32 Front fog lamps

Refer to: R19 03

32.1 Effective date and Scope:

32.1.1 Effective date from 2006/7/1, the new types of front fog lamps used in M and N vehicles, and from 2008/7/1 all types of front fog lamps used in M and N vehicles, shall comply with this regulation and shall be use certified ”Filament lamps” and/or “LED light sources” approved with this Directions.

32.1.2 Effective date from 2007/1/1,the new types of front fog lamps used in L3 vehicles, and from 2009/1/1 all types of front fog lamps used in L3 and L5 vehicles, shall comply with this regulation and shall be use certified ”Filament lamps” and/or “LED light sources” approved with this Directions.

32.1.3 The applicants applying for low volume safety approval may be exempt from regulation of “front fog lamps” except large passenger vehicle and child-only vehicle.

32.1.4 Applying for vehicle-by-vehicle low volume safety approval, the vehicle may be exempt from regulation of “front fog lamps”.

32.1.5 "Colour of the light emitted from the device." The definitions of the colour of the light emitted, given in “The installation of lighting and light-signaling devices” regulated in “VSTD”, which apply to this Regulation.

32.2 The lamp on a vehicle that improves the illumination of the road in condition of fog, snowfall, heavy rain and dust cloud.

32.3 Front fog lamps shall according to suitable variants and range are of principle：

32.3.1 Brand

32.3.2 The characteristics of the optical system，however，if bulbs or filter’s color is change that it doesn’t mean to change the variants.

32.3.3 The inclusion of components capable of altering the optical effects by reflection, refraction, absorption and/or deformation during operation

32.3.4 The category of bulbs

32.3.5 The lenses and coating of material constitution

32.4 Photometric test

32.4.1 The illumination produced by the front fog lamp shall be determined by means of a vertical screen set up 25 m forward of the lens of the front fog lamp as shown on Figure 1. The screen illumination shall be measured by means of a photo-electric cell having a useful area comprised within a square of 65 mm side.

32.4.2 A colorless-bulb standard (reference) filament lamp of the category specified by the manufacturer, designed for a rated voltage of 12V and supplied by the manufacturer, shall be used. During the checking of the front fog lamp, the voltage of the terminal of filament lamp shall be regulated so as to obtain the reference luminous flux. The beam shall produce on the screen over a width of not less than 2.25 m on both sides of the line VV, a symmetrical cut-off approximating sufficiently closely to the horizontal to enable adjustment to be performed with its aid. During the checking of the front fog lamp with filament lamp which cannot be replaced, the voltage at the terminals of the filament lamp shall be regulated at 12.0 V.

32.4.3 The front fog lamp shall be so directed that the cut-off on the screen is 50 cm below the line hh.

32.4.4 When so adjusted, the illumination produced on the screen shall meet the requirements of Table 1.

32.4.5 Approval may be obtained for a type of front fog lamp emitting either white or yellow light defined in “The installation of lighting and light-signaling devices” of “Directions”.

32.4.6 The front fog lamp shall be equipped with one filament lamp approved according to ”Filament lamps” regulated in VSTD, even if the filament lamp cannot be replaced. Any ”Filament lamps” regulated in VSTD filament lamp may be used, provided that no restriction on the use is made in ”Filament lamps” regulated in VSTD and its series of amendments in force at the time of application for type approval.

32.4.7 In the case of a replaceable filament lamp(s):

32.4.7.1 The design of the device shall be such that the filament lamp can be fixed in no other position but the correct one.

32.4.7.2 The filament lamp holder shall conform to the characteristics given in IEC Publication 60061. The holder data sheet relevant to the category of filament lamp used, applies.

