

DISCUSSION PAPER

Mopeds Euro 3 & AHO all rev.2

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Brussels, **XXX**
[...](2013) **XXX** draft

COMMISSION DIRECTIVE/.../EU

of **XXX**

amending for the purposes of adapting to technical progress, Directive 97/24/EC of the European Parliament and of the Council on certain components and characteristics of two or three-wheel motor vehicles, Directive 2002/24/EC relating to the type-approval of two or three-wheel motor vehicles and Directive 2009/67/EC of the European Parliament and of the Council on the installation of lighting and light-signalling devices on two- or three-wheel motor vehicles

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(Text with EEA relevance)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Directive 97/24/EC of the European Parliament and of the Council¹ of 17 June 1997 on certain components and characteristics of two- or three-wheel motor vehicles and in particular Article 4 and the second indent of Article 7 thereof,

Having regard to Directive 2002/24/EC of the European Parliament and of the Council² of 09 May 2002 relating to the type-approval of two or three-wheel motor vehicles and in particular Article 17 thereof,

Having regard to Directive 2009/67/EC of the European Parliament and of the Council³ of 25 August 2009 on the installation of lighting and light-signalling devices on two- or three-wheel motor vehicles and in particular Article 4 thereof,

Whereas:

- (1) The Union is a contracting party of the Agreement of the United Nations Economic Commission for Europe concerning the adoption of uniform technical prescriptions for wheeled vehicles, equipment and parts which can be fitted to and/or used on wheeled vehicles and the conditions for reciprocal recognition of approvals granted on the basis of these prescriptions ('Revised 1958 Agreement'). In order to simplify the type-approval legislation in line with the recommendations of the report published by the Commission in 2006 entitled 'CARS 21: A Competitive Automotive Regulatory System for the 21st century', it is appropriate to repeal all separate Directives without reducing the level of protection. The requirements set out in those Directives should be carried over to Regulation

¹ OJ L 226, 18.8.1997, p. 1

² OJ L 124, 9.5.2002, p. 1

³ OJ L 222, 25.8.2009, p.1

(EU) No [xxx/2013] or to the delegated acts adopted pursuant to that Regulation and should be replaced, where appropriate, with references to the corresponding United Nations Economic Commission for Europe (UNECE) regulations which the Union has voted in favour of or to which the Union has acceded and which are annexed to the Revised 1958 Agreement. To reduce the administrative burden of the type-approval process, vehicle manufacturers should be allowed to seek type-approval in accordance with that Regulation, where appropriate, directly by means of obtaining approval under the relevant UNECE regulations referred to in the Annexes to Regulation (EU) No [xxx/2013] or in the delegated acts adopted pursuant to that Regulation.

- (2) Consequently, UNECE regulations and the amendments thereto on which the Union has voted in favour, in application of Decision 97/836/EC, should be incorporated within the EU type-approval legislation. However, in the transitional period until the date in which UN Regulation No 41 shall be made obligatory in Regulation (EU) No [xxx/2013] it is appropriate that the sound requirements for motorcycles set-out in Chapter 9 of Directive 97/24/EC and the 4th series of amendments to UN Regulation 41 shall be regarded, for new types, as equivalent including the associated sound limits set-out in Annex 6 to that Regulation.
- (3) Owing to the high level of hydrocarbon and ~~CO~~carbon monoxide emissions produced by vehicle categories L1e, L2e and L6e (two- and three-wheel mopeds, respectively light quadricycles) it is appropriate to revise environmental test type I, tailpipe emissions after cold start, by including emission measurements starting directly after cold start in order to better reflect real-world use and the significant share of pollutant emissions produced directly after cold start and while the engine warms up. The justification in terms of air quality benefits and cost efficiency were proven in the impact assessment SEC (2010) 1152. The changes in the emission laboratory test procedure also drive changes in the administrative provisions, in particular changes to entries on the Certificate of Conformity (CoC) and the measurement test results sheet set-out in Framework Directive 2002/24/EC.
- (4) In order to ensure a level playing field and for the sake of equal environmental performance of L-category vehicles in terms of crankcase gas emissions for all manufacturers it is also appropriate to request the vehicle manufacturer ~~when applying for new type approval~~ to state explicitly that zero emissions stem from the crankcase gas ventilation system when applying for new type approval, implying that the crankcase is properly sealed and that the crankcase gasses are not being discharged directly into the ambient atmosphere throughout its useful life.
- (5) In order to be coherent with UNECE lighting and lighting installation requirements for L-category vehicles and in order to improve their visibility, new types of L-category vehicles are to be equipped with automatic switching on of lighting in compliance with UNECE Regulations No 74 (L1e vehicles), No 53 (L3e motorcycles) or be equipped with dedicated day-time running lights (DRL) complying with the relevant requirements of UNECE Regulation No 87. For all other subcategories of L-category vehicles an automatic switching on of lighting shall be installed or at the choice of the manufacturer, dedicated day-time running lights that automatically switch on.
- (6) With this Directive the introduction of the Euro level is made explicit for category L vehicles in the scope of Directive 2002/24/EC. Certificates of Conformity for vehicles with an emission approval according to previous provisions are continued to be allowed to indicate the Euro level on a voluntary basis.

(6)(7) The measures provided for in this Directive are in accordance with the opinion of the Technical Committee - Motor Vehicles.

HAS ADOPTED THIS DIRECTIVE:

Article 1

Article 4(1) of Directive 97/24/EC is amended as follows:

"In accordance with the provisions of Article 11 of Directive 92/61/EEC, the equivalence shall be recognized of the requirements of Chapters 1 (tyres), 2 (lighting and light-signalling devices), 4 (rear view mirrors), Annex III of Chapter 9 (permissible sound level and exhaust system requirements for motorcycles) and 11 (safety belts) of the Annex to this Directive and those of United Nations ECE Regulations Nos 30⁴, 54⁵, 64⁶ and 75⁷ in respect of tyres, 3⁸, 19⁹, 20¹⁰, 37¹¹, 38¹², 50¹³, 53¹⁴, 56¹⁵, 57¹⁶, 72¹⁷, 74¹⁸ and 82¹⁹ in respect of lighting and light-signalling devices, 81²⁰ in respect of rear-view mirrors, 16²¹ in respect of safety belts and Regulation No 41²² in respect of noise emissions from motorcycles."

Article 2

Annex I to Chapter 5 of Directive 97/24/EC is amended in accordance with Annex I to this Directive.

Article 3

Annex IV to Chapter 5 of Directive 97/24/EC is amended as follows:

Petrol (E5) and diesel (B5) reference fuels shall be specified in accordance with section A of Annex IX to Regulation (EC) No 692/2008 of 18 July 2008 regarding implementing and

4 E/ECE/TRANS/505/REV 1/ADD 29. [OJ this footnote starts at No 5, ~~footnotes 1 to 4~~ in consolidated Directive 97/24/EC-are maintained]

5 E/ECE/TRANS/505/REV 1/ADD 53.

6 E/ECE/TRANS/505/REV 1/ADD 63.

7 E/ECE/TRANS/505/REV 1/ADD 74.

8 E/ECE/TRANS/324/ADD 2.

9 E/ECE/TRANS/324/REV 1/ADD 18.

10 E/ECE/TRANS/324/REV 1/ADD 19.

11 E/ECE/TRANS/505/REV 1/ADD 36.

12 E/ECE/TRANS/324/REV 1/ADD 37.

13 E/ECE/TRANS/505/REV 1/ADD 49.

14 E/ECE/TRANS/505/REV 1/ADD52/Rev.2

15 E/ECE/TRANS/505/REV 1/ADD 55.

16 E/ECE/TRANS/505/REV 1/ADD 56.

17 E/ECE/TRANS/505/REV 1/ADD 71.

18 E/ECE/TRANS/505/REV 1/~~ADD 71~~,ADD73/Rev.2/Amend.1

19 E/ECE/TRANS/505/REV 1/ADD 81.

20 E/ECE/TRANS/505/REV 1/ADD 80.

21 E/ECE/TRANS/505/REV 1/ADD 15.

22 E/ECE/TRANS/505/Rev.1/Add.40/Rev.2

amending Regulation (EC) No 715/2007 of the European Parliament and of the Council on type-approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information.

Article 4

Annex IV and Annex VII to Directive 2002/24/EC are amended in accordance with Annex II to this Directive.

Article 5

Directive 2009/67/EC is amended in accordance with Annex III to this Directive.

Article 6

1. With effect from 1 July 2014 Member States shall refuse, on grounds relating to measures to counter air pollution and functional safety, to grant EC type approval for new types of vehicle which do not comply with Directives 2002/24/EC and 97/24/EC as amended by this Directive.
2. With effect from 1 July 2014 Certificates of Conformity for vehicles complying with the provisions of Directive 97/24/EC as amended by this Directive shall be issued in accordance with this Directive.

Article 7

1. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by at the latest 1 July 2014. They shall forthwith communicate to the Commission the text of those provisions.

When Member States adopt those provisions, they shall contain a reference to this Directive or be accompanied by such a reference on the occasion of their official publication. Member States shall determine how such reference is to be made.
2. Member States shall communicate to the Commission the text of the main provisions of national law which they adopt in the field covered by this Directive.

Article 8

This Directive shall enter into force on the day following that of its publication in the *Official Journal of the European Union*.

Article 9

This Directive is addressed to the Member States.

