protective device in accordance with the requirements of 3.3 and 3.4.

3.2.2.2 The vehicle is so designed and/or equipped at the rear that by virtue of their shape and characteristics, its component parts can be regarded as replacing the rear underrun protective device. Components whose combined function satisfies the requirements set out in 3.3 and 3.4 are considered to form a rear underrun protective device.

3.3 A device for protection against underrunning from the rear, generally consists of a cross-member and linking components connected to the chassis side members or to whatever replaces them. It shall have the following characteristics:

3.3.1 The device shall be fitted as close to the rear of the vehicle as possible. When the vehicle is unladen, the lower edge of the device shall at no point be more than 550 mm above the ground for M2, N2, N3, T3 or T4 categories of vehicles. In case of M3 category of vehicles, the lower edge of the device shall at no point be more than 700 mm above the ground (*see* Fig. 1).

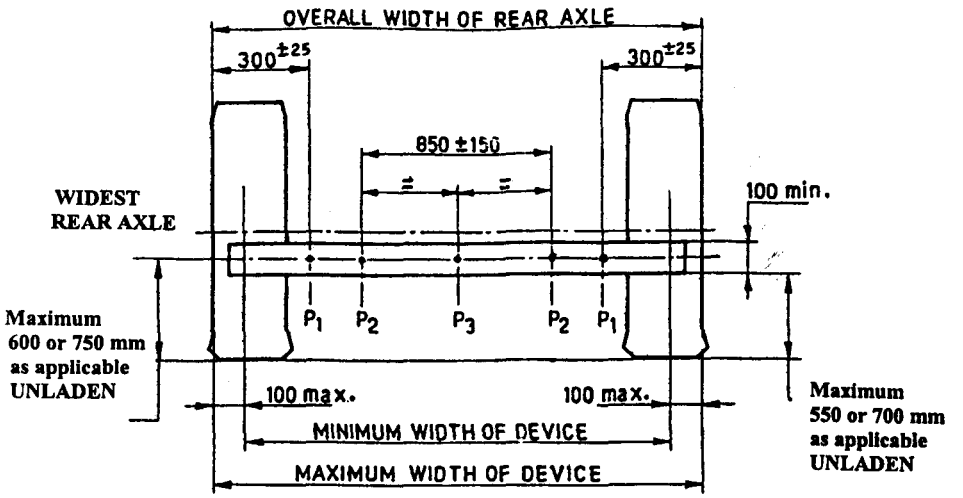
3.3.2 The width of the device shall at no point exceed the width of the rear axle measured at the outer most points of the wheel, excluding the bulging of the tyres close to the ground, nor shall it be more than 100 mm shorter on either side. Where there is more than one rear axle, the width to be considered is that of the widest rear axle. Where the device is contained in or comprised by the vehicle body work which itself extends beyond the width of the rear axle the requirement that the RUP must not exceed that of the rear axle shall not apply.

3.3.3 The section height of the cross-members shall be not less than 100 mm. The lateral extremities of the cross-members shall not bend to the rear or have a sharp outer edge; this condition is fulfilled when the lateral extremities of the cross-member are rounded on the outside and have a radius of curvature not less than 2.5 mm.

3.3.4 The device may be so designed that its position at the rear of the vehicle can be varied. In this event, there shall be a guaranteed method of securing it in the service position so that any unintentional change of position is precluded. It shall be possible for the operator to vary the position of the device by applying a force not exceeding 40daN.

3.4 Performance Requirements and Evaluation

3.4.1 The device shall offer adequate resistance to forces applied parallel to the longitudinal axis of the vehicle, and be connected, when in the service position with the chassis side members or whatever replaces them.



All dimensions in millimetres.

NOTE — The exact transverse location of points P_1 and P_2 is to be specified by the manufacturer within the limits shown.

FIG. 1 POSITION OF REAR UNDERRUN PROTECTIVE DEVICE AND THE RESISTANCE POINTS P_1, P_2 AND P_3

3.4.1.1 This requirement shall be satisfied if it is shown that both during and after the application, the horizontal distance between the rear of the device and the rear extremity of the vehicle does not exceed 400 mm at any of the points P_1, P_2 and P_3 (*see* Fig. 1). In measuring this distance, any part of the vehicle which is more than 3 m above the ground when the vehicle is unladen shall be excluded.