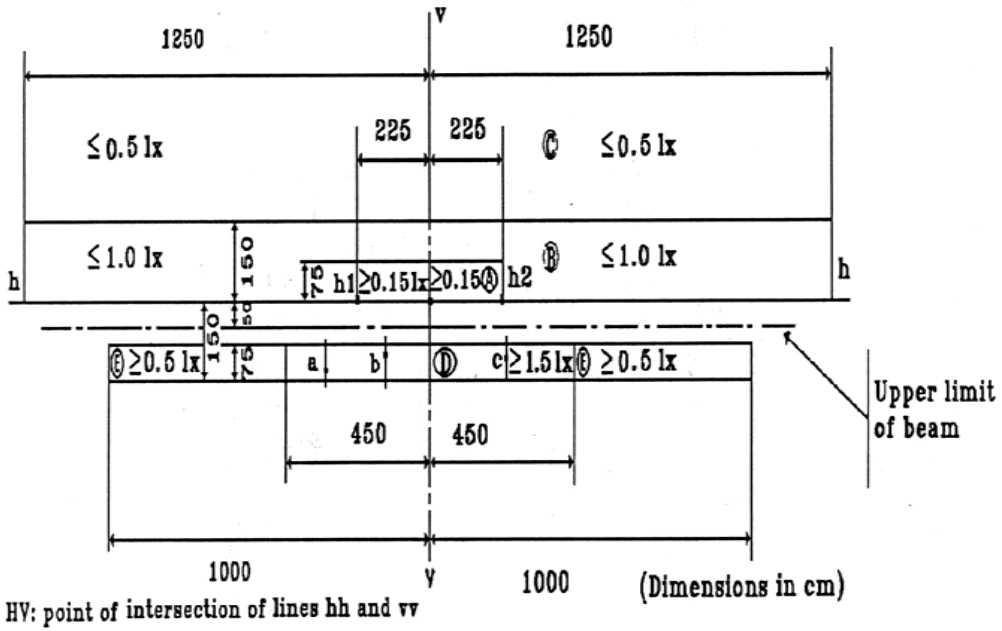


Table 1. The illumination produced on the screen by the front fog lamp		
Position on measuring screen		Illumination required (Unit：lux)
Zone	Zone limits	
A	225cm on both sides of the line VV and 75 cm above line hh	≧0.15 and ≦1

B	1250cm on both sides of the line VV and 150 cm above line hh, including hh (except zone A)	≦1
C	1250cm on both sides of the line VV and starting from 150 cm above hh. The luminous intensity in any direction forming an angle of more than 15° above the horizontal shall be limited to 200 cd.	≦0.5
D	450 cm on both sides of the line VV and comprised between the parallels to hh respectively situated 75 and 150 cm below hh.	On each vertical line in this zone, there shall be at least one point (a, b, c) where the illumination is ≧ 1.5
E	From 450 cm to 1000 cm on both sides of zone D and comprised between the parallels to hh respectively situated 75 and 150 cm below hh.	On each vertical line in this zone, there shall be at least one point where the illumination is ≧0.5
Note：	The illumination specifications also apply to the straight lines constituting the zones. The strictest specifications shall be applied in respect to straight lines contiguous to two zones. The illumination shall be measured either in white light or colored light as prescribed by the manufacturer for use of front fog lamp in normal service. No variations in illumination detrimental to satisfactory visibility shall exist in either of the zones B and C.	

32.4.8 Once the photometric values have been measured according to the prescriptions in this Regulation, in the point of maximum illumination in zone D (Emax) and in point HV, a complete headlamp shall be tested for stability of photometric performance in operation. “Complete headlamp” shall be understood to mean the complete lamp itself including those surrounding body parts and lamps that could influence its thermal dissipation.

32.5 Tests for stability of photometric performance: The tests shall be carried out in a dry and still atmosphere at an ambient temperature of 23 ± 5°C, the complete headlamp being mounted on a base representing the correct installation on the vehicle.

32.5.1 Clean headlamp:

32.5.1.1 Test Procedure: The headlamp shall be operated for 12 hours.

32.5.1.1.1 In the case where only a front fog lamp is to be approved, the corresponding filament lamp(s) is (are) lit for the prescribed time.

32.5.1.1.2 In the case of a front fog lamp reciprocally incorporated with another function:

32.5.1.1.2.1 If the applicant declares that the headlamp is to be used with a single filament lit at a time, the test shall be carried out in accordance with this condition, activating each specified function successively for half the time specified above.

32.5.1.1.2.2 In all other cases, the headlamp shall be subjected to the following cycle until the time specified is reached: 15 minutes, front fog lamp filament(s) lit 5 minutes, all filaments (that can be lit simultaneously).

32.5.1.1.3 In the case of grouped lighting functions all the individual functions shall be lit simultaneously for the time specified for individual lighting functions (a), also taking into account the use of reciprocally incorporated lighting functions, according to the manufacturer's specifications.

32.5.1.1.4 Test voltage: The voltage of the filament lamp shall be adjusted so as to supply 90 % of the maximum wattage. The

applied wattage shall in all cases comply with the corresponding value of a filament lamp of 12 V rated voltage, except if the applicant for approval specifies that the headlamp may be used at a different voltage. In the latter case, the test shall be carried out with the filament lamp of which the wattage is the highest that can be used.

32.5.1.2 Test Results:

32.5.1.2.1 Visual Inspection: It shall be inspected visually, no distortion, deformation, cracking or change in color of either the headlamp lens or the external lens, if any, shall be noticeable.

32.5.1.2.2 Photometric test: A 10 % discrepancy between the photometric characteristics and the values measured prior to the test is permissible including the tolerances of the photometric procedure. To comply with the requirements of this Regulation, the photometric values shall be verified in the following points: HV, and point of Emax in zone D.