Done at Brussels,

*For the Commission
The President
On behalf of the President
[Position]*

Annex I

Annex I of chapter 5 of Directive 97/24/EC is amended as follows:

Section 2.2. is amended to read as follows:

- 2.2. Description of tests
- 2.2.1. The category L1e, L2e or L6e vehicle in compliance with Euro 3 emissions shall be subjected to Type I and II tests, as specified below:
 - 2.2.1.1. Type I test (checking the average emissions of gaseous pollutants in a congested urban area)
 - 2.2.1.1.1. The test vehicle is placed on a chassis dynamometer equipped with a brake and a flywheel. The following test procedure shall be carried out:
 - 2.2.1.1.1.1. A cold test phase 1 lasting a total of 448 seconds and comprising four elementary cycles is carried out without interruption;
 - 2.2.1.1.1.2. A warm test phase 2 shall follow subsequent to cold test phase 1 without delay, lasting a total of 448 seconds and comprising four elementary cycles. The warm test phase 2 shall be carried out without interruption;
 - 2.2.1.1.1.3. Each elementary cycle within cold test phase 1 or in warm test phase 2 shall comprise of seven operations (idling, acceleration, steady speed, deceleration, steady state deceleration, idle). During both test phase 1 and 2 the exhaust gases shall be diluted with fresh air to ensure that the flow volume of the mixture shall remain constant
 - 2.2.1.1.1.4. In the type I test:
 - 2.2.1.1.1.4.1. a continuous flow of samples of the mixture of exhaust gas and dilution air shall be passed into bag No 1 collected during cold phase 1. A continuous flow of samples of the exhaust gasses and dilution air mixture shall be passed into a separate bag No 2 collected during warm phase 2. The concentrations of carbon monoxide, total hydrocarbons, oxides of nitrogen and carbon dioxide shall be determined separately for the cold test bag No 1 and the warm test bag No 2 and in succession for test phases 1 and 2;
 - 2.2.1.1.1.4.2. The total volume of the mixture in each bag shall be measured and be added up to one total bag volume;
 - 2.2.1.1.1.4.3. At the end of each test phase the distance effectively travelled is recorded from the total shown on the additive revolution counter driven by the roller.
 - 2.2.1.1.2. The test is carried out by the procedure described in Appendix 1. The methods used to collect and analyse the gases are those laid down.
 - 2.2.1.1.3. Subject to the provisions 2.2.1.1.4, the test is carried out three times. The total mass of carbon monoxide, hydrocarbons and nitrogen oxides obtained in each test shall be less than the Euro 3 limit values set out in the table below.

2.2.1.1.3.1.

Component type-approval and conformity of production	
CO (g/km)	HC + NOx (g/km)
L ₁	L ₂
1 ⁽¹⁾	1.2
⁽¹⁾ The limit for the mass of CO shall be 3.5 g/km in the case of three-wheel mopeds (L2e) and light quadricycles (L6e).	

Table 1: Euro 3 emission limits for vehicle categories L1e, L2e and L6e.

- 2.2.1.1.3.2. However, one of the three results for each of the abovementioned pollutants may exceed the limit value prescribed for the moped concerned by a maximum of 10 %, provided that the arithmetic mean of the three results is less than the prescribed limit value. If more than one pollutant exceeds the prescribed limit values, it is immaterial whether this occurs in the same test or in different tests.
- 2.2.1.1.4. The number of tests prescribed in 2.2.1.1.3 is reduced under the conditions described below, where V_1 is the result of the first test and V_2 is the result of the second test for each of the pollutants referred to in 2.2.1.1.3.
- 2.2.1.1.4.1. Only one test is required if $V_1 \leq 0.70$ L for all the pollutants concerned.
- 2.2.1.1.4.2. Only two tests are required if $V_1 \leq 0.85$ L for all the pollutants concerned and if, for at least one pollutant, $V_1 > 0.70$ L. In addition, for each of the pollutants concerned, V_2 shall be such that $V_1 + V_2 < 1.70$ L and $V_2 < L$.
- 2.2.1.1.5. A category L1e, L2e or L6e vehicle complying with the Euro 3 test type I limits set-out in point 2.2.1.1.3.1. and the test type I requirements set-out in this Annex shall be denominated as a Euro 3 compliant L1e, L2e or L6e vehicle.
- 2.2.1.2. Type II test (test of carbon monoxide and unburnt hydrocarbons emissions at idling speed).
- 2.2.1.2.1. The mass of carbon monoxide and the mass of unburnt hydrocarbons emitted with the engine at idling speed are measured for one minute.
- 2.2.1.2.2. This test shall be carried out in accordance with the procedure described in Appendix 2.

Section 4.2. of appendix 1 is amended to read as follows:

4.2. Gas-collection equipment

The gas-collection equipment shall consist of the following components (see sub-appendices 2 and 3):

- 4.2.1. A device to collect all the exhaust gases produced during the test, whilst maintaining

atmospheric pressure at the moped exhaust outlet (s).

- 4.2.2. A tube connecting the exhaust-gas collection equipment and the exhaust-gas sampling system. This connecting tube and the gas collection equipment shall be made of stainless steel, or of another material which will not affect the composition of the gases collected and will resist their temperature.
- 4.2.3. A device to suck in the diluted gases. This device shall guarantee constant flow of a sufficient volume to ensure that all the exhaust gases are sucked in.
- 4.2.4. A sampling probe attached to the outside of the gas-collection device which can collect a constant sample of the dilution air using a pump, a filter and a flow meter for the duration of the test.
- 4.2.5. A sampling probe directed upstream of the flow of diluted gases to sample the mixture for the duration of the test at a constant rate of flow using, if necessary, a filter, a flow meter and a pump. The minimum rate of flow of the gases in the two sampling systems described above shall be at least 150 l/h.
- 4.2.6. Three-way valves on the sampling circuits described above to direct the flow of samples either to the atmosphere or to their respective sampling bags for the duration of the test.
- 4.2.7: Leak-tight sampling bags to collect the mixture of exhaust gas and dilution air shall be unaffected by the pollutants concerned and of sufficient capacity not to disrupt the normal flow of sampling .There shall be at a minimum one separate sampling bag No 1 for cold test phase 1 and one separate sampling bag No 2 for the warm test phase 2.
 - 4.2.7.1. These sampling bags shall each have an automatic sealing device which can be closed rapidly and tightly, either on the sampling circuit or on the analysis circuit at the end of the test.
 - 4.2.7.1.1. The sealing device on bag No 1 shall close after 448 s after start of the type 1 test.
 - 4.2.7.1.2. The sealing device on bag No 2 shall immediately open subsequent to the sealing of bag No 1. The sealing device on bag No 2 shall close again after 896 s after start of the type 1 test;
- 4.2.8. There shall be a method of measuring the total volume of diluted gases passing through the sampling device during the test. The exhaust dilution system shall comply with the requirements set-out in ~~appendix~~Appendix 2 to Chapter 6 of Annex I of UNECE Regulation No 83.

4.2.9.

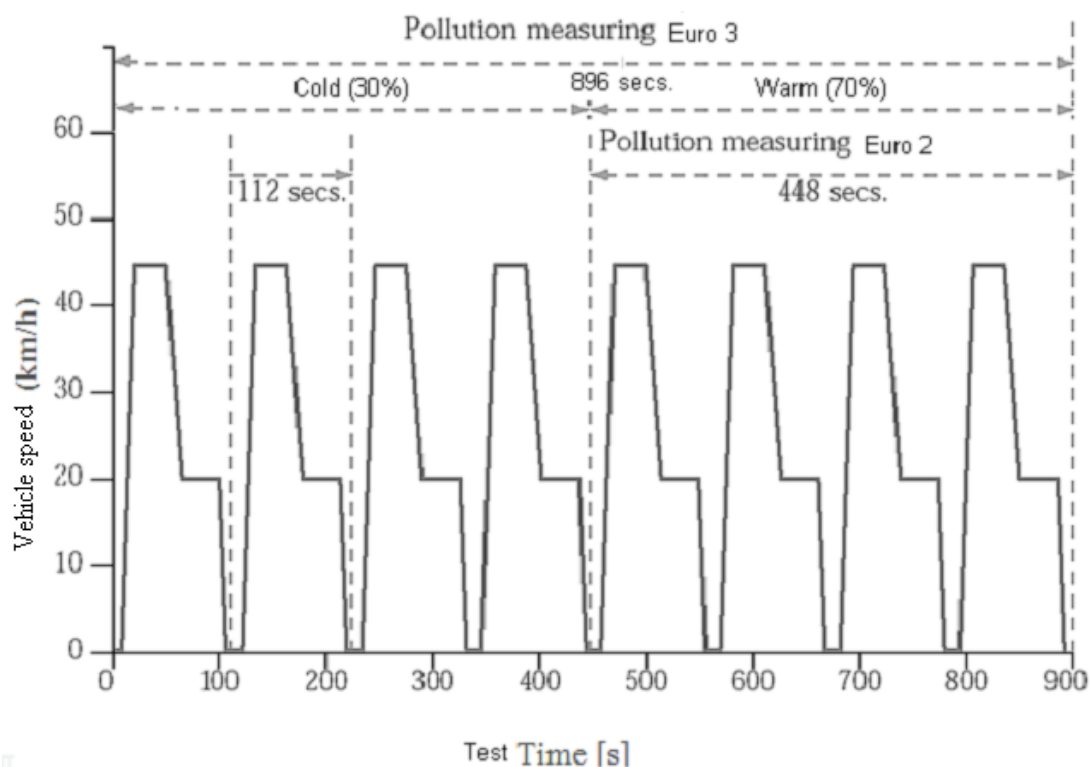


Figure 1: Pollutant emission sampling Euro 3 compared to Euro 2 for an L1e, L2e or L6e category vehicle.

