هيئة التقييس لدول مجلس التعاون لدول الخليج العربية
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السيارات - حواجز الحماية الأمامية للشاحنات وطرق اختبارها

MOTOR VEHICLES
FRONT UNDERRUN PROTECTIVE DEVICES IN TRUCKS AND ITS METHODS OF TEST

إعداد

اللجنة الفنية الفرعية الخليجية لقطاع مواصفات المركبات والإطارات

هذه الوثيقة مشروع لمواصفة قياسية خليجية تم توزيعها لإبداء الرأي والملحوظات بشأنها، لذلك فإنها عرضة للتغيير والتبديل، ولا يجوز الرجوع إليها كمواصفة قياسية خليجية إلا بعد اعتمادها من مجلس إدارة الهيئة.

تقديم

هيئة التقييس لدول مجلس التعاون لدول الخليج العربية هيئة إقليمية تضم في عضويتها الأجهزة الوطنية للمواصفات والمقاييس في دول الخليج العربية ، ومن مهام الهيئة إعداد المواصفات القياسية الخليجية بواسطة لجان فنية متخصصة .

وقد قامت هيئة التقييس لدول مجلس التعاون لدول الخليج العربية ضمن برنامج عمل اللجنة الفنيـة رقم٢-١ " اللجنة الفنية الخليجية الفرعية لقطـاع مواصـفات المركبـات والإطـارات " بإعـداد المواصفة القياسية الخليجية رقم "GSO2/DS/ECE 93: 2009 " السيارات - حواجز الحمايـة الأمامية للشاحنات وطرق اختبارها " من قبل سلطنة عمان وقد تم إعداد المشروع بعد اسـتعراض المواصفات القياسية العربية والأجنبية والدولية والمؤلفات المرجعية ذات الصلة.

وقد اعتمدت هذه المواصفة كلائحة فنية خليجية في اجتماع مجلس إدارة الهيئة رقم ( )، الذي عقد بتاريخ / / هـ ، الموافق / / م.

Foreword

Standardization Organization for GCC (GSO) is a regional Organization which consists of the National Standards Bodies of GCC member States. One of GSO main functions is to issue Gulf Standards /Technical regulation through specialized technical committees (TCs).

GSO through the technical program of committee TC No. 2-1 " The Gulf technical Subcommittee for vehicles and tyres standards " has prepared this Standard . The Draft Standard has been prepared by sultanate of Oman.

The draft Standard has been prepared based on relevant ADMO, International and National foreign Standards and references.

This standard has been approved as Gulf Standard by GSO Board of Directors in its meeting No..../.... …….held on / / / H , / / G

MOTOR VEHICLES
FRONT UNDERRUN PROTECTION IN TRUCK AND ITS METHODS OF TEST

1- SCOPE AND FIELD OF APPLICATION

This standard is concerned with the requirements for the front underrun protective devices (FUPD) of trucks having maximum mass exceeding 3.5 tones used for the carriage of goods. This standard does not apply to off road vehicles and vehicles such that their use is incompatible with the provisions of front underrun protection.

2- COMPLEMENTARY REFERENCES

2.1 GSO 159/.1993.... "Motor Vehicles - Weights and Dimensions".

2.2 GSO 48/.1984.... "Motor Vehicles - Conformity Certificates".

3- DEFINITIONS

3.1 **Maximum mass:** The mass stated by the vehicle manufacturer to be technically permissible.

3.2 **Maximum weight:** The vertical force (in newtons) required to support the same vehicle loaded to its maximum mass.

3.3 **Unladen Vehicle:** The vehicle in running order unoccupied and unladen but complete with fuel, coolant, lubricant, tools and a spare wheel.

3.4 **Type of FUPD**: FUPD which do not differ with respect to the essential characteristics such as shape, dimensions, attachment, materials and the markings.

3.5 **Front Underrun Protection (FUP)** : The presence at the front of the vehicle of either: a special FUPD or a body work, chassis parts or other components

such that by virtue of their shape and characteristics, these elements can be regarded as fulfilling the function of the FUPD.

4- REQUIREMENTS

The following shall be met:

4.1 General

4.1.1 All vehicles carrying goods, including tankers, mobile cranes, mobile workshops of maximum mass exceeding 3.5 tonnes, shall be equipped with front underrun protective devices to offer effective protection for passenger cars or vehicles carrying goods having maximum mass not exceeding 3.5 tonnes against underrunning in the event of a frontal collision.

