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Acts whose titles are printed in light type are those relating to day-to-day management of agricultural matters, and are generally valid for a limited period.

The titles of all other acts are printed in bold type and preceded by an asterisk.

II

(Non-legislative acts)

ACTS ADOPTED BY BODIES CREATED BY INTERNATIONAL AGREEMENTS

Regulation No 123 of the Economic Commission for Europe of the United Nations (UN/ECE) — Uniform provisions concerning the approval of adaptive front-lighting systems (AFS) for motor vehicles

Incorporating all valid text up to:

Supplement 4 to the original version of the Regulation — Date of entry into force: 19 August 2010

CONTENTS

A. ADMINISTRATIVE PROVISIONS

0. SCOPE

This Regulation applies to adaptive front-lighting systems (AFS) for motor vehicles of categories M and N [1].

1. DEFINITIONS

For the purpose of this Regulation:

1.1. the definitions given in Regulation No 48 and its series of amendments in force at the time of application for type approval shall apply;

1.2. 'Adaptive front lighting system' (or 'system') means a lighting device, providing beams with differing characteristics for automatic adaptation to varying conditions of use of the dipped-beam (passing beam) and, if it applies, the main-beam (driving-beam) with a minimum functional content as indicated in paragraph 6.1.1; such systems consist of the 'system control', one or more 'supply and operating device(s)', if any, and the 'installation units' of the right and of the left side of the vehicle;

[1] As defined in Annex 7 to the Consolidated Resolution on the Construction of Vehicles (R.E.3), (document TRANS/WP.29/78/Rev.1/Amend.2 as last amended by Amend.4).

1.3. 'Class' of a passing beam (C, V, E or W) means the designation of a passing beam, identified by particular provisions according to this Regulation and Regulation No 48 [1];

1.4. 'Mode' of a front-lighting function provided by a system means a beam within the provisions (see paragraphs 6.2 and 6.3 of this Regulation) either for one of the passing beam classes or for the main beam, designed and specified by the manufacturer for adaptation to dedicated vehicle and ambient conditions;

1.4.1. 'Bending mode' means the designation of a mode of a front-lighting function with its illumination being laterally moved or modified (to obtain an equivalent effect), designed for bends, curves or intersections of the road, and, identified by particular photometric provisions;

1.4.2. 'Category 1 bending mode' means a bending mode with horizontal movement of the kink of the cut-off;

1.4.3. 'Category 2 bending mode' means a bending mode without horizontal movement of the kink of the cut-off;

1.5. 'Lighting unit' means a light emitting part of the system, which may consist of optical, mechanical and electrical components, designed to provide or contribute to the beam of one or more front-lighting function(s) provided by the system;

1.6. 'Installation unit' means an indivisible housing (lamp body) which contains one or more lighting unit(s);

1.7. 'Right side' respectively 'left side' means the combined total of the lighting units intended to be installed to that side of the longitudinal median plane of the vehicle, relative to its forward motion;

1.8. 'System control' means that part(s) of the system receiving the signals from the vehicle and controlling the operation of the lighting units automatically;

1.9. 'Neutral state' means the state of the system when a defined mode of the class C passing beam ('basic passing beam') or of the main beam, if any, is produced, and no AFS control signal applies;

1.10. 'Signal' means any AFS control signal as defined in Regulation No 48 or, any additional control input to the system or, a control output from the system to the vehicle;

1.11. 'Signal generator' means a device, reproducing one or more of the signals for system tests;

1.12. 'Supply and operating device' means one or more components of a system providing power to one or more parts of the system, including such as power and/or voltage control(s) for one or more light sources as e.g. electronic light source control gears;

1.13. 'System reference axis' means the intersection line of the vehicle's longitudinal median plane with the horizontal plane through the centre of reference of one lighting unit specified in the drawings according to paragraph 2.2.1 below;

1.14. 'Lens' means the outermost component of an installation unit, which transmits light through the illuminating surface;

[1] For explanation only. The provisions of the passing beam classes are dedicated to conditions as follows: C for the basic passing beam, V for use in lit areas such as towns, E for use on roads such as motorways, W for use in adverse conditions such as wet road.