In section 4.3. of ~~appendix~~Appendix 1 the following point is added:

4.3.3 The analytical equipment shall be capable of measuring independently the mixture sample of exhaust gasses and dilution air captured in bag No 1 and in bag No. 2.

Section 5.4. of ~~appendix~~Appendix 1 is amended to read as follows:

5.4. Conditioning of the test vehicle

5.4.1. The tyre pressure of the test vehicle shall be that stated by the manufacturer for normal road use. However, if the diameter of the rollers is less than 500 mm, the pressure in the tyres may be increased by 30-50 %.

5.4.2. The fuel tank(s) shall be drained through the provided fuel tank(s) drain(s) and charged with the test fuel specified in Annex IV.

5.4.3. The test vehicle shall be moved to the test area and the following operations shall be performed:

5.4.3.1. The test vehicle shall be placed, either by being driven or pushed, on a dynamometer and operated through the test cycle set-out in paragraph 2.1. The test vehicle need not be cold, and may be used to set dynamometer power.

- 5.4.3.2. The load on the driving wheel shall be within ± 3 kg of the load, on a vehicle in normal road use, with a driver weighing $75 \text{ kg} \pm 5 \text{ kg}$, sitting in an upright position.
- 5.4.3.3. Practice runs over the test cycle set-out in paragraph 2.1. may be performed at test points, provided an emission sample is not taken, for the purpose of finding the minimum throttle action to maintain the proper speed-time relationship.
- 5.4.3.4. Before placing the test vehicle in the soak area the test vehicle shall undergo four consecutive operating cycles as set-out in paragraph 2.1., each lasting 112 seconds. This preconditioning test cycle shall be performed with the dynamometer settings laid down in paragraphs 5.1. and 5.2. Measurement of the tailpipe emissions is not required for this preconditioning test cycle.
- 5.4.3.5. Within 5 minutes of completion of preconditioning, the test vehicle shall be removed from the dynamometer and may be driven or pushed to the soak area to be parked. The ambient temperature in the soak area shall be controlled to be $298 \text{ K} \pm 5 \text{ K}$. The vehicle shall be stored for not less than 6 hours and not more than 36 hours prior to the cold start type I test or until the engine oil temperature T_{Oil} or the coolant temperature T_{Coolant} or the sparkplug seat/gasket temperature T_{SP} (only for air cooled engine) equals the air temperature of the soak area. Which of the criteria has been selected shall be indicated in the test report.

Section 7.1 of ~~appendix~~Appendix 1 is amended to read as follows:

7.1. Sampling

- 7.1.1. Sampling begins as soon as the test commences, as indicated in 6.2.2.
- 7.1.2. Bags Nos 1 and 2 shall be hermetically sealed and follow the sealing sequence set-out in 4.2.7.1. The bags Nos 1 and 2 shall not be interconnected during cold test phase 1 or warm test phase 2.
- 7.1.3. At the end of the final cycle the device for collecting the diluted exhaust gases and the dilution air shall be closed and the gases produced by the engine diverted into the atmosphere.

Section 7.2.4. of ~~appendix~~Appendix 1 is amended to read as follows:

- 7.2.4. The concentrations of HC, CO and NO_x and CO₂ in the samples of diluted exhaust gases and in the bags collecting the dilution air are determined from the values shown or recorded by the measuring equipment by applying the correct calibration curves.

Section 8 of ~~appendix~~Appendix 1 is amended to read as follows:

8. Determination of the quantity of gaseous pollutants emitted.

- 8.1. The masses of CO₂ and gaseous pollutants CO, HC, NO_x shall be separately

determined for bag No 1 and for bag No2 according to paragraphs 8.1 to 8.6.

- 8.2. The mass of carbon monoxide gas emitted during the test is determined by means of the formula:

$$CO_m = \frac{1}{S_x} \cdot V \cdot d_{CO} \cdot \frac{CO_c}{10^6}$$

$$CO_m = \frac{1}{S} \cdot V \cdot d_{CO} \cdot \frac{CO}{10^6}$$

where:

- 8.2.1. CO_m is the mass of carbon monoxide emitted during the test, expressed in g/km;
8.2.2. S_x is the distance actually travelled expressed in km, obtained by multiplying the total number of revolutions shown on the revolution counter by the circumference of the roller,

where:

X = 1 for cold phase 1;

X = 2 for warm phase 2.

- 8.2.3. d_{CO} is the density of carbon monoxide at a temperature of 273.2 K (0°C) and at a pressure of 101.333 kPa (= 1,250 kg10³ g/m³);

- 8.2.4. CO_c is the volume concentration of carbon monoxide in the diluted gases, expressed in parts per million and corrected to take account of the pollution of the dilution air:

$$CO_c = CO_e - CO_d \cdot \left(1 - \frac{1}{DF}\right)$$

where:

- 8.2.4.1. CO_e is the concentration of carbon monoxide, measured in parts per million, in the sample of diluted gases collected in bag S_a ;
8.2.4.2. CO_d is the concentration of carbon monoxide, measured in parts per million, in the sample of dilution air collected in bag S_b ;
8.2.4.3. DF is the coefficient defined in section 8.6;
8.2.5. V is the total volume, expressed in m³ /test, of diluted gases at reference temperature 0°C (273.2 K (0 °C)) and reference pressure 101.333 kPa:

$$V = V_0 \cdot \frac{N(P_a - P_i) \cdot 273}{101.33 \cdot (T_p + 273)}$$

$$V = V_0 \cdot \frac{N \cdot (P_a - P_i) \cdot 273.2}{101.3 \cdot (T_p + 273.2)}$$

where:

- 8.2.5.1. V_0 is the volume of gas displaced by pump P_1 during one rotation expressed in m^3 / revolution. This volume is a function of the differential pressures between the inlet and outlet sections of the pump itself;
 - 8.2.5.2. N is the number of rotations made by the pump P_1 during the four test cycles;
 - 8.2.5.3. P_a is the atmospheric pressure expressed in kPa;
 - 8.2.5.4. P_i is the mean value, expressed in kPa, during performance of the four cycles of the drop in pressure in the inlet section pump P_1 ;
 - 8.2.5.5. T_p ($^{\circ}\text{C}$) is the value, during performance of the four cycles, of the temperature of the diluted gases measured in the inlet section of pump P_1 .
- 8.3. The mass of unburned hydrocarbons emitted through the moped's exhaust during the test is calculated by means of the formula:

$$HC_m = \frac{1}{S_x} \cdot V \cdot d_{HC} \cdot \frac{HC_c}{10^6}$$

$$HC_m = \frac{1}{S} \cdot V \cdot d_{HC} \cdot \frac{HC}{10^6}$$

where:

- 8.3.1. HC_m is the mass of hydrocarbons emitted during the test, expressed in g/min;
- 8.3.2. S_x is the distance defined in 8.2.2;
- 8.3.3. d_{HC} is the density of hydrocarbons at a temperature of 273.2 K (0°C) and a pressure of 101.333 kPa (for petrol (E5) ($\text{C}_1\text{H}_{1.89}\text{O}_{0.016}$)) ($= 0.631 \text{ kg/m}^3$);
- 8.3.4. HC_c is the concentration of the diluted gases expressed in parts per million carbon equivalent and corrected to take account of the dilution air:

$$HC_c = HC_e - HC_d \cdot \left(1 - \frac{1}{DF}\right)$$

where:

- 8.3.4.1. HC_e is the concentration of hydrocarbons, expressed in parts per million carbon equivalent, in the sample of diluted gases collected in bag S_a ;
- 8.3.4.2. HC_d is the concentration of hydrocarbons, expressed in parts per million carbon equivalent, in the sample of dilution air collected in bag S_b ;

- 8.3.4.3. DF is the coefficient defined in 8.6;
- 8.3.5. V is the total volume defined in 8.2.5.
- 8.4. The mass of oxides of nitrogen emitted through the moped's exhaust during the test is calculated by means of the formula:

$$NO_{xm} = \frac{1}{S_X} \cdot V \cdot d_{NO_2} \cdot \frac{NO_{xc} \cdot K_h}{10^6}$$

where:

- 8.4.1. NO_{xm} is the mass of oxides of nitrogen emitted during the test, expressed in g/km;
- 8.4.2. S_X is the distance defined in 8.2.2;
- 8.4.3. d_{NO_2} is the density of the oxides of nitrogen in the exhaust gases, in NO_2 equivalent, at a temperature of 273.2 K (0 °C) and a pressure of 101.333 kPa (= 2,05 kg.050 10³ g/m³);
- 8.4.4. NO_{xc} is the concentration of oxides of nitrogen in the diluted gases, expressed in parts per million and corrected to take account of the dilution air:

$$NO_{xc} = NO_{xe} - NO_{xd} \cdot \left(1 - \frac{1}{DF}\right)$$

where:

- 8.4.4.1. NO_{xe} is the concentration of oxides of nitrogen, expressed in parts per million, in the sample of diluted gases collected in bag S_a ;
- 8.4.4.2. NO_{xd} is the concentration of oxides of nitrogen, expressed in parts per million, in the sample of dilution air collected in bag S_b ;
- 8.4.4.3. DF is the coefficient defined in 8.6.
- 8.4.5. K_h is the correction factor for humidity

$$K_h = \frac{1}{1 - 0.0329 \cdot (H - 10.7)}$$

where:

- 8.4.5.1. H is the absolute humidity in grams of water per kg of dry air

$$H = \frac{6.2111 \cdot U \cdot P_d}{P_a - P_d \cdot \frac{U}{100}} \text{ (g / kg)}$$

where:

- 8.4.5.1.1. U is the humidity content expressed as a percentage;
- 8.4.5.1.2. P_d is the saturated water-vapour pressure, expressed in kPa, at the test temperature;
- 8.4.5.1.3. P_a is the atmospheric pressure in kPa.