4.1.2 The front underrun protective device shall comply with the requirements specified in item 4.2.

4.1.3 If the vehicle is so designed and equipped at the front that by virtue of their shape and characteristics, its component parts comply with the requirements specified in items 4.2 and 4.3, then the vehicle may not be necessary to be provided with front underrun protective device.

4.1.4 The maximum mass of a vehicle type for which the front underrun protective device to be installed shall not exceed the value indicated on the front underrun protective device for which it is designed for.

4.2 FUPD Technical requirement

4.2.1 The FUPD shall offer adequate resistance to forces applied parallel to the longitudinal axis of the vehicle and also satisfy certain dimensional requirements. These shall be checked in accordance with the test procedure and conditions specified in this Regulation.

4.2.2 The section height of the FUPD cross-member shall not be less than 100 mm for goods vehicles having a maximum mass between 3.5 and 12 tones and 120 mm for goods vehicles having maximum mass exceeding 12tones.

4.2.3 The lateral extremities of the cross-member shall not bend to the front 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 of not less than 2.5 mm.

4.2.4 The device may be so designed that its position at the front 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.

4.2.5 It shall be possible for the operator to vary the position of the device by applying a force not exceeding 40 daN;

4.2.6 The outermost surfaces of every front guard installation shall be essentially smooth or horizontally corrugated so that domed heads of bolts or rivets may protrude beyond the surface to a distance not exceeding 10 mm.

4.3 Installation of FUPD

4.3.1 The maximum mass of a vehicle type shall not exceed the value indicated on the approved FUPD intended to be installed on that vehicle.

4.3.2 The vehicle with the FUPD installed shall satisfy the dimensional requirements specified in item 6.3 of this regulation taking into account the test conditions and information indicated on this regulation in respect of the FUPD.

4.3.3 The FUPD shall be so fitted to the vehicle that the horizontal distance measured in the rearward direction from the foremost part of the vehicle to the front of the FUPD does not exceed 400 mm diminished by the recorded deformation measured at any of the points where the test forces have been applied during the test of the FUPD in conformity with the provisions of this regulation .

4.3.4 In measuring the distances, any part of the vehicle which is more than 2 m above the ground shall be excluded.

4.3.5 The maximum ground clearance with respect to the underside of the FUPD shall be no more than 400 mm, between the two points (P1) in the installed condition.(Fig 2)

4.3.6 Outboard of each point (P1) of the above mentioned height may be greater than 400mm providing the underside is not above a plane passing through the underside of the FUPD directly below the point (P1)and forming a slope at 15° above the horizontal (Fig 2)

4.3.7 The height above the ground of the points of application of the test forces applied to the FUPD shall not exceed 445 mm

4.3.8 The maximum ground clearance with respect to the underside of the FUPD between the two points (P1) shall be no more than 450 mm taking into account their movement during the application of the test load.

4.3.9 The width of the FUPD shall at no point exceed the width of the mudguards covering the wheels of the foremost axle nor shall it be more than 100 mm shorter on either side than the foremost axle measured at the outermost points of the tyres, excluding the bulging of the tyres close to the ground (fig 1), or

200 mm shorter on either side, measured from the outermost points of the access steps to the driver's cabin.

4.4 **Vehicle with Front underrun protection (FUP)**

4.4.1 Any vehicle used for the carriage of goods and having a maximum mass exceeding 3.5 tonnes shall be deemed to satisfy the condition of providing effective protection for passenger cars and trucks having a maximum mass less than 3.5 tonnes against under running, provided that the vehicle is equipped with an FUPD which has not been separately approved for this Regulation or is so designed and/or equipped at the front that, by virtue of their shape and characteristics, its component parts can be regarded as replacing the front underrun protective device.

4.4.2 Components whose combined function satisfies the following requirements are considered to form a front underrun protective device.

4.4.3 The FUP shall offer adequate resistance to forces applied parallel to the longitudinal axis of the vehicle.

4.4.4 The FUP shall satisfy the dimensional requirements indicated in item 6.3 of this regulation.

4.4.5 The section height of the FUPD cross-member not separately approved shall not be less than 100 mm for goods vehicles having a maximum mass between 3.5 and 12 tonnes and 120 mm for vehicles having maximum mass exceeding 12tonnes

4.4.6 The device may be so designed that its position at the front 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.