1.15. 'Coating' means any product(s) applied in one or more layers to the outer face of a lens;

1.16. Systems of different 'types' means systems which differ in such essential respects as:

1.16.1. the trade name or mark(s);

1.16.2. the inclusion or elimination of components capable of altering optical characteristics/photometric properties of the system;

1.16.3. suitability for right-hand or left-hand traffic or for both traffic systems;

1.16.4. the front-lighting function(s), mode(s) and classes produced;

1.16.5. the materials constituting the lenses and coatings, if any;

1.16.6. the characteristic(s) of the signal(s), specified for the system;

1.17. 'Aiming' means the positioning of the beam or part thereof on an aiming screen according to the relevant criteria;

1.18. 'Adjustment' means the use of the means provided by the system for vertical and/or horizontal aiming of the beam;

1.19. 'Traffic-change function' means any front-lighting function or a mode thereof, or part(s) thereof only, or any combination of these, intended to avoid glare and provide sufficient illumination in case where a vehicle being equipped with a system designed for one traffic direction only is temporarily used in a country with the opposite direction of traffic.

1.20. 'Substitute function' means any specified front-lighting and/or front light-signalling, be it a front-lighting and/or a front light-signalling function, or a mode thereof, or part(s) thereof only, or any combination of it, intended to replace a front-lighting function/mode in case of failure.

1.21. References made in this Regulation to standard (etalon) filament lamp(s) and gas-discharge light source(s) shall refer to Regulations No 37 and No 99 respectively, and to their series of amendments in force at the time of application for type approval.

2. APPLICATION FOR APPROVAL OF A SYSTEM

2.1. The application for approval shall be submitted by the owner of the trade name or mark or by his duly accredited representative.

It shall specify:

2.1.1. the front-lighting functions, which are intended to be provided by the system, for which Approval is sought according to this Regulation;

2.1.1.1. any other front-lighting or front light signalling function(s), provided by any lamp(s) being grouped, combined or reciprocally incorporated to the lighting units of the system, for which Approval is sought; sufficient information for identification of the respective lamp(s) and indication of the regulation(s), according to which they are intended to be (separately) approved;

2.1.2. whether the passing beam is designed for both left-hand and right-hand traffic or for either left-hand or right-hand traffic only;

2.1.3. if the system is equipped with one or more adjustable lighting unit(s):

2.1.3.1. the mounting position(s)of the respective lighting unit(s) in relation to the ground and the longitudinal median plane of the vehicle;

2.1.3.2. the maximum angles above and below the normal position(s) which the device(s) for vertical adjustment can achieve;

2.1.4. the category, as listed in Regulation No 37 or No 99 and their series of amendments in force at the time of the application for type approval, of replaceable and/or non-replaceable filament or gas discharge light source(s) used and/or the light source module specific identification code(s) for LED modules, if available;

2.1.5. if the system is equipped with one or more non-replaceable light source(s):

2.1.5.1. identification of the lighting unit(s) of which said light source(s) is/are a non-replaceable part;

2.1.6. the operation conditions e.g. different input voltages according to the provisions of the Annex 9 to this Regulation, if applicable.

2.2. Every application for approval shall be accompanied by:

2.2.1. drawings in triplicate in sufficient detail to permit identification of the type, showing the position(s) intended for the approval number(s) and the additional symbols in relation to the circle(s) of the approval mark(s), and showing in what geometrical position the lighting units are to be mounted on the vehicle in relation to ground and vehicle longitudinal median plane, and showing each of them in vertical (axial) section and in front elevation, with main details of the optical design including the axis/axes of reference and the point(s) to be taken as centre(s) of reference in the tests and any optical features, of the lens, if applicable and in case of LED module(s) also the space(s) reserved for the specific identification code(s) of the module(s);

2.2.2. a concise technical description of the system specifying:

(a) the lighting function(s) and their modes to be provided by the system ([1]);

(b) the lighting units contributing to each of them ([1]), and the signals ([2]) with the technical characteristics relevant to their operation;