8.5. Carbon dioxide (CO₂)

The mass of carbon dioxide emitted by the vehicle's exhaust during the test shall be calculated by means of the following formula:

$$CO_{2M} = \frac{1}{S_x} \cdot V \cdot d_{CO_2} \cdot \frac{CO_{2C}}{10^2}$$

where:

- 8.5.1. CO_{2m} is the mass of carbon dioxide emitted during the test part, in g/km
- 8.5.2. S_x is the distance defined in paragraph 8.2.2.,
- 8.5.3. V is the total volume defined in paragraph 8.2.5.,
- 8.5.4. d_{CO₂} is the density of the carbon dioxide at a temperature of 273.2 K (0 °C) and a pressure of 101.3 kPa, d_{CO₂} = 1.964 kg10³ g/m³,
- 8.5.5. CO_{2c} is the concentration of diluted gases, expressed in per cent carbon dioxide equivalent, corrected to take account of the dilution air by the following equation:

$$CO_{2C} = CO_{2e} - CO_{2d} \left(1 - \frac{1}{DF} \right)$$

where:

- 8.5.5.1. CO_{2e} is the concentration of carbon dioxide expressed in per cent, in the sample of diluted gases collected in bag(s) S_A,
- 8.5.5.2. CO_{2d} is the concentration of carbon dioxide expressed in per cent, in the sample of dilution air collected in bag(s) S_B,
- 8.5.5.3. DF is the coefficient defined in paragraph 8.6.

8.6. DF is a coefficient expressed by means of the formula:

$$DF = \frac{13.4}{C_{CO_2} + (C_{HC} + C_{CO}) \cdot 10^{-4}} \text{ for petrol (E5)}$$

where:

- 8.6.1. C_{CO₂} = concentration of CO₂ in the diluted exhaust gas contained in the sampling bags, expressed in per cent volume,

8.6.2. C_{HC} = concentration of HC in the diluted exhaust gas contained in the sampling bags, expressed in ppm carbon equivalent,

8.6.2. C_{CO} = concentration of CO in the diluted exhaust gas contained in the sampling bags, expressed in ppm.

9. The test results for cold phase 1 and warm phase 2 are expressed in g/km:

$$HC \text{ in g/km} = (HC_{\text{mass_phase 1}} + HC_{\text{mass_phase 2}}) / S_T$$

$$CO \text{ in g/km} = (CO_{\text{mass_phase 1}} + CO_{\text{mass_phase 2}}) / S_T$$

$$NO_x \text{ in g/km} = (NO_{x\text{mass_phase 1}} + NO_{x\text{mass_phase 2}}) / S_T$$

$$CO_2 \text{ in g/km} = (CO_{2\text{mass_phase 1}} + CO_{2\text{mass_phase 2}}) / S_T$$

where:

$HC_{\text{mass_phase1_or_2}}$: see definition in 8.3.

$CO_{\text{mass_phase1_or_2}}$: see definition in 8.2.

$NO_{x\text{mass_phase1_or_2}}$: see definition in 8.3

$CO_{2\text{mass_phase1_or_2}}$: see definition in 8.5

S_T : total test distance actually covered by the L1e, L2e or L6e vehicle in cold phase 1 (S_1) and in warm phase 2 (S_2).

10. Weighting of type I test results

10.1. The (average) result of the cold phase is named R_{X1} , the (average) result of the warm phase is named R_{X2} . Using these emission results in g/km the final type I test result R_X shall be calculated by means of the following equation:

~~$$R_X = R_{X1} \cdot 0.3 + R_{X2} \cdot 0.7$$~~

$$R_X = R_{X1} \cdot 0.3 + R_{X2} \cdot 0.7$$

where

X = HC, CO, NO_x or CO₂

R_{HC} = the total measured emission of hydrocarbons in phase 1 + 2 in g/km;

R_{CO} = the total measured emission of carbon monoxide in phase 1 + 2 in g/km;

R_{NO_x} = the total measured emission of carbon monoxide in phase 1 + 2 in g/km;

R_{CO_2} = the total measured emission of carbon dioxide in phase 1 + 2 in g/km;

11. Fuel consumption

The fuel consumption shall be calculated using the test results from paragraph 10.1 as follows:

$$FC = \frac{0.118}{D} [(0.848 \cdot R_{HC}) + (0.429 \cdot R_{CO}) + (0.273 \cdot R_{CO_2})]$$
$$FC = \frac{0.118}{D} \cdot [(0.848 \cdot R_{HC}) + (0.429 \cdot R_{CO}) + (0.273 \cdot R_{CO_2})]$$

where:

FC = the fuel consumption in litre per 100 km;

D = the density of the test fuel in kg/l at 288.2 K (15°C).

Appendix 3 is added:

1. Emissions from crankcase gasses.

Zero crankcase gas emissions shall be emitted from the type-approved vehicle. Crankcase emissions shall not be discharged directly into the ambient atmosphere from any L-category vehicle throughout its useful life.

2. Interpretation of CO₂ emission and fuel consumption test type I results

~~The CO₂ emission and fuel consumption data measured in the type I test shall be provided to the buyer of the vehicle at the time of purchase of a new category L1e, L2e or L6e vehicle, in a format which they consider appropriate. For this purpose the following requirements shall apply:~~

2.1. The CO₂ and fuel consumption values adopted as the type approval value shall be the value declared by the manufacturer if the value measured by the technical service does not exceed the declared value by more than 4 per cent. The measured value can be lower without any limitations.

2.2. If the measured value of CO₂ and fuel consumption exceeds the manufacturer's declared CO₂ value and fuel consumption by more than 4 per cent, then another test is run on the same vehicle.

2.3. When the average of the two test results does not exceed the manufacturer's declared value by more than 4 per cent, then the value declared by the manufacturer is taken as the type approval value.

2.4. If the average still exceeds the declared value by more than 4 per cent, a final test is run on the same vehicle. The average of the three test results is taken as the type approval value.

Annex II

Point 46 of Annex IV point 46 to Directive 2002/24/EC, is amended to read as follows:

46. Exhaust emissions⁽¹¹⁾; ~~CO₂ emissions, fuel consumption and crankcase gas emissions²~~
- 46.1. Type I test: CO: g/km HC: g/km NOx g/km HC + NOx: g/km CO₂: g/km Fuel consumption: l/100km Euro level: (1, 2, or 3)⁽¹²⁾
- 46.2. Type HI test: ~~for mopeds: CO: g/min km HC: g/min~~
~~for motorcycles and tricycles: CO: % vol~~
~~Visible air pollution caused by an engine with compression ignition:
- corrected value of absorption coefficient: m⁻¹ km NOx
. g/km HC + NOx: g/km⁽¹³⁾~~
- 46.3. ~~The undersigned declares that zero crankcase gas emissions are emitted from the vehicle and that crankcase gas emissions shall not be discharged directly into the ambient atmosphere throughout the useful life of the vehicle.~~ Type II test: CO⁽¹³⁾: g/min HC⁽¹³⁾: g/min
~~CO⁽¹⁴⁾: % vol~~
~~Visible air pollution caused by an engine with compression ignition:
- corrected value of absorption coefficient: m⁻¹~~

Annex VII, point 2.1. Footnote 12 to Annex IV of Directive 2002/24/EC is added:

(¹²) Number of the base Directive and latest amending Directive applicable to the approval including the Euro-level according to the following rules:

Voluntary indication of Euro level at the choice of the approval authority for approvals before the entry into force date set out in Article 8;

In table 2.2.1.1.3 of Annex I to Chapter 5 of Directive 97/24/EC, as last amended ~~to read~~ by Directives 2002/51/EC, 2003/77/EC, 2005/30/EC, 2006/27/EC, 2006/72/EC and 2006/120/EC, compliance with the first row of limit values shall mean compliance with the "Euro 1" level and compliance with the second row of limit values, compliance with the "Euro 2" level;

Full compliance with Annex I to Chapter 5 of Directive 97/24/EC, as last amended by [this Directive], which includes compliance with the "Euro 2" level combined with the new test methodology, shall mean compliance with the "Euro 3" level;

In table 2.2.1.1.5 of Annex II to Chapter 5 of Directive 97/24/EC, as last amended by Directives 2002/51/EC, 2003/77/EC, 2005/30/EC, 2006/27/EC, 2006/72/EC, 2006/120/EC and [this Directive], compliance with:

- the rows of limit values in part "A" of table 2.2.1.1.5 concerning class I (< 150 cm³) and class II (• 150 cm³), shall mean compliance with the "Euro 2" level;
- the rows of limit values in part "B" of table 2.2.1.1.5 concerning class I (< 150 cm³) and class II (• 150 cm³), shall mean compliance with the "Euro 3" level;
- the rows of limit values in part "C" of the table 2.2.1.1.5 concerning class I (v_{max} < 130 km/h) and class II (v_{max} • 130 km/h), shall mean compliance with the "Euro 3" level.

⁽¹³⁾ Only for L1e, L2e and L6e category vehicles complying with the provisions of Directive 97/24/EC, as amended by [this Directive].