3.4.1.2 Point P_1 are located 300 ± 25 mm from the longitudinal planes tangential to the outer edges of the wheels on the rear axle; point P_2 which are located on the line joining point P_1, are symmetrical to the median longitudinal plane of the vehicle at a distance from each other of 700 to 1 000 mm inclusive, the exact position being specified by the manufacturer. The height above the ground of points P_1 and P_2 (*see* Fig. 1) shall be defined by the vehicle manufacturer within the lines that bound the device horizontally. The height shall not, however, exceed 600 mm when the vehicle is unladen. P_3 is the centre point of the straight line joining point P_2.

3.4.2 A horizontal force equal to 12.5 percent of the maximum technically permissible weight of the vehicle but not exceeding 25 kN shall be applied successively to both points P_1 and to point P_3.

3.4.3 A horizontal force equal to 50 percent of the maximum technically permissible weight of the vehicle but not exceeding 100 kN shall be applied successively to both points P_2.

3.4.4 The forces specified in **3.4.2** and **3.4.3** above shall be applied separately, on the same guard. The order in which the forces are applied may be specified by the manufacturer.

3.4.5 Whenever a practical test is performed to verify compliance with the above metioned requirements, the following conditions shall be fulfilled:

3.4.5.1 *Test conditions for RUPDs*

At the request of the manufacturer the test may be conducted either:

a) On a vehicle of the type for which the test RUPD is intended; in this case the conditions set out in **3.4.5.2** shall be observed; or

b) On a part of the chassis of the vehicle type for which the RUPD is intended; this part shall be representative of the vehicle type(s) in question; or

c) On a rigid test bench.

In case of (a) and (b) above, the parts used to connect the RUPD to part of vehicle chassis or to the rigid bench shall be equivalent to those which are used to secure the RUPD when it is installed on the vehicle.

3.4.5.2 *Test conditions for vehicles*

a) The vehicle shall be at rest on a level, flat, rigid and smooth surface.

b) The front wheels shall be in the straight-ahead position.

c) The tyres shall be inflated to the pressure recommended by the vehicle manufacturer.

d) The vehicle may, if necessary to achieve the test forces required, be restrained by any method, this method to be specified by the vehicle manufacturer.