(c) which categories ([1]) of the bending mode requirements apply, if any;

(d) which additional data set(s) of class E passing beam provisions according to Table 6 of Annex 3 to this Regulation apply, if any;

(e) which set(s) of class W passing beam provisions according to Annex 3 to this Regulation apply, if any;

(f) which lighting units ([2]) provide or contribute to one or more passing beam cut-off(s);

(g) the indication(s) ([1]) according to the provisions of paragraph 6.4.6 of this Regulation with respect to the paragraphs 6.22.6.1.2.1 and 6.22.6.1.3 of Regulation No 48;

(h) which lighting units are designed to provide the minimum passing beam illumination according to the paragraph 6.2.9.1 of this Regulation;

([1]) To be indicated in a form conforming to the model of Annex 1.
([2]) To be indicated in a form conforming to the model of Annex 10.

(i) mounting and operation specifications for test purposes;

(j) any other relevant information;

(k) In the case of LED module(s) this shall include:

(i) A brief technical specification of the LED module(s);

(ii) A drawing with dimensions and the basic electrical and photometric values and the objective luminous flux;

(iii) In case of electronic light source control gear, information on the electrical interface necessary for approval testing;

2.2.2.1. the safety concept as laid down in the documentation, which, to the satisfaction of the Technical Service responsible for type approval tests:

(i) describes the measures designed into the system to ensure compliance with the provisions of paragraphs 5.7.3, 5.9 and 6.2.6.4 below; and

(ii) indicates the instructions for their verification according to paragraph 6.2.7. below; and/or

(iii) gives access to the relevant documents demonstrating the system's performance concerning sufficient reliability and safe operation of the measures specified according to the paragraph 2.2.2.1(i) above, e.g. FMEA ('Failure Mode and Effect Analysis'), FTA ('Fault Tree Analysis') or any similar process appropriate to system safety considerations.

2.2.2.2. the make and type of supply and operating device(s), if any and if not being part of an installation unit;

2.2.3. one set of samples of the system, for which approval is sought, including the mounting devices, supply and operating devices, and signal generators if any;

2.2.4. for the test of plastic material of which the lenses are made:

2.2.4.1. fourteen lenses;

2.2.4.1.1. ten of these lenses may be replaced by ten samples of material at least 60 × 80 mm in size, having 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 × 15 mm;

2.2.4.1.2. every such lens or sample of material shall be produced by the method to be used in mass production;

2.2.4.2. a lighting element or optical assembly, if applicable, to which the lenses can be fitted in accordance with the manufacturer's instructions;

2.2.5. For testing the resistance of the light transmitting components made of plastic material against UV radiation of those light source(s) inside the system, which can emit UV radiation as e.g. gas discharge light sources, LED modules, according to paragraph 2.2.4 of Annex 6 to this Regulation:

one sample of each relevant material being used in the system or one system or part(s) thereof, containing these. Each material sample shall have the same appearance and surface treatment, if any, as intended for use in the system to be approved;

2.2.6. the materials making up the lenses and coatings, if any, shall be accompanied by the test report of the characteristics of these materials and coatings if they have already been tested;

2.2.7. in case of a system according to paragraph 4.1.7 below, a vehicle representative of the vehicle(s) indicated according to paragraph 4.1.6 below.

3. MARKINGS

3.1. The installation units of a system submitted for approval shall bear the trade name or mark of the applicant.

3.2. They shall comprise each, on the lenses and on the main bodies, spaces of sufficient size for the approval mark and the additional symbols referred to in paragraph 4; these spaces shall be indicated on the drawings referred to in paragraph 2.2.1 above.

3.2.1. If however the lens cannot be detached from the main body of the installation unit, one marking as per paragraph 4.2.5 shall be sufficient.

3.3. The installation units or systems designed to satisfy the requirements both of right-hand and of left-hand traffic shall bear markings indicating the two settings of the optical element(s) on the vehicle or of the light source(s) on the reflector(s); these markings shall consist of the letters 'R/D' for the position for right-hand traffic and the letters 'L/G' for the position for left-hand traffic.