⁽¹⁴⁾ For L-category vehicles within the scope of Article 1 of Directive 2002/24/EC, with the exception of L1e, L2e and L6e vehicles.

Point 2 of Annex VII of Directive 2002/24/EC is amended as follows:

2. Results of the emission tests

Number of the base Directive and latest amending Directive applicable to the approval. In the case of a Directive with two or more implementation stages, indicate also the implementation stage and the Euro level:

Variant/version:

Euro level⁽¹⁾: :

2.1. Type I test

CO: g/km

HC⁽³⁾: g/km

NOx⁽³⁾ g/km

HC + NOx⁽⁴²⁾: g/km

CO₂⁽²⁾: g/km

Fuel consumption⁽²⁾: l/100km

2.2. Type II

CO (g/min) ⁽²⁾

HC (g/min) ⁽²⁾

CO (% vol) ⁽⁴³⁾ at normal idle speed

Specify the idle speed ^{(3) (4)}:

CO (% vol) ⁽³⁾ at high idle speed

Specify the idle speed ^{(3) (4)}:

Engine oil temperature ^{(3) (5)}:

The footnotes of Annex VII of Directive 2002/24/EC are amended as follows:

⁽¹⁾ Refer to footnote ⁽¹²⁾ in Annex IV.

~~Footnote~~ ⁽¹⁾⁽²⁾ Only for L1e, L2e and L6e category vehicles.

~~Footnote~~ ⁽²⁾⁽³⁾ For L-category vehicles in the scope of Article 1 of Directive 2002/24/EC with the exception of L1e, L2e and L6e vehicles.

⁽⁴⁾ Mention the measurement tolerance.

⁽⁵⁾ Applicable for four-stroke engines only.

Annex III

In Annex I to Section A of Directive 2009/67/EC, the following points are added:

- 16 ~~‘automatically switching on of lighting’ means a lighting system turned on when the ignition switch or the engine on-off switch is in the on position; ‘daytime running lamp’ means a lamp facing in a forward direction used to make the vehicle more easily visible when driving during daytime;~~
- 17 ~~‘day time running lights’ means automatically switching on of a lighting system which increases visibility of the vehicle at day time;~~
- 1817 ~~‘stop-/start system’ means an automatic stop and start of the engine to reduce the amount of idling, thereby reducing fuel consumption, pollutant and CO₂ emissions;~~
- 19 ~~‘pure electric vehicle’ means a vehicle powered by:~~
- ~~(a) — a system consisting of one or more electric energy storage devices, one or more electric power conditioning devices and one or more electric machines that convert stored electric energy to mechanical energy delivered at the wheels for propulsion of the vehicle;~~
- ~~(b) — an auxiliary electric propulsion fitted to a vehicle designed to pedal;~~
- 2018 ~~‘hybrid electric vehicle’ means a vehicle, including vehicles which draw energy from a consumable fuel only for the purpose of re-charging the electrical energy/power storage device, that, for the purpose of mechanical propulsion, draws energy from both of the following on-vehicle sources of stored energy/power:~~
- ~~(a) — a consumable fuel,~~
- ~~(b) — a battery, capacitor, flywheel / generator or other electrical energy or power storage device. ‘Vehicle master control switch’ means the device by which the vehicle’s on-board electronics system is brought from being switched off, as is the case when a vehicle is parked without the driver being present, to normal operation mode.~~

In Annex I to Section B of Directive 2009/67/EC, the following ~~points are~~point is added:

- 15 ~~In order to improve their visibility, all L-category vehicles referred to in Article 1 of Directive 2002/24/EC are to be equipped with automatic switching on of lighting or day time running lights at the choice of the manufacturer and shall comply with the following:~~
- 15.1. ~~for L1e vehicles automatic switching on of lighting and light signalling devices shall be in compliance with UNECE regulation No 74 Rev. 2;~~
- 15.210.1. ~~for L3e and L4e vehicles at the choice of the vehicle manufacturer, either automatic switching on of lighting and light signalling devices shall be in compliance with UNECE Regulation No 53 Rev. 2 and its amendments 1 and 2, or be in compliance with dedicated day time running light (DRL) requirements in accordance with UNECE regulation No 87 Rev. 2 and its amendments 1 and 2; Vehicles shall be~~

fitted with either:

- dipped-beam headlamps which are automatically switched on when the vehicle master control switch has been activated; or
- daytime running lamps.

~~15.3. for all other category vehicles in the scope of Article 1 of Directive 2002/24/EC at the choice of the manufacturer either automatic switching on of lighting and light-signalling devices shall be installed or dedicated day time running lights (DRL) that automatically switch on.~~

~~15.4. To allow a combustion engine to start running, the lighting system turning on automatically may be turned off during the engine cranking period for a consecutive period of less than or equal to 10 s.~~

~~16 A derogation of definition A(16) shall be allowed for:~~

~~(a) L category vehicles not equipped with a stop start system;~~

~~(b) L category vehicles equipped with a propulsion other than pure electric or hybrid electric propulsion.~~

~~For the L category vehicles complying with points (a) and (b) the lighting system may also automatically switch on if the engine starts to run.~~

In Annex I to Section B of Directive 2009/67/EC, point 11 is amended to read as follows:

11 In the absence of specific requirements, the electrical connections shall be such that the main-beam headlamp, the dipped-beam headlamp and the fog lamps cannot be switched on until the lamps referred to in point 10 have also been switched on. This requirement does not apply, however, to dipped-beam headlamps when switched on automatically in compliance with point 10.1., main-beam or dipped-beam headlamps when their optical warnings consist of the intermittent lighting-up at short intervals of the main-beam headlamp, or the intermittent lighting-up at short intervals of the dipped-beam headlamp, or the alternate lighting-up at short intervals of the main-beam and dipped-beam headlamps.

In Annex I to Section B of Directive 2009/67/EC, the following points are added:

15. Vehicles of category L1e and L3e may be fitted with retro-reflective or equivalent (e.g. glowing) devices incorporated in the tyre sidewalls or rims so as to provide a visual impression of circles of light and making a two-wheeled vehicle easily recognisable. Such devices need not be type-approved provided their performance is comparable to that required by UNECE standards, such as UNECE Regulation No 88, and they may incorporate small electric light sources with a limited output provided that such light is not visible directly (i.e. pointed inward towards wheel). The colour emitted shall be as close to white as possible (i.e. pale green hue is permitted in case of glowing devices).

16. Vehicles of category L1e and L3e may be fitted with additional rear and side retro-reflective devices and materials provided that they do not impair the effectiveness of

the mandatory lighting and light-signalling devices. In particular, luggage compartments and saddle bags may be fitted with retro-reflective materials, provided that these have the same colour as the lighting device at that location.

17. No vehicle shall be fitted with auxiliary light sources of which the emitted light can be observed either directly or indirectly while driving, other than those for the purpose of illuminating controls, tell-tales and indicators or the occupant compartment.
18. Where automatically switched-on headlamp or daytime running lamp activation is linked to the running of an engine, this shall be construed as being linked to the activation of the master control switch. This shall in particular be the case for vehicles with electric or other alternative propulsion systems and vehicles equipped with an automatic engine stop/start system.

Annex II to Directive 2009/67/EC is amended to read as follows:

REQUIREMENTS CONCERNING TWO-WHEEL MOPEDS

1. Vehicles of category L1e shall meet all the relevant requirements of UNECE Regulation No 74, supplement 7 to the 01 series of amendments. Vehicles with a maximum vehicle design speed of • 25 km/h shall meet all the relevant requirements as prescribed for vehicles with a maximum vehicle design speed of > 25 km/h.
- 1.1. Vehicles of category L1e shall, in the absence of specific requirements for vehicles of that category, be fitted with a rear registration plate lamp.
- 1.2. In the absence of specific requirements in UNECE Regulation No 74, vehicles of category L1e may be fitted with daytime running lamps which are activated instead of automatically switched-on headlamps and which comply with the requirements set out in point 6.15. to 6.15.7. of Annex III

Appendix 1 and 2 of Annex II to Directive 2009/67/EC are deleted as well as the references thereto in the List of Annexes.

Appendix 3 of Annex II to Directive 2009/67/EC is renumbered as Appendix 1 as well as the reference thereto in the List of Annexes.

Appendix 4 of Annex II to Directive 2009/67/EC is renumbered as Appendix 2 as well as the reference thereto in the List of Annexes.

In Appendix 2 of Annex II to Directive 2009/67/EC, the following point is added:

5.7. Rear registration plate lamp

Point 6.3. of Appendix 2 of Annex II to Directive 2009/67/EC is amended to read as follows:

6.3. Daytime running lamp: yes/no ()

In Annex III to Directive 2009/67/EC, the following point is added:

1.8. Rear registration plate lamp

Point 2.3. of Annex III to Directive 2009/67/EC is amended to read as follows:

2.3. Daytime running lamp

Point 6.1.10. of Annex III to Directive 2009/67/EC is amended to read as follows:

6.1.10. Circuit-closed tell-tale: mandatory if the driving beam headlamp is fitted (non-flashing blue tell-tale).

In Annex III to Directive 2009/67/EC, the following point is added:

6.1.11. Other requirements:

- driving-beam headlamps of vehicles which tend to lean in corners may be fitted with a horizontal inclination adjustment system (HIAS) as defined in paragraph 2.25. of UNECE Regulation No 53, provided that all relevant requirements of that Regulation applying to HIAS are met;
- the combined value of the maximum intensity of all driving-beam headlamps which can be activated at the same time shall not exceed 225 000 cd.

