70 Lane departure warning system

Refer to: R130 00

70.1 Effective Date and Scope:

70.1.1 Effective date from 2019/1/1, the new vehicle variants of category symbols M2, M3, N2 and N3, and from 2021/1/1, the all vehicle variants of category symbols M2, M3, N2 and N3, shall comply with this regulation.

70.2 Definitions

70.2.1 "Lane Departure Warning System (LDWS)" means a system to warn the driver of an unintentional drift of the vehicle out of its travel lane.

70.2.2 "Lane" means one of the longitudinal strips into which a roadway is divided.

70.2.3 "Visible lane marking" means delineators intentionally placed on the borderline of the lane that are directly visible by the driver while driving.

70.2.4 "Rate of departure" means the subject vehicle’s approach velocity at a right angle to the visible lane marking at the warning issue point.

70.2.5 "Common space" means an area on which two or more information functions (e.g. symbols) may be displayed, but not simultaneously.

70.3 The principles of applicable type and scope of lane departure warning system shall be as below:

70.3.1 The same vehicle brand; If use chassis vehicle instead of completed vehicle for testing, then the same chassis brand is necessary.

70.3.2 Vehicle features which significantly influence the performances of the lane departure warning system.

70.3.3 The type and design of the lane departure warning system.

70.4 Specifications

70.4.1 Declaration of design compliance: applicant shall ensure and declare to comply with the following requirements.

70.4.1.1 The effectiveness of the LDWS shall not be adversely affected by magnetic or electrical fields.

70.4.2 Performance requirements

70.4.2.1 Whenever the system is active, as specified in paragraph 70.4.2.3 below, the LDWS shall warn the driver if the vehicle crosses over a visible lane marking for the lane in which it is running, on a road with a directional form that varies between straight and a curve having an inner lane marking with a minimum radius of 250 m, when there has been no purposeful demand to do so. Specifically:

70.4.2.1.1 It shall provide the driver with the warning specified in paragraph 70.4.4.1. below when tested in accordance with the provisions of paragraph 70.5.5 below (departure warning test) and with lane markings as specified in paragraph 70.5.2.3 below.

70.4.2.1.2 The warning mentioned in paragraph 70.4.2.1 above may be suppressed when there is a driver action which indicates an intention to depart from the lane.

70.4.2.2 The system shall also provide the driver with the warning specified in paragraph 70.4.4.2 below when tested in accordance with the provisions of paragraph 70.5.6 below (failure detection test). The signal shall be constant.

70.4.2.3 The LDWS shall be active at least at vehicle speeds above 60 km/h, unless manually deactivated as per paragraph 70.4.3 below.

70.4.3 If a vehicle is equipped with a means to deactivate the LDWS function, the following conditions shall apply as appropriate:

70.4.3.1 The LDWS function shall be automatically reinstated at the initiation of each new ignition "on" (run) cycle.

70.4.3.2 A constant optical warning signal shall inform the driver that the LDWS function has been deactivated. The yellow warning signal specified in paragraph 70.4.4.2. below may be used for this purpose.

70.4.4 Warning indication

70.4.4.1 The lane departure warning referred to in paragraph 70.4.2.1. above shall be noticeable by the driver and be provided by:

(a) At least two warning means out of optical, acoustic and haptic, or

(b) One warning means out of haptic and acoustic, with spatial indication about the direction of unintended drift of the vehicle.

70.4.4.1.1 Where an optical signal is used for the lane departure warning, it may use the failure warning signal as specified in paragraph 70.4.4.2. below in a flashing mode.

70.4.4.2 The failure warning referred to in paragraph 70.4.2.2. above shall be a yellow optical warning signal.

70.4.4.3 The LDWS optical warning signals shall be activated either when the ignition (start) switch is turned to the "on" (run) position or when the ignition (start) switch is in a position between the "on" (run) and "start" that is designated by the manufacturer as a check position (initial system (power-on)). This requirement does not apply to warning signals shown in a common space.