4.4.7 It shall be possible for the operator to vary the position of the device by applying a force not exceeding 40 daN;

4.4.8 The FUP shall have sufficient strength that the horizontal distance measured in the rearward direction between the foremost part of the vehicle after the application of the test forces and the test ram contact surface on the vehicle does not exceed 400 mm (item 6.3).

4.4.9 In measuring the distances, any part of the vehicle which is more than 2 m above the ground shall be excluded.

4.4.10 The maximum ground clearance with respect to the underside of the FUP shall be no more than 400 mm between the two points P1 (Fig 2)

4.4.11 This height may be greater than 400 mm providing the underside is not above a plane passing through the underside of the FUP directly below the point P1 and forming a slope at 15° above the horizontal (Fig 2)

4.4.12 The maximum ground clearance with respect to the underside of the FUP between the two points P1 shall be no more than 450 mm taking into account their movement during the application of the test load.

4.4.13 The width of the FUP shall at no point exceed the width of the mudguards covering the wheels of the foremost axle nor shall it be more than 100 mm shorter on either side than the foremost axle measured at the outermost points of the tyres, excluding the bulging of the tyres close to the ground (Fig l), or 200 mm shorter on either side, measured from the outermost points of the access steps to the driver's cabin.

5- MARKING

5.1 Each front underrun protective device shall be legibly and durably marked or labelled with the following information in Arabic and/or English.

5.1.1 Manufacturers name and/or trademark.

5.1.2 Date of manufacture.

5.1.3 The maximum mass of vehicle on which the front underrun protective device may be installed.

5.1.4 A detailed description with sketches the correct installation and adjustment of the device.

5.1.5 Drawings, diagrams and layout plans of the components of the structure.

6- TESTING

6.1 Sampling

A sufficient number of front underrun protective devices shall be taken from the consignment of the devices of the same type and subjected to the required tests prescribed in this standard.

6.2 Measuring instruments

6.2.1 Dimension measuring instrument

The instruments used shall permit measurement to an accuracy of (± 1) mm.

6.2.2 Force measuring instruments

The instruments used shall permit measurement to an accuracy of ± 5% of the range.

6.3 Tests

The following tests shall be carried out on the sample withdrawn in accordance with item 6.1.

6.3.1 Visual inspection

The front underrun protective device shall be visually examined to check for any damage, crack, sharp outer edge or any apparent defects.

6.3.2 Test conditions for FUPD

6.3.2.1 The test may be carried out either:

- On a vehicle of the type for which FUPD is intended
- On a part of the chassis of the vehicle type for which the FUPD is intended, this part shall be representative of the vehicle type in question
- On a rigid test bench

6.3.2.2 Test conditions for vehicles.

- The sample shall be installed on to a vehicle of the type for which the front underrun protective device is intended or part of the chassis or on a rigid bench..
- The vehicle shall be restrained by a suitable method as specified by the manufacturer to or restrained by any method specified by the manufacturer.
- The dimensions shall be taken as if the vehicle were in the following condition:
- The vehicle shall be at rest on a level, flat, rigid and smooth surface.
- The front steered wheels shall be in the straight-ahead position.
- The vehicle shall be unladen.
- The tyres shall be inflated to the pressure recommended by the vehicle manufacturer.
- Vehicles equipped with hydro-pneumatic, hydraulic or pneumatic suspension or a device for automatic leveling according to load, shall be tested in the normal running condition specified by the manufacturer.

6.3.2.3 Procedure

The measurements shall be made on the front underrun protective device installed in accordance with item 6.3.2.1 and in compliance with items 6.3.2.2

6.3.3 Strength test

6.3.3.1 Apparatus

- The apparatus shall consists of a rams which are suitably articulated (e.g. 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 indicated by the manufacturer.
- The surface shall not be more than 400 mm wide, with a radius of curvature of (5 ± 1) mm at the vertical edges.
- The centre of the surface is placed successively at points P1, P2 and P3 (fig 1)

6.3.3.2 Preparation for the test

The vehicle shall be prepared for the tests as explained in item 6.3.2.2.

6.3.3.3 Procedure

6.3.3.3.1 Points P1 are located up to 200 mm from the longitudinal planes tangential to the outermost points of the tyres on the front axle, excluding the bulging of the tyres close to the ground; points P2 are symmetrical to the median longitudinal plane of the vehicle at a distance from each other of 700 to 1,200 mm inclusive. The exact positions shall be specified by the manufacturer.