Point 6.2.3.1. of Annex III to Directive 2009/67/EC is amended to read as follows:

6.2.3.1. In width:

- a single independent passing-beam headlamp may be fitted above, below or to one side of another front lamp. If lamps are stacked on top of each other, the reference centre of the passing-beam headlamp shall be located within the longitudinal median plane of the vehicle. If they are side by side, their reference centres shall be symmetrical in relation to the longitudinal median plane of the vehicle;
- a single independent passing-beam headlamp which is reciprocally incorporated with another front lamp shall be fitted in such a way that its reference centre lies within the longitudinal median plane of the vehicle. However, when the vehicle is fitted with another front lamp alongside the passing-beam headlamp, their reference centres shall be symmetrical in relation to the longitudinal median plane of the vehicle;
- two passing-beam headlamps of which either none, one or both are reciprocally incorporated with another front lamp shall be fitted in such a way that their reference centres are symmetrical in relation to the longitudinal median plane of the vehicle;

here there are two passing-beam headlamps, the lateral distance between the outward edges of the light-emitting surfaces and the outermost edges of the vehicle shall not exceed 400 mm.

Point 6.2.11. of Annex III of Directive 2009/67/EC is amended to read as follows:

6.2.11. Other requirements:

- passing-beam headlamps of vehicles which tend to lean in corners may be

fitted with a horizontal inclination adjustment system (HIAS) as defined in paragraph 2.25 of UNECE Regulation No 53, provided that all relevant requirements of that Regulation applying to HIAS are met;

- passing-beam headlamps of which the lowest point of the light-emitting surface is 0.8 m or less above the ground shall be adjusted to an initial aiming inclination of between -1.0 % and -1.5 %. The precise value may be declared by the manufacturer;
- passing-beam headlamps of which the lowest point of the light-emitting surface is between 0.8 m and 1.0 m above the ground shall be adjusted to an initial aiming of inclination between -1.0 % and -2.0 %. The precise value may be declared by the manufacturer;
- passing-beam headlamps of which the lowest point of the light-emitting surface is 1.0 m or more above the ground shall be adjusted to an initial aiming inclination of between -1.5 % and -2.0 %. The precise value may be declared by the manufacturer;
- for passing-beam headlamps with a light source with an objective luminous flux not exceeding 2000 lumen and an initial inclination of between -1.0 % and -1.5 %, the vertical inclination shall remain between -0.5 % and -2.5 % under all loading conditions. The vertical inclination shall remain between -1.0 % and -3.0 % if the initial inclination is set between -1.5 % and -2.0 %. An external adjusting device may be used to satisfy the requirements, provided that no tools other than those provided with the vehicle are needed;
- for passing-beam headlamps with a light source with an objective luminous flux exceeding 2000 lumen and an initial inclination of between -1.0 % and -1.5 %, the vertical inclination shall remain between -0.5 % and -2.5 % under all loading conditions. The vertical inclination shall remain between -1.0 % and -3.0 % if the initial inclination is set between -1.5 % and -2.0 %. A headlamp levelling device may be used to satisfy the requirements of this paragraph, provided that its operation is fully automatic and the response time is less than 30 seconds.

In Annex III to Directive 2009/67/EC, the following point is added:

6.2.11.1. Testing conditions:

- the inclination requirements in point 6.2.11. shall be verified as follows:
 - vehicle with its mass in running order and a mass of 75 kg simulating the driver;
 - vehicle fully laden with the mass distributed so as to attain the maximum axle loads as declared by the manufacturer for this loading condition;
 - vehicle with a mass of 75 kg simulating the driver and additionally laden so as to attain the maximum permissible rear axle load as

declared by the manufacturer; however, the front axle load shall be as low as possible in this case;

- before any measurement is made, the vehicle shall be rocked three times and then moved backwards and forwards for at least a complete wheel revolution.

Point 6.4.1. of Annex III to Directive 2009/67/EC is amended to read as follows:

6.4.1. Number:

- one or two, in the case of vehicles with an overall width not exceeding 1300 mm;
- two, in the case of vehicles with an overall width exceeding 1300 mm;
- an additional stop lamp of category S3 or S4 (i.e. central high mounted stop lamp) may be fitted, provided that all relevant requirements of UNECE Regulation No 48 applying to the installation of such stop lamps on vehicles of category M1 are met.

Point 6.5.3.1. of Annex III to Directive 2009/67/EC is amended to read as follows:

6.5.3.1. In width:

- a single independent front position lamp may be fitted above, below or to one side of another front lamp. If lamps are stacked on top of each other, the reference centre of the front position lamp shall be located within the longitudinal median plane of the vehicle. If they are side by side, their reference centres shall be symmetrical in relation to the longitudinal median plane of the vehicle;
- a single independent front position lamp which is reciprocally incorporated with another front lamp shall be fitted so that its reference centre lies within the longitudinal median plane of the vehicle. However, when the vehicle is fitted with another front lamp alongside the front position lamp, their reference centres shall be symmetrical in relation to the longitudinal median plane of the vehicle;
- two front position lamps of which either none, one or both are reciprocally incorporated with another front lamp shall be fitted so that their reference centres are symmetrical in relation to the longitudinal median plane of the vehicle;
- where there are two front position lamps, the lateral distance between the outward edges of the light-emitting surfaces and the outermost edges of the vehicle shall not exceed 400 mm.

Point 6.6.3.1. of Annex III to Directive 2009/67/EC is amended to read as follows:

6.6.3.1. In width:

- a single rear position lamp shall be installed on the vehicle so that the reference centre of the rear position lamp shall be located within the longitudinal median plane of the vehicle;
- two rear position lamps shall be installed on the vehicle so that the reference centres of the rear position lamps are symmetrical in relation to the longitudinal median plane of the vehicle;
- in the case of vehicles with two rear wheels and an overall width exceeding 1 300 mm, the lateral distance between the outward edges of the light-emitting surfaces and the outermost edges of the vehicle shall not exceed 400 mm.

Point 6.7.3.1. of Annex III to Directive 2009/67/EC is amended to read as follows:

6.7.3.1. In width:

- if there is a single rear retro-reflector, this shall be installed on the vehicle so that the reference centre of the rear retro-reflector is located within its longitudinal median plane;
- if there are two rear retro-reflectors, these shall be installed on the vehicle so that the reference centres of the rear retro-reflectors are symmetrical in relation to its longitudinal median plane;
- if there are two rear retro-reflectors, the lateral distance between the outward edges of the light-emitting surfaces and the outermost edges of the vehicle shall not exceed 400 mm.

In Annex III to Directive 2009/67/EC, the following points are added:

6.15. Daytime running lamp

6.15.1. Number:

- one or two, in the case of vehicles with an overall width not exceeding 1 300 mm;
- two, in the case of vehicles with an overall width exceeding 1 300 mm.

6.15.2. Arrangement:

- no specific requirements.

6.15.3. Position:

6.15.3.1. In width:

- a single independent daytime running lamp may be fitted above, below or to one side of another front lamp. If lamps are stacked on top of each other, the reference centre of the daytime running lamp shall be located within the longitudinal median plane of the vehicle. If they are side by side, their

reference centres shall be symmetrical in relation to the longitudinal median plane of the vehicle;

- a single independent daytime running lamp which is reciprocally incorporated with another front lamp shall be fitted so that its reference centre lies within the longitudinal median plane of the vehicle. However, when the vehicle is fitted with another front lamp alongside the daytime running lamp, their reference centres shall be symmetrical in relation to the longitudinal median plane of the vehicle;
- two daytime running lamps of which either none, one or both are reciprocally incorporated with another front lamp shall be fitted so that their reference centres are symmetrical in relation to the longitudinal median plane of the vehicle;
- the inward edges of the light-emitting surfaces shall be at least 500 mm apart in the case of vehicles with an overall width exceeding 1 300 mm.

6.15.3.2. In height:

- a minimum of 250 mm and a maximum of 1 500 mm above the ground.

6.15.3.3. In length:

- at the front of the vehicle. This requirement is considered to have been met if the light emitted disturbs the driver neither directly nor indirectly by reflection off the rear-view mirrors and/or other reflective surfaces on the vehicle.

6.15.3.4. Distance:

- if the distance between the front direction indicator lamp and the daytime running lamp is 40 mm or less, the electrical connections of the daytime running lamp on the relevant side of the vehicle shall be such that either:
 - it is switched off; or
 - its luminous intensity is reduced to a level not exceeding 140 cd;
- during the entire period (both on and off cycle) of activation of the relevant front direction indicator lamp.

6.15.4. Geometric visibility:

- • = 10° upwards and 10° downwards;
- • = 20° to the left and to the right if there is only one daytime running lamp;
- • = 20° outwards and 20° inwards if there are two daytime running lamps.

6.15.5. Orientation:

- to the front; may move in line with the steering angle of any handlebars.