70.4.4.4 The optical warning signals shall be visible even by daylight; the satisfactory condition of the signals must be easily verifiable by the driver from the driver's seat.

70.4.4.5 When the driver is provided with an optical warning signal to indicate that the LDWS is temporarily not available, for example due to inclement weather conditions, the signal shall be constant. The failure warning signal specified in paragraph 70.4.4.2. above may be used for this purpose.

70.4.5 Applicants shall provide design explanation for preventing LDWS modification, or providing the methods for checking system is functioning well.

70.5 Test procedure

70.5.1 Applicants shall providing following documents at least:

70.5.1.1 The manufacturer shall provide a brief documentation package which gives access to the basic design of the system and, if applicable, the means by which it is linked to other vehicle systems. The function of the system shall be explained and the documentation shall describe how the operational status of the system is checked, whether there is an influence on other vehicle systems, and the method(s) used in establishing the situations which will result in a failure warning signal being displayed.

70.5.1.2 The vehicle manufacturer shall demonstrate through the use of documentation that the system works at all conditions of load.

70.5.2 Test conditions

70.5.2.1 The test shall be performed on a flat, dry asphalt or concrete surface.

70.5.2.2 The ambient temperature shall be between 0° C and 45° C.

70.5.2.3 Visible lane markings

70.5.2.3.1 The visible lane markings used in the lane departure warning tests of paragraph 70.5.5. below shall be comply with paragraph 70.6, with the markings being in good condition and of a material conforming to the standard for visible lane markings. The visible lane marking layout used for the testing shall be recorded.

70.5.2.4 The test shall be performed under visibility conditions that allow safe driving at the required test speed.

70.5.3 Vehicle conditions

70.5.3.1 Test weight

The vehicle may be tested at any condition of load, the distribution of the mass among the axles being that stated by the vehicle manufacturer without exceeding any of the maximum permissible mass for each axle. No alteration shall be made once the test procedure has begun.

70.5.3.2 The vehicle shall be tested at the tyre pressures recommended by the vehicle manufacturer.

70.5.3.3 In the case where the LDWS is equipped with a user-adjustable warning threshold, the test as specified in paragraph 70.5.5. below shall be performed with the warning threshold set at its maximum lane departure setting. No alteration shall be made once the test procedure has begun.

70.5.4 Optical warning signal verification test

With the vehicle stationary check that the optical warning signal(s) comply with the requirements of paragraph 70.4.4.3. above.

70.5.5 Lane departure warning test

70.5.5.1 Drive the vehicle at a speed of 65 km/h +/- 3 km/h into the centre of the test lane in a smooth manner so that the attitude of the vehicle is stable. Maintaining the prescribed speed, gently drift the vehicle, either to the left or the right, at a rate of departure of between 0.1 and 0.8 m/s so that the vehicle crosses the lane marking. Repeat the test at a different rate of departure within the range 0.1 and 0.8 m/s. Repeat the above tests drifting in the opposite direction.

70.5.5.2 The LDWS shall provide the lane departure warning indication mentioned in paragraph 70.4.4.1. above at the latest when the outside of the tyre of the vehicle's front wheel closest to the lane markings crosses a line 0.3 m beyond the outside edge of the visible lane marking to which the vehicle is being drifted.

70.5.6 Failure detection test

70.5.6.1 Simulate a LDWS failure, for example by disconnecting the power source to any LDWS component or disconnecting any electrical connection between LDWS components. The electrical connections for the failure warning signal of paragraph 70.4.4.2. above and the LDWS disable control of paragraph 70.4.3. above shall not be disconnected when simulating a LDWS failure.

70.5.6.2 The failure warning signal mentioned in paragraph 70.4.4.2. above shall be activated and remain activated while the vehicle is being driven and be reactivated after a subsequent ignition "off" ignition "on" cycle as long as the simulated failure exists.