3.4. In the case of a system designed to meet the requirements set out in paragraph 5.8.2 below by means of, or using additionally, an area on the front lens(es) of the installation unit(s) which can be occulted, this area must be outlined indelibly. This marking is not necessary, however, where the area is clearly apparent.

3.5. In the case of an AFS with LED module(s), the corresponding installation unit(s) shall bear the marking of the rated voltage and rated wattage and the light source module specific identification code.

3.6. LED module(s) submitted along with the approval of the AFS:

3.6.1. Shall bear the trade name or mark of the applicant. This marking shall be clearly legible and indelible;

3.6.2. Shall bear the specific identification code of the module. This marking shall be clearly legible and indelible.

This specific identification code shall comprise the starting letters 'MD' for 'MODULE' followed by the approval marking without the circle as prescribed in paragraph 4.2.1 below and in the case several non-identical light source modules are used, followed by additional symbols or characters. This specific identification code shall be shown in the drawings mentioned in paragraph 2.2.1 above. The approval marking does not have to be the same as the one on the lamp in which the module is used, but both markings shall be from the same applicant.

3.7. If an electronic light source control gear which is not part of a LED module is used to operate a LED module(s), it shall be marked with its specific identification code(s), the rated input voltage and wattage.

4. APPROVAL

4.1. General

4.1.1. If all the samples of a type of a system submitted pursuant to paragraph 2 above satisfy the provisions of this Regulation, approval shall be granted.

4.1.2. Where lamps being grouped, combined or reciprocally incorporated with the system satisfy the requirements of more than one regulation, a single international approval mark may be affixed provided that each of the grouped, combined or reciprocally incorporated lamps satisfies the provisions applicable to it.

4.1.3. An approval number shall be assigned to each type approved. Its first two digits (at present 00) shall indicate the series of amendments incorporating the most recent major technical amendments made to the regulation at the time of issue of the approval. The same Contracting Party may not assign the same number to another type of system covered by this Regulation.

4.1.4. Notice of approval or of extension or refusal or withdrawal of approval or production definitely discontinued of a type of system pursuant to this Regulation shall be communicated to the Parties to the 1958 Agreement applying this Regulation, by means of a form conforming to the model in Annex 1 to this Regulation, with the indications according to paragraph 2.1.3.

4.1.4.1. If the installation unit(s) is/are equipped with an adjustable reflector and if this/these installation unit(s) is/are to be used only in mounting positions according to the indications in paragraph 2.1.3 the applicant shall be obliged by approval to inform the user in a proper way about the correct mounting position(s).

4.1.5. In addition to the mark prescribed in paragraph 3.1, an approval mark as described in paragraphs 4.2 and 4.3 below shall be affixed in the spaces referred to in paragraph 3.2 above to every installation unit of a system conforming to a type approved under this Regulation.

4.1.6. The applicant shall indicate in a form corresponding to the respective model in the Annex 1 to this Regulation, the vehicle(s) for which the system is intended.

4.1.7. If approval is sought for a system which is not intended to be included as part of the approval of a vehicle type according to Regulation No 48,

4.1.7.1. the applicant shall submit sufficient documentation to prove the capability of the system to comply with the provisions of paragraph 6.22 of Regulation No 48 when correctly installed, and

4.1.7.2. the system shall be approved according to Regulation No 10.

4.2. Composition of the approval mark

The approval mark shall consist of:

4.2.1. An international approval marking, comprising:

4.2.1.1. a circle surrounding the letter 'E' followed by the distinguishing number of the country which has granted approval [1];