6.15.6. Electrical connections:

- all daytime running lamps shall light up when the master control switch is activated; however, they may remain off under the following conditions:
 - the automatic transmission control is in the park position;
 - the parking brake is activated; or
 - during the time prior to the vehicle being set in motion for the first time after each manual activation of the master control switch and the vehicle's propulsion system;
- daytime running lamps may be manually deactivated; however, this shall be possible only at a vehicle speed not exceeding 10 km/h. The lamps shall be automatically reactivated when the vehicle speed exceeds 10 km/h or when the vehicle has travelled more than 100 m;
- daytime running lamps shall in each case be deactivated automatically when:
 - the vehicle is shut down by means of the master control switch;
 - the front fog lamps are activated;
 - the headlamps are activated, except when they are used to give intermittent luminous warnings at short intervals; and
 - in ambient lighting conditions of less than 1000 lux where the indicated speed on the vehicle's speedometer is still clearly legible (e.g. when speedometer illumination is always on) and the vehicle is not fitted with a non-flashing green tell-tale in compliance with point 6.5.9. or a dedicated green circuit-closed tell-tale for the daytime running lamp identified by the appropriate symbol. In such a case, the passing-beam headlamps and the lighting devices required in point 11 of Annex I Section B shall be automatically activated simultaneously within 2 seconds of the ambient lighting level dropping below 1000 lux. If the ambient lighting conditions subsequently reach a level of at least 7000 lux, the daytime running lamps shall be automatically reactivated, while the passing-beam headlamps and the lighting devices required in point 11 of Annex I Section B shall be deactivated simultaneously within five to 300 seconds (i.e. fully automatic light switching is required if the driver has no visible indication and stimulus to activate normal lighting when it is dark).

6.15.7. Circuit-closed tell-tale:

- optional

In Appendix 4 of Annex III to Directive 2009/67/EC, the following point is added:

5.8. Rear registration plate lamp

Point 6.4. of Appendix 4 of Annex III to Directive 2009/67/EC is amended to read as follows:

6.4. Daytime running lamp: yes/no (*)

Annex IV of Directive 2009/67/EC is amended to read:

REQUIREMENTS CONCERNING TWO-WHEEL MOTORCYCLES

1. Vehicles of category L3e shall meet all the relevant requirements of supplement 13 to the 01 series of amendments of UNECE Regulation No 53.,

Appendix 1 and 2 of Annex II to Directive 2009/67/EC are deleted as well as the references thereto in the List of Annexes.

Appendix 3 of Annex IV to Directive 2009/67/EC is renumbered as Appendix 1 as well as the reference thereto in the List of Annexes.

Appendix 4 of Annex IV to Directive 2009/67/EC is renumbered as Appendix 2 as well as the reference thereto in the List of Annexes.

In Appendix 2 of Annex II to Directive 2009/67/EC, the following point is added:

5.9. Non-triangular side retro-reflectors

Point 6.4. of Appendix 2 of Annex II to Directive 2009/67/EC is amended to read as follows:

6.4. Daytime running lamp: yes/no (*)

In Annex V to Directive 2009/67/EC, the following point is added:

1.9. Non-triangular side retro-reflectors

Point 2.4. of Annex V to Directive 2009/67/EC is amended to read as follows:

2.4. Daytime running lamp

Point 6.1.11. of Annex V to Directive 2009/67/EC is amended to read as follows:

6.1.11. Other requirements:

- driving-beam headlamps of vehicles which tend to lean in corners may be fitted with a horizontal inclination adjustment system (HIAS) as defined in paragraph 2.25. of UNECE Regulation No 53, provided that all relevant requirements of that Regulation applying to HIAS are met;
- the combined value of the maximum intensity of all driving-beam headlamps which can be activated at the same time shall not exceed 225 000 cd.

In Annex V to Directive 2009/67/EC, the following points are added:

6.13. Daytime running lamp

6.13.1. Number:

- one or two, in the case of vehicles with an overall width not exceeding 1 300 mm;
- two, in the case of vehicles with an overall width exceeding 1 300 mm.

6.13.2. Arrangement:

- no specific requirements.

6.13.3. Position:

6.13.3.1. In width:

- a single independent daytime running lamp may be fitted above, below or to one side of another front lamp. If lamps are stacked on top of each other, the reference centre of the daytime running lamp shall be located within the longitudinal median plane of the vehicle. If they are side by side, their reference centres shall be symmetrical in relation to the longitudinal median plane of the vehicle;
- a single independent daytime running lamp which is reciprocally incorporated with another front lamp shall be fitted so that its reference centre lies within the longitudinal median plane of the vehicle. However, when the vehicle is fitted with another front lamp alongside the daytime running lamp, their reference centres shall be symmetrical in relation to the longitudinal median plane of the vehicle;
- two daytime running lamps of which either none, one or both are reciprocally incorporated with another front lamp shall be fitted so that their reference centres are symmetrical in relation to the longitudinal median plane of the vehicle;
- the inward edges of the light-emitting surfaces shall be at least 500 mm apart in the case of vehicles with an overall width exceeding 1 300 mm.

6.13.3.2. In height:

- a minimum of 250 mm and a maximum of 1 500 mm above the ground.

6.13.3.3. In length:

- at the front of the vehicle. This requirement is considered to have been met if the light emitted disturbs the driver neither directly nor indirectly by reflection off the rear-view mirrors and/or other reflective surfaces on the vehicle.

6.13.3.4. Distance:

- if the distance between the front direction indicator lamp and the daytime running lamp is 40 mm or less, the electrical connections of the daytime

running lamp on the relevant side of the vehicle shall be such that either:

- it is switched off; or
- its luminous intensity is reduced to a level not exceeding 140 cd;

during the entire period (both on and off cycle) of activation of the relevant front direction indicator lamp.

6.13.4. Geometric visibility:

- • = 10° upwards and 10° downwards;
- • = 20° to the left and to the right if there is only one daytime running lamp;
- • = 20° outwards and 20° inwards if there are two daytime running lamps.

6.13.5. Orientation:

- to the front; may move in line with the steering angle of any handlebars.

6.13.6. Electrical connections:

- all daytime running lamps shall light up when the master control switch is activated; however, they may remain off under the following conditions:
 - the automatic transmission control is in the park position;
 - the parking brake is activated; or
 - during the time prior to the vehicle being set in motion for the first time after each manual activation of the master control switch and the vehicle's propulsion system;
- daytime running lamps may be manually deactivated; however, this shall be possible only at a vehicle speed not exceeding 10 km/h. The lamps shall be automatically reactivated when the vehicle speed exceeds 10 km/h or when the vehicle has travelled more than 100 m;
- daytime running lamps shall in each case be deactivated automatically when:
 - the vehicle is shut down by means of the master control switch;
 - the front fog lamps are activated;
 - the headlamps are activated, except when they are used to give intermittent luminous warnings at short intervals; and
 - in ambient lighting conditions of less than 1 000 lux where the indicated speed on the vehicle's speedometer is still clearly legible (e.g. when speedometer illumination is always on) and the vehicle is not fitted with a non-flashing green tell-tale in compliance with point 6.5.9. or a dedicated green circuit-closed tell-tale for the daytime

running lamp identified by the appropriate symbol. In such a case, the passing-beam headlamps and the lighting devices required in point 11 of Annex I Section B shall be automatically activated simultaneously within 2 seconds of the ambient lighting level dropping below 1 000 lux. If the ambient lighting conditions subsequently reach a level of at least 7 000 lux, the daytime running lamps shall be automatically reactivated, while the passing-beam headlamps and the lighting devices required in point 11 of Annex I Section B shall be deactivated simultaneously within five to 300 seconds (i.e. fully automatic light switching is required if the driver has no visible indication and stimulus to activate normal lighting when it is dark).

6.13.7. Circuit-closed tell-tale:

– optional

In Appendix 4 of Annex V to Directive 2009/67/EC, the following point is added:

5.9. Non-triangular side retro-reflectors

Point 6.4. of Appendix 4 of Annex V to Directive 2009/67/EC is amended to read as follows:

6.4. Daytime running lamp: yes/no (*)

In Annex VI to Directive 2009/67/EC, the following point is added:

1.10. non-triangular side retro-reflectors

In Annex VI to Directive 2009/67/EC, point 2.4. is amended to read as follows:

2.4. Daytime running lamp

Point 6.1.11. of Annex VI to Directive 2009/67/EC is amended to read as follows:

6.1.11. Other requirements:

- driving-beam headlamps of vehicles which tend to lean in corners may be fitted with a horizontal inclination adjustment system (HIAS) as defined in paragraph 2.25. of UNECE Regulation No 53, provided that all relevant requirements of that Regulation applying to HIAS are met;
- the combined value of the maximum intensity of all driving-beam headlamps which can be activated at the same time shall not exceed 225 000 cd.

Point 6.2.3.1. of Annex VI to Directive 2009/67/EC is amended to read as follows:

6.2.3.1. In width:

- a single independent passing-beam headlamp may be fitted above, below or to one side of another front lamp. If lamps are stacked on top of each other, the reference centre of the passing-beam headlamp shall be located within the longitudinal median plane of the vehicle. If they are side by side, their reference centres shall be symmetrical in relation to the longitudinal median

plane of the vehicle;

- a single independent passing-beam headlamp which is reciprocally incorporated with another front lamp shall be fitted in such a way that its reference centre lies within the longitudinal median plane of the vehicle. However, when the vehicle is fitted with another front lamp alongside the passing-beam headlamp, their reference centres shall be symmetrical in relation to the longitudinal median plane of the vehicle;
- two passing-beam headlamps of which either none, one or both are reciprocally incorporated with another front lamp shall be fitted in such a way that their reference centres are symmetrical in relation to the longitudinal median plane of the vehicle;

here there are two passing-beam headlamps, the lateral distance between the outward edges of the light-emitting surfaces and the outermost edges of the vehicle shall not exceed 400 mm.