70.5.7 Deactivation Test

70.5.7.1 If the vehicle is equipped with means to deactivate the LDWS, turn the ignition (start) switch to the "on" (run) position and deactivate the LDWS. The warning signal mentioned in paragraph 70.4.3.2. above shall be activated. Turn the ignition (start) switch to the "off" position. Again, turn the ignition (start) switch to the "on" (run) position and verify that the previously activated warning signal is not reactivated, thereby indicating that the LDWS has been reinstated as specified in paragraph 70.4.3.1. above. If the ignition system is activated by means of a "key", the above requirement shall be fulfilled without removing the key.

70.6 Visible lane marking identification

70.6.1 For the purpose of the approval test referred to in paragraphs 70.5.2.3 and 70.5.5 of this Regulation, the test lane width shall be greater than 3 m. Lane marking shall use a dotted white line, the length shall be 4m, interval shall be 6m, the width of line shall be 10 cm. Road marking shall use white line, the width of line shall be 15 cm.

70.6.2 The visible lane markings identified in Table 1 below are assumed to be white.

Pattern (Lane marking shall use a dotted white line, left and right road marking shall use white line)			Width		
Left edge lane marking	Centre line	Right edge lane marking	Left edge lane marking	Centre line	Right edge lane marking

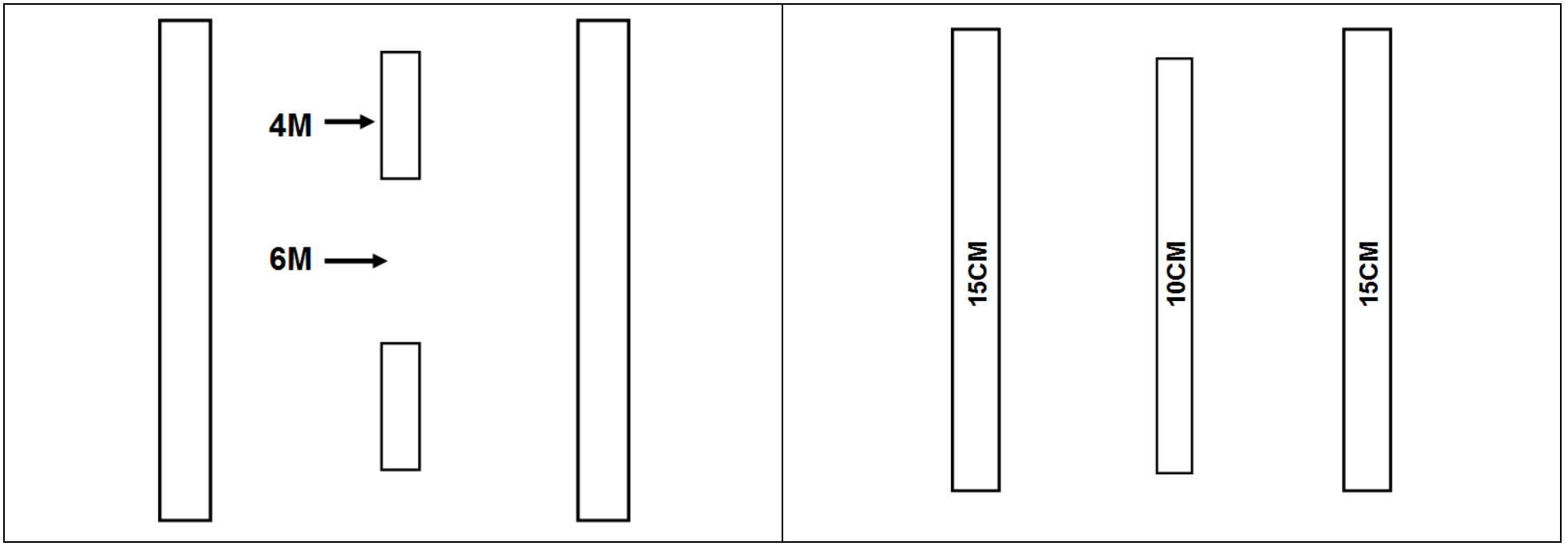


Figure 1: Lane marking illustration