[1] 1 for Germany, 2 for France, 3 for Italy, 4 for the Netherlands, 5 for Sweden, 6 for Belgium, 7 for Hungary, 8 for the Czech Republic, 9 for Spain, 10 for Serbia, 11 for the United Kingdom, 12 for Austria, 13 for Luxembourg, 14 for Switzerland, 15 (vacant), 16 for Norway, 17 for Finland, 18 for Denmark, 19 for Romania, 20 for Poland, 21 for Portugal, 22 for the Russian Federation, 23 for Greece, 24 for Ireland, 25 for Croatia, 26 for Slovenia, 27 for Slovakia, 28 for Belarus, 29 for Estonia, 30 (vacant), 31 for Bosnia and Herzegovina, 32 for Latvia, 33 (vacant), 34 for Bulgaria, 35 (vacant), 36 for Lithuania, 37 for Turkey, 38 (vacant), 39 for Azerbaijan, 40 for The former Yugoslav Republic of Macedonia, 41 (vacant), 42 for the European Community (Approvals are granted by its Member States using their respective ECE symbol), 43 for Japan, 44 (vacant), 45 for Australia, 46 for Ukraine, 47 for South Africa, 48 for New Zealand, 49 for Cyprus, 50 for Malta, 51 for the Republic of Korea, 52 for Malaysia and 53 for Thailand. Subsequent numbers shall be assigned to other countries in the chronological order in which they ratify or accede to the Agreement Concerning the Adoption of Uniform Technical Prescriptions for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these Prescriptions, and the numbers thus assigned shall be communicated by the Secretary-General of the United Nations to the Contracting Parties to the Agreement.

4.2.1.2. the approval number prescribed in paragraph 4.1.3 above;

4.2.2. the following additional symbol (or symbols):

4.2.2.1. on a system, the letter 'X', and those of the function(s) being provided by the system:

'C' for the class C passing beam, with the addition of symbols for the relevant other classes of passing beam:

'E' for a class E passing beam,

'V' for a class V passing beam,

'W' for a class W passing beam;

'R' for a driving beam;

4.2.2.2. in addition to each symbol and above it a score, if the lighting function or mode thereof is provided by more than one installation unit from one or both side(s);

4.2.2.3. in addition the symbol 'T', after the symbol(s) of all lighting function(s) and/or class(es) designed to comply with the respective bend lighting provisions, with said symbol(s) arranged together and leftmost;

4.2.2.4. on a separate installation unit, the letter 'X', and those of the function(s) being provided by the lighting unit(s) comprised in it;

4.2.2.5. if the installation unit on a given side is not the only contributor to a lighting function or mode of a lighting function it shall bear a score above the symbol of the function;

4.2.2.6. on a system or part thereof meeting left-hand traffic requirements only, a horizontal arrow pointing to the right of an observer facing the installation unit, i.e. to the side of the road on which the traffic moves;

4.2.2.7. on a system or part thereof designed to meet the requirements of both traffic systems e.g. by means of an appropriate adjustment of the setting of the optical element or the light source, a horizontal arrow with a head on each end, the heads pointing respectively to the left and to the right;

4.2.2.8. on an installation unit incorporating a lens of plastic material, the group of letters 'PL' to be affixed near the symbols prescribed in paragraphs 4.2.2.1 to 4.2.2.7 above;

4.2.2.9. on an installation unit contributing to fulfil the requirements of this Regulation in respect of the driving beam, an indication of the maximum luminous intensity expressed by the reference mark, as defined in paragraph 6.3.2.1.3 below, placed near the circle surrounding the letter 'E';

4.2.3. In every case the relevant operating mode used during the test procedure according to paragraph 1.1.1.1 of Annex 4 and the permitted voltage(s) according to paragraph 1.1.1.2 of Annex 4 shall be stipulated on the approval forms and on the communication forms transmitted to the countries which are Contracting Parties to the Agreement and which apply this Regulation.

In the corresponding cases, the system or part(s) thereof shall be marked as follows:

4.2.3.1. on an installation unit meeting the requirements of this Regulation which is so designed that the light source(s) of the passing beam shall not be lit simultaneously with that of any other lighting function with which it may be reciprocally incorporated: an oblique stroke (/) shall be placed after the passing beam symbol(s) in the approval mark.

4.2.3.2. on an installation unit meeting the requirements of Annex 4 to this Regulation only when supplied with a voltage of 6 V or 12 V, a symbol consisting of the number 24 crossed out by an oblique cross (X), shall be placed near the holders of the light source(s).