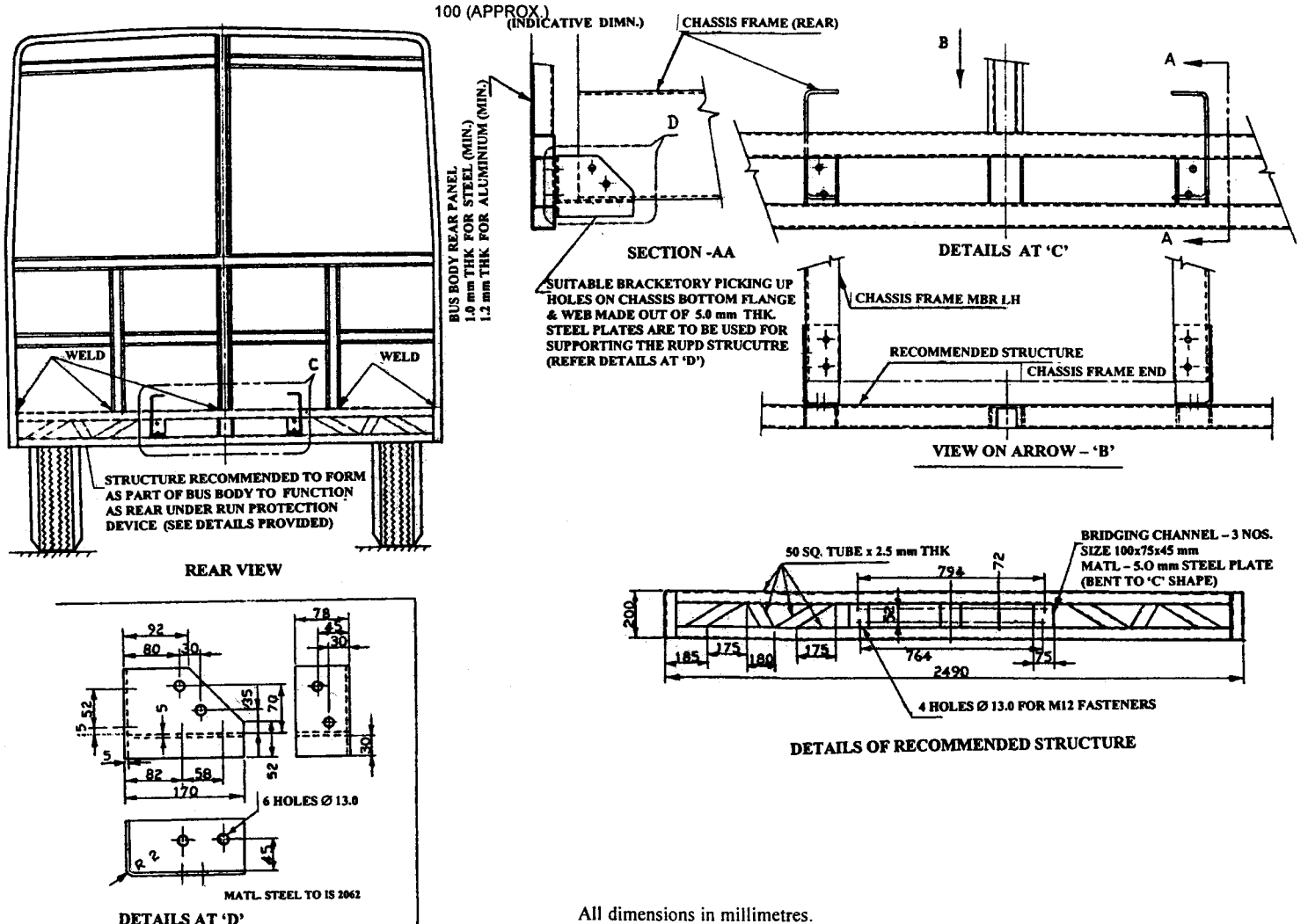
e) Vehicles equipped with hydropneumatic, hydraulic or pneumatic suspension or a device for automatic levelling according to load shall be tested in the normal running condition specified by the manufacturer.

3.4.5.3 The specified forces shall be applied by rams which are suitably articulated (for example by means of universal joints) and shall be parallel to the median longitudinal plane of the vehicle via a surface not more than 250 mm in height (the exact height shall be indicated by the manufacturer) and 200 mm wide, with a radius of curvature of 5 ± 1 mm at the vertical edges; the centre of the surface is placed successively at point P_1, P_2 and P_3.

3.4.6 At the request of manufacturer and with the consent of testing agency the test procedure described in **3.4.1** to **3.4.5** may be simulated by calculations.

ANNEX A

(*Clause* 3.2.1.2)



All dimensions in millimetres.

TYPICAL RECOMMENDED RUPD CONFIGURATION FOR M3 CATEGORY BUS FOR DIMENSIONAL REQUIREMENTS

ANNEX B

(Foreword)

COMMITTEE COMPOSITION

Automotive Body, Chassis, Accessories and Garage Equipment Sectional Committee, TED 6

Organization	*Representative(s)*
Automotive Research Association of India, Pune	SHRI BALRAJ BHANOT (***Chairman***) SHRI S. M. HARGAPURKAR (*Alternate*)
Ashok Leyland Ltd, Chennai	SHRI C. B. S. MENON SHRI K. HARIKRISHNAN (*Alternate*)
Association State Road Transport Undertakings, New Delhi	DIRECTOR (TECHNICAL)
Autoliv IFB India Ltd, Bangalore	SHRI V. RAGHU SHRI S. RANGARAJAN (*Alternate*)
Automotive Component Manufacturers Association, New Delhi	ASSISTANT DIRECTOR
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Central Institute of Road Transport, Pune	SHRI N. R. KACHARE SHRI P. S. MUNOLI (*Alternate*)
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Sutlej Motors Ltd, Jalandhar	SHRI K. S. WILKHU

Organization	*Representative(s)*
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SHRI P. K. SHARMA
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