6.3.3.3.2 The height above the ground of points P1 and P2 shall be defined by the vehicle manufacturer within the lines that bound the front face of the device. The height shall not, however, exceed 445 mm when the vehicle is unladen. P3 is in the vertical longitudinal median plane of the vehicle (Fig 1)

6.3.3.3.3 The test forces set out below shall be applied to each of the test points in separate tests on the same vehicle or device or, if requested by the manufacturer, on different vehicles or device samples.

- If the structure and components of the vehicle relevant to the front underrun protection are located substantially symmetrical to its longitudinal median plane the tests at points P1 and P2 shall be carried out only on one side.
- When tested the forces shall be applied as rapidly as possible and the device or vehicle shall withstand the forces in the items mentioned below for at least 0.2 seconds.
- A horizontal force equal to 50% of the maximum weight of the vehicle or intended vehicle type(s) but not exceeding 80 x 10^3 N shall be applied successively to both points P1
- A horizontal force equal to 100% of the maximum weight of the vehicle or intended vehicle type(s) but not exceeding 160 x 10^3 N shall be applied successively to both points P2.
- If the device is discontinuous and is reduced in cross-section area between the two points P2, then the tests shall continue with the application of a horizontal force applied to the point P3 the same as that to the points P1.

6.3.3.3.4. The maximum horizontal and vertical displacements of each test point during the application of the above forces shall be recorded and the highest value recorded on the test report or the document supplied with the device.

6.3.3.4 Result

At the end of each test the distance between the rear of the front underrun protective device and the front extremity of the vehicle at any of the points shall be measured.