4.2.4. The two digits of the approval number (at present 00) which indicate the series of amendments incorporating the most recent major technical amendments made to the regulation at the time of issue of the approval and, if necessary, the required arrow may be marked close to the above additional symbols.

4.2.5. The marks and symbols referred to in paragraphs 4.2.1 and 4.2.2 above shall be clearly legible and be indelible. They may be placed on an inner or outer part (transparent or not) of the installation unit which cannot be separated from its light-emitting surface(s). In any case it shall be visible when the installation unit(s) is/are fitted on the vehicle. The displacement of a movable part of the vehicle is permitted to fulfil this requirement.

4.3. Arrangement of the approval mark

4.3.1. Independent lamps

Annex 2, Figures 1 to 10, to this Regulation gives examples of arrangements of the approval mark with the above-mentioned additional symbols.

4.3.2. Grouped, combined or reciprocally incorporated lamps

4.3.2.1. Where lamps being grouped, combined or reciprocally incorporated with the system have been found to comply with the requirements of several regulations, a single international approval mark may be affixed, consisting of a circle surrounding the letter 'E' followed by the distinguishing number of the country which has granted the approval, and an approval number. This approval mark may be located anywhere on the grouped, combined or reciprocally incorporated lamps, provided that:

4.3.2.1.1. it is visible as per paragraph 4.2.5;

4.3.2.1.2. no part of the grouped, combined or reciprocally incorporated lamps that transmit light can be removed without at the same time removing the approval mark.

4.3.2.2. The identification symbol for each lamp appropriate to each regulation under which approval has been granted, together with the corresponding series of amendments incorporating the most recent major technical amendments to the regulation at the time of issue of the approval, and if necessary, the required arrow shall be marked:

4.3.2.2.1. either on the appropriate light-emitting surface,

4.3.2.2.2. or in a group, in such a way that each of the grouped, combined or reciprocally incorporated lamps may be clearly identified (see for possible examples in Annex 2).

4.3.2.3. The size of the components of a single approval mark shall not be less than the minimum size required for the smallest of the individual marks by the regulation under which approval has been granted.

4.3.2.4. An approval number shall be assigned to each type approved. The same Contracting Party may not assign the same number to another type of grouped, combined or reciprocally incorporated lamps covered by this Regulation.

4.3.2.5. Annex 2, Figures 11 and 12, to this Regulation give examples of arrangements of approval marks for grouped, combined or reciprocally incorporated lamps with all the above-mentioned additional symbols, and relating to a system with functions provided by more than one installation unit per side of the vehicle.

4.3.2.6. Annex 2, Figure 13, to this Regulation gives examples of approval marks relating to the complete system.

B. TECHNICAL REQUIREMENTS FOR SYSTEMS OR PART(S) OF A SYSTEM

Unless otherwise specified, photometric measurements shall be carried out according to the provisions set out in the Annex 9 to this Regulation.

5. GENERAL SPECIFICATIONS

5.1. Each sample, when its approval is sought for right-hand traffic only, shall conform to the specifications set forth in paragraphs 6 and 7 below; if however its approval is sought for left-hand traffic, the provisions of paragraph 6 below, including the relevant annexes to this Regulation, apply with the inversion of right to left and vice versa.

Correspondingly, the designation of the angular positions and elements is adjusted by exchanging 'R' for 'L' and vice versa.

5.1.2. Systems or part(s) thereof, shall be so made as to retain their prescribed photometric characteristics and to remain in good working order when in normal use, in spite of the vibrations to which they may be subjected.

5.2. Systems or part(s) thereof, shall be fitted with a device enabling them to be so adjusted on the vehicle as to comply with the rules applicable to them.

5.2.1. Such adjustment device(s) need not be fitted on systems or part(s) thereof, provided that their use is confined to vehicles on which the setting can be adjusted by other means or no such means are needed according to the applicant's system description.

5.3. With the exception of LED modules the system shall not be equipped with light sources that are not approved according to Regulation No 37 or No 99 and their series of amendments in force at the time of application for type approval and/or for which a restriction on the use is made in Regulation No 37;

5.3.1. If a light source is replaceable:

5.3.1.1. Its lamp holder shall conform to the characteristics given on the data sheet of IEC Publication No 60061, as referred to in the relevant light source regulation.