Point 6.2.11. of Annex VI to Directive 2009/67/EC is amended to read as follows:

6.2.11. Other requirements:

- passing-beam headlamps of vehicles which tend to lean in corners may be fitted with a horizontal inclination adjustment system (HIAS) as defined in paragraph 2.25 of UNECE Regulation No 53, provided that all relevant requirements of that Regulation applying to HIAS are met;
- passing-beam headlamps of which the lowest point of the light-emitting surface is 0.8 m or less above the ground shall be adjusted to an initial aiming inclination of between -1.0 % and -1.5 %. The precise value may be declared by the manufacturer;
- passing-beam headlamps of which the lowest point of the light-emitting surface is between 0.8 m and 1.0 m above the ground shall be adjusted to an initial aiming of inclination between -1.0 % and -2.0 %. The precise value may be declared by the manufacturer;
- passing-beam headlamps of which the lowest point of the light-emitting surface is 1.0 m or more above the ground shall be adjusted to an initial aiming inclination of between -1.5 % and -2.0 %. The precise value may be declared by the manufacturer;
- for passing-beam headlamps with a light source with an objective luminous flux not exceeding 2000 lumen and an initial inclination of between -1.0 % and -1.5 %, the vertical inclination shall remain between -0.5 % and -2.5 % under all loading conditions. The vertical inclination shall remain between -1.0 % and -3.0 % if the initial inclination is set between -1.5 % and -2.0 %. An external adjusting device may be used to satisfy the requirements, provided that no tools other than those provided with the vehicle are needed;
- for passing-beam headlamps with a light source with an objective luminous

flux exceeding 2000 lumen and an initial inclination of between -1.0 % and -1.5 %, the vertical inclination shall remain between -0.5 % and -2.5 % under all loading conditions. The vertical inclination shall remain between -1.0% and -3.0% if the initial inclination is set between -1.5 % and -2.0 %. A headlamp levelling device may be used to satisfy the requirements of this paragraph, provided that its operation is fully automatic and the response time is less than 30 seconds.

In Annex VI to Directive 2009/67/EC, the following point is added:

6.2.11.1. Testing conditions:

- the inclination requirements in point 6.2.11. shall be verified as follows:
 - vehicle with its mass in running order and a mass of 75 kg simulating the driver;
 - vehicle fully laden with the mass distributed so as to attain the maximum axle loads as declared by the manufacturer for this loading condition;
 - vehicle with a mass of 75 kg simulating the driver and additionally laden so as to attain the maximum permissible rear axle load as declared by the manufacturer; however, the front axle load shall be as low as possible in this case;
- before any measurement is made, the vehicle shall be rocked three times and then moved backwards and forwards for at least a complete wheel revolution.

Point 6.4.1. of Annex VI to Directive 2009/67/EC is amended to read as follows:

6.4.1. Number:

- one or two, in the case of vehicles with an overall width not exceeding 1 300 mm;
- two, in the case of vehicles with an overall width exceeding 1 300 mm;
- an additional stop lamp of category S3 or S4 (i.e. central high mounted stop lamp) may be fitted, provided that all relevant requirements of UNECE Regulation No 48 applying to the installation of such stop lamps on vehicles of category M1 are met.

Point 6.5.3.1. of Annex VI to Directive 2009/67/EC is amended to read as follows:

6.5.3.1. In width:

- a single independent front position lamp may be fitted above, below or to one side of another front lamp. If lamps are stacked on top of each other, the reference centre of the front position lamp shall be located within the longitudinal median plane of the vehicle. If they are side by side, their

- reference centres shall be symmetrical in relation to the longitudinal median plane of the vehicle;
- a single independent front position lamp which is reciprocally incorporated with another front lamp shall be fitted so that its reference centre lies within the longitudinal median plane of the vehicle. However, when the vehicle is fitted with another front lamp alongside the front position lamp, their reference centres shall be symmetrical in relation to the longitudinal median plane of the vehicle;
 - two front position lamps of which either none, one or both are reciprocally incorporated with another front lamp shall be fitted so that their reference centres are symmetrical in relation to the longitudinal median plane of the vehicle;
 - where there are two front position lamps, the lateral distance between the outward edges of the light-emitting surfaces and the outermost edges of the vehicle shall not exceed 400 mm.

Point 6.6.3.1. of Annex VI to Directive 2009/67/EC is amended to read as follows:

6.6.3.1. In width:

- a single rear position lamp shall be installed on the vehicle so that the reference centre of the rear position lamp shall be located within the longitudinal median plane of the vehicle;
- two rear position lamps shall be installed on the vehicle so that the reference centres of the rear position lamps are symmetrical in relation to the longitudinal median plane of the vehicle;
- in the case of vehicles with two rear wheels and an overall width exceeding 1 300 mm, the lateral distance between the outward edges of the light-emitting surfaces and the outermost edges of the vehicle shall not exceed 400 mm.

Point 6.12.3.1. of Annex VI to Directive 2009/67/EC is amended to read as follows:

6.12.3.1. In width:

- if there is a single rear retro-reflector, this shall be installed on the vehicle so that the reference centre of the rear retro-reflector is located within its longitudinal median plane;
- if there are two rear retro-reflectors, these shall be installed on the vehicle so that the reference centres of the rear retro-reflectors are symmetrical in relation to its longitudinal median plane;
- if there are two rear retro-reflectors, the lateral distance between the outward edges of the light-emitting surfaces and the outermost edges of the vehicle shall not exceed 400 mm.

In Annex VI to Directive 2009/67/EC, the following points are added:

6.14. Daytime running lamp

6.14.1. Number:

- one or two, in the case of vehicles with an overall width not exceeding 1 300 mm;
- two, in the case of vehicles with an overall width exceeding 1 300 mm.

6.14.2. Arrangement:

- no specific requirements.

6.14.3. Position:

6.14.3.1. In width:

- a single independent daytime running lamp may be fitted above, below or to one side of another front lamp. If lamps are stacked on top of each other, the reference centre of the daytime running lamp shall be located within the longitudinal median plane of the vehicle. If they are side by side, their reference centres shall be symmetrical in relation to the longitudinal median plane of the vehicle;
- a single independent daytime running lamp which is reciprocally incorporated with another front lamp shall be fitted so that its reference centre lies within the longitudinal median plane of the vehicle. However, when the vehicle is fitted with another front lamp alongside the daytime running lamp, their reference centres shall be symmetrical in relation to the longitudinal median plane of the vehicle;
- two daytime running lamps of which either none, one or both are reciprocally incorporated with another front lamp shall be fitted so that their reference centres are symmetrical in relation to the longitudinal median plane of the vehicle;
- the inward edges of the light-emitting surfaces shall be at least 500 mm apart in the case of vehicles with an overall width exceeding 1300 mm.

6.14.3.2. In height:

- a minimum of 250 mm and a maximum of 1500 mm above the ground.

6.14.3.3. In length:

- at the front of the vehicle. This requirement is considered to have been met if the light emitted disturbs the driver neither directly nor indirectly by reflection off the rear-view mirrors and/or other reflective surfaces on the vehicle.

6.14.3.4. Distance:

- if the distance between the front direction indicator lamp and the daytime running lamp is 40 mm or less, the electrical connections of the daytime running lamp on the relevant side of the vehicle shall be such that either:
 - it is switched off; or
 - its luminous intensity is reduced to a level not exceeding 140 cd;
- during the entire period (both on and off cycle) of activation of the relevant front direction indicator lamp.

6.14.4. Geometric visibility:

- • = 10° upwards and 10° downwards;
- • = 20° to the left and to the right if there is only one daytime running lamp;
- • = 20° outwards and 20° inwards if there are two daytime running lamps.

6.14.5. Orientation:

- to the front; may move in line with the steering angle of any handlebars.

6.14.6. Electrical connections:

- all daytime running lamps shall light up when the master control switch is activated; however, they may remain off under the following conditions:
 - the automatic transmission control is in the park position;
 - the parking brake is activated; or
 - during the time prior to the vehicle being set in motion for the first time after each manual activation of the master control switch and the vehicle's propulsion system;
- daytime running lamps may be manually deactivated; however, this shall be possible only at a vehicle speed not exceeding 10 km/h. The lamps shall be automatically reactivated when the vehicle speed exceeds 10 km/h or when the vehicle has travelled more than 100 m;
- daytime running lamps shall in each case be deactivated automatically when:
 - the vehicle is shut down by means of the master control switch;
 - the front fog lamps are activated;
 - the headlamps are activated, except when they are used to give intermittent luminous warnings at short intervals; and
 - in ambient lighting conditions of less than 1000 lux where the

indicated speed on the vehicle's speedometer is still clearly legible (e.g. when speedometer illumination is always on) and the vehicle is not fitted with a non-flashing green tell-tale in compliance with point 6.5.9. or a dedicated green circuit-closed tell-tale for the daytime running lamp identified by the appropriate symbol. In such a case, the passing-beam headlamps and the lighting devices required in point 11 of Annex I Section B shall be automatically activated simultaneously within 2 seconds of the ambient lighting level dropping below 1000 lux. If the ambient lighting conditions subsequently reach a level of at least 7000 lux, the daytime running lamps shall be automatically reactivated, while the passing-beam headlamps and the lighting devices required in point 11 of Annex I Section B shall be deactivated simultaneously within five to 300 seconds (i.e. fully automatic light switching is required if the driver has no visible indication and stimulus to activate normal lighting when it is dark).

6.14.7. Circuit-closed tell-tale:

 - optional

In Appendix 4 of Annex VI to Directive 2009/67/EC, the following point is added:

5.9. Non-triangular side retro-reflectors

Point 6.5. of Appendix 4 of Annex VI to Directive 2009/67/EC is amended to read as follows:

6.5. Daytime running lamp: yes/no (C^{*})