32.5.2 Dirty headlamp: After being tested as specified in paragraph 32.5.1, the headlamp shall be operated for one hour as described paragraph 32.5.1, after being prepared as: The test mixture shall be uniformly applied to the entire light emitting surface of the headlamp and then left to dry. This procedure shall be repeated until the illumination value has dropped to 15-20% of the values measured for each following point: point of Emax in zone D.

32.5.3 Test for change in vertical position of the cut-off line under the influence of heat:

32.5.3.1 Using a mass production filament lamp which has been aged for at least one hour, the headlamp shall be operated. The position of the cut-off line between a point situated 2.25 m left and a point situated 2.25 m right of the line VV, a symmetrical cut-off approximating sufficiently closely to the horizontal to enable adjustment to be performed with its aid, shall be verified after 3 minutes (r3) and 60 minutes (r60) respectively of operation. The result expressed in milliradians (mrad) shall be considered as acceptable when the absolute value $\Delta rI = |r3 - r60|$ recorded on this headlamp is not more than 2.0 mrad ($\Delta rI \leq 2.0$ mrad).

32.5.3.2 However, if this value is more than 2.0 mrad but not more than 3.0 mrad, a second headlamp shall be tested as described in

paragraph 32.5.3.1 after being subjected three consecutive times to the cycle as described below, in order to stabilize the position of mechanical parts of the headlamp on a base representative of the correct installation on the vehicle:

Operation of the front fog lamp for one hour, Period of rest for one hour.

The headlamp type shall be considered acceptable if the mean value of the absolute values ΔrI measured on the first sample and ΔrII measured on the second sample is not more than 2 mrad.

32.6 Requirements for lamps incorporating lenses of plastic material -Testing of lens or material samples and of complete:

Thirteen lenses shall be supplied, numbered and tested pursuant to the Table 2. Two samples of complete lamps shall be supplied, numbered and tested in accordance with the Table 3. The test method and the standards for respective test item are indicated below：

32.6.1 Resistance to temperature changes

32.6.1.1 Before the test, the samples shall be kept at 23 ± 5°C and 60% ~ 75% RH (RH = relative humidity) for at least four hours. Then three new samples (lens) shall be subject to five cycles of temperature and humidity change in accordance with the following program：

3 hours at 40 ± 2°C and 85% ~95% RH,

1 hour at 23 ± 5°C and 60% ~75% RH,

15 hours at -30 ± 2°C,

1 hour at 23 ± 5°C and 60% ~75% RH,

3 hours at 80 ± 2°C,

1 hour at 23 ± 5°C and 60% ~75% RH.

32.6.1.2 Photometric measurements shall be carried out on the samples before and after the test that shall comply with 32.4.2. These measurements shall be made by using a standard lamp, at the following points：HV and Emax zone D.

32.6.1.3 The variation between the photometric values measured on each sample before and after the test shall not exceed 10%

including the tolerances of the photometric procedure.

32.6.2 Resistance to atmospheric and chemical agents

The definition of the following readings are indicated in the table：

Reading	With Sample	With central part of DD (diaphragm baffle)	Quantity represented
T1	No	No	Incident flux in initial reading
T2	Yes (before test)	No	Flux transmitted by the new material in a field of 24°C
T3	Yes (after test)	No	Flux transmitted by the tested material in a field of 24°C
T4	Yes (before test)	Yes	Flux diffused by the new material
T5	Yes (after test)	Yes	Flux diffused by the tested material

32.6.2.1 Three samples shall be exposed to an energetic illumination of 1200 W/m^2 ± 200 W/m^2 for a period such that the luminous energy that they receive is equal to 4500 MJ/m^2 ± 200 MJ/m^2. Within the enclosure, the temperature measured on the black panel placed on a level with the sample shall be 50 °C ± 5°C. In order to ensure a regular exposure, the samples shall revolve around the source of radiation at a speed between 1 and 5 1/min. The samples shall be sprayed with distilled water at a temperature of 23 °C ± 5°C in accordance with the following cycle：

Spraying：5 minutes,

Drying：25 minutes

32.6.2.2 After the test of resistance to atmospheric agents, the outer face of the samples shall be free from cracks, scratches, chipping and deformation, and the mean variation (Δt_m) in transmission $\Delta t = (T_2-T_3)/T_2$ measured on the three samples shall not exceed 0.020.

32.6.2.3 Soak a piece of cotton cloth until saturation with the test mixture (The test mixture shall be composed of 61.5% n-heptane, 12.5% toluene, 7.5% ethyl tetrachloride, 12.5% trichloroethylene and 6% xylene (volume%).), and, within 10 seconds, apply it for 10 minutes to the outer face of the sample at a pressure of 50 N/cm2. At the end of the application of the test mixture, the samples shall be dried in the open air and then washed with the solution-detergents at 23 °C ± 5°C. Afterward the samples shall be carefully rinsed with distilled water at 23 °C ± 5°C and then wiped off with a soft cloth.