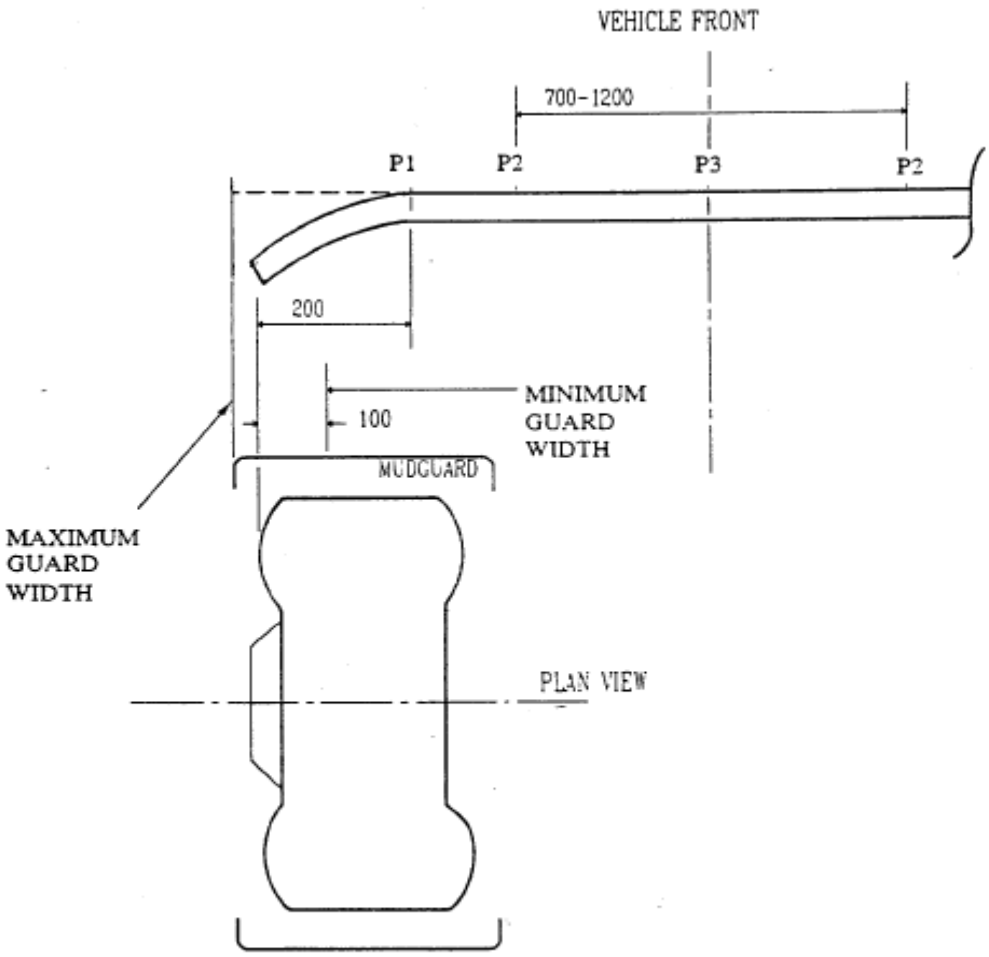
7- CRITERIA OF TECHNICAL CONFORMITY

7.1 The criteria of technical conformity shall be in accordance with the Gulf Standard G.S. 48/1984 “Motor Vehicles - Conformity Certificates”.

7.2 The front underrun protective device shall be considered complying with all the requirements of this regulation when the withdrawn sample from the consignment or the supplied sample by the manufacturer passes the tests.

7.3 In case one or more front underrun protective device in the sample fails to pass the tests, a second sample double the number of units as the first one shall be withdrawn from the same consignment or the supplied sample and subjected to the tests.

The front underrun protective device shall be considered complying with the requirements of this regulation when all the units of the second sample pass the tests, otherwise the front underrun protective device shall be considered non-complying.



FUP NORMALLY CONSISTS OF A CROSS-MEMBER AND LINKS TO THE CHASSIS OR OTHER STRUCTURAL MEMBERS

Note: The shape of FUPD is only an example.

Fig 1

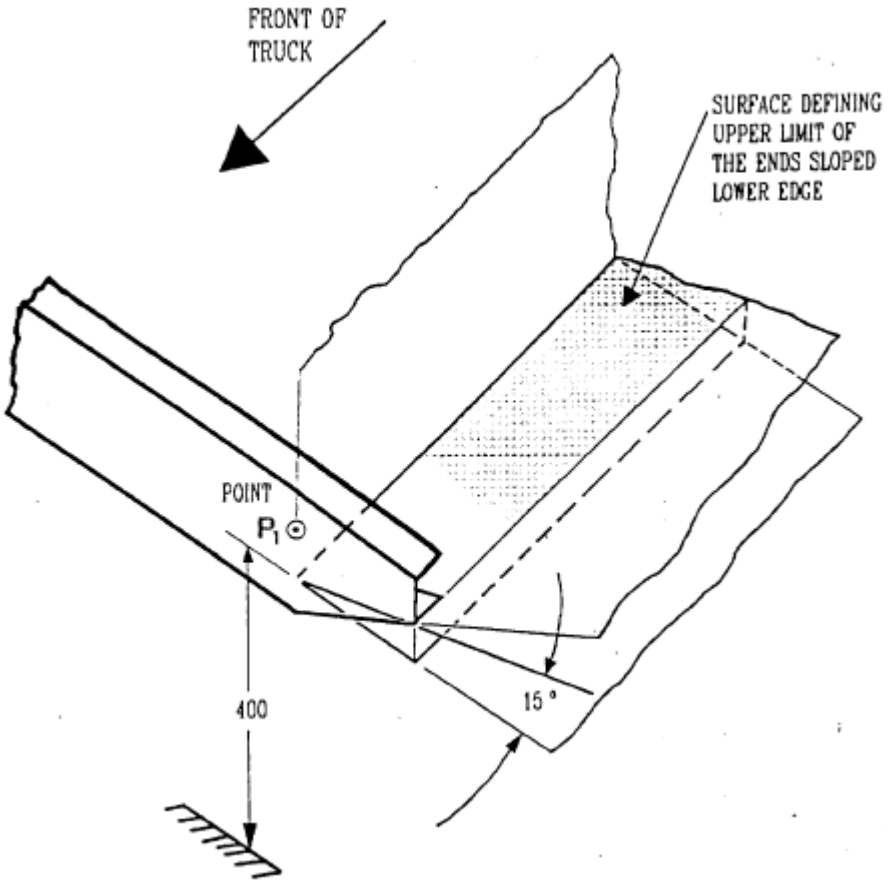

FRONT OF
TRUCK
SURFACE DEFINING
UPPER LIMIT OF
THE ENDS SLOPED
LOWER EDGE
POINT
P1
400
15 °

Fig 2