32.6.2.4 After the test of resistance to chemical agents, the samples shall not bear any traces of chemical staining likely to cause a variation of flux diffusion $\Delta d = (T_5-T_4)/T_2$, whose mean variation (Δd_m) measured on the three samples shall not exceed 0.020.

32.6.3 Resistance to detergents and hydrocarbons

32.6.3.1 The outer face of three samples shall be heated to 50 °C ± 5°C and then immersed for five minutes in a mixture maintained at 23 °C ± 5°C and composed of 99% distilled water and 1% of alkylaryl sulphonate. At the end of the test, the samples shall be dried in a test chamber at 50 °C ± 5°C. The surface of the samples shall be cleaned with a moist cloth

32.6.3.2 The outer face of these three samples shall then be lightly rubbed for one minute with a cotton cloth soaked in a mixture composed of 70% n-heptane and 30% toluene (volume percent), and then shall be dried in the open air.

32.6.3.3 After the above two tests have been performed successively, the mean value (Δtm) of the variation in transmission $\Delta t =$ (T2-T3)/T2 measured on the three samples shall not exceed 0.010.

32.6.4 Resistance to mechanical deterioration

The spray gun used with test mixture of silica sand shall be equipped with a nozzle 1.3 mm in diameter allowing a liquid flow rate of 0.24+/-0.02 1/minute at an operating pressure of 6.0 bars -0, +0.5 bar, at a distance of 380 mm+/-10 mm from the nozzle. The jet

shall be sprayed almost perpendicular to the surface to be tested. The deterioration shall be checked by means of one or more samples of glass placed as a reference near the lenses to be tested. The mixture shall be sprayed until the variation in the diffusion of light on the sample or samples measured by the method, is such that: $\Delta d = (T_5-T_4)/T_2 = 0.025 \pm 0.0025$.

32.6.4.1 After this test, the variations in transmission: $\Delta t = (T_2-T_3)/T_2$ and in diffusion: $\Delta d = (T_5-T_4)/T_2$ shall be measured. The mean value of the three samples shall be such that: $\Delta t_m \leq 0.100$, $\Delta d_m \leq 0.050$.

32.6.5 Test of adherence of coatings, if any

32.6.5.1 The lens with coating shall be conducted by the test of the adherence of coating, if any.

32.6.5.2 A surface of 20 mm x 20 mm in area of the coating of a lens shall be cut a razor blade into a grid of squares approximately 2 mm x 2 mm. An adhesive tape with a force adhesion of 2 N/cm ± 20%, at least 25mm wide, shall be pressed for at least 5 minutes to the surface. Then the end of the adhesive tape shall be loaded in such a way that the force of adhesion to the surface considered is balanced by a force perpendicular to that surface. At this stage, the tape shall be torn off at a constant speed of 1.5 m/s +/- 0.2 m/s.

32.6.5.3 There shall be no appreciable impairment of the gridded area. Impairments at the intersections between squares or at the edges of the cuts shall be permitted, provided that the impaired area does not exceed 15% of the gridded surface.

32.6.6 Tests of the complete lamp incorporating a lens of plastic material

32.6.6.1 Resistance to mechanical deterioration (the lens of lamp sample No. 1 shall be subjected to the test)

32.6.6.1.1The lens of lamp sample No. 1 shall be subjected to the test described in paragraph 32.6.4.1.

32.6.6.1.2After the test, the results of photometric measurements carried out on the lamp in accordance with this Regulation shall not exceed by more than 30% the maximum values prescribed in zones A and B.

32.6.6.2 Test of adherence of coating (the sample of complete lamp No. 2 shall be tested): The lens of lamp sample No. 2 shall be subjected to the test and meet the results described in paragraph 32.6.5.

Table 2. Tests on plastic material (lenses or samples)

Tests \ Sample No.	Lenses or samples							Lenses					
	1	2	3	4	5	6	7	8	9	10	11	12	13
Resistance to Temperature changes										○	○	○	
Resistance to atmospheric agents	○	○	○										
Resistance to chemical agents	○	○	○										
Resistance to detergents and hydrocarbons				○	○	○							
Resistance to mechanical deterioration							○	○	○				
Test of adherence of coating													○

Remark：The samples of material at least 60 mm x 80 mm in size shall have a flat or convex outer surface and a substantially flat area (radius of curvature not less than 300 mm) in the middle measuring at least 15 x 15mm.

Table 3. Tests on complete lamps

Tests \ Sample No.	Complete lamp	
	1	2
Resistance to mechanical deterioration	○	
Test of adherence of coating		○