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

5.3.2. If a light source is non-replaceable, it shall not be a part of a lighting unit that provides the passing beam in the neutral state.

5.4. System(s) or part(s) thereof, designed to satisfy the requirements both of right-hand and of left-hand traffic may be adapted for traffic on a given side of the road either by an appropriate initial setting when fitted on the vehicle or by selective setting by the user. In any case, only two different and clearly distinct settings, one for right-hand and one for left-hand traffic, shall be possible, and the design shall preclude inadvertent shifting from one setting to the other or setting in an intermediate state.

5.5. Complementary tests shall be done according to the requirements of Annex 4 of this Regulation to ensure that in use there is no excessive change in photometric performance.

5.6. If the lens of a lighting unit is of plastic material, tests shall be done according to the requirements of Annex 6 to this Regulation.

5.7. On a system or part(s) of, designed to provide alternately the driving beam and the passing beam, any mechanical, electro-mechanical or other device incorporated in the lighting unit(s), for switching from one to the other beam shall be so constructed that:

5.7.1. the device is strong enough to withstand 50 000 operations without suffering damage despite the vibrations to which it may be subjected in normal use;

5.7.2. either the passing beam or the driving beam shall always be obtained, without any possibility of remaining in an intermediate or undefined state; if this is not possible, such a state must be covered by the provisions according to paragraph 5.7.3 below;

5.7.3. in the case of failure it must be possible to obtain automatically a passing beam or a state with respect to the photometric conditions which yields values not exceeding 1,5 lx in the zone III b as defined in Annex 3 to this Regulation and at least 4 lx in a point of 'segment Emax', by such means as e.g. switching off, dimming, aiming downwards, and/or functional substitution;

5.7.4. the user cannot, with ordinary tools, change the shape or position of the moving parts, or influence the switching device.

5.8. Systems shall provide means allowing them to be used temporarily in a territory with the opposite direction of driving than that for which approval is sought, without causing undue dazzle to the oncoming traffic. For these purposes the system(s) or part(s) thereof shall:

5.8.1. be capable of providing a selective setting by the user according to paragraph 5.4 above, without special tools; or

5.8.2. provide means to achieve a traffic-change function, meeting the values shown in the following table when tested according to paragraph 6.2 below with the adjustment left unchanged compared to that for the original traffic direction;

5.8.2.1. Passing beam designed for right-hand traffic and adapted to left-hand traffic:

at 0,86 D-1,72 L at least 3 lux

at 0,57 U-3,43 R not more than 1,0 lux

5.8.2.2. Passing beam designed for left-hand traffic and adapted to right-hand traffic:

at 0,86 D-1,72 R at least 3 lux

at 0,57 U-3,43 L not more than 1,0 lux

5.8.2.3. the occultation of a respective lens area according to paragraph 3.4 above may be such means or part of it.

5.9. The system shall be so made that, if a light source and/or a LED module has failed, a failure signal in order to comply with the relevant provisions of Regulation No 48 shall be provided.

5.10. The component(s) to which a replaceable light source is assembled shall be so made that the light source fits easily and, even in darkness, can be fitted in no position but the correct one.

5.11. In the case of a system according to paragraph 4.1.7 above.

5.11.1. The system shall be accompanied by a copy of the form according to paragraph 4.1.4 above and instructions to enable its installation according to the provisions of Regulation No 48.

5.11.2. The Technical Service responsible for type approval shall verify that:

(a) the system can be correctly installed according to said instructions;

(b) the system, when installed in the vehicle, complies with the provisions of paragraph 6.22 of Regulation No 48;

to confirm compliance with the provisions of paragraph 6.22.7.4 of Regulation No 48 a test drive is mandatory, which comprises any situation relevant to the system control on the basis of the applicant's description. It shall be notified whether all modes are activated, performing and de-activated according to the applicant's description; obvious malfunctioning, if any, to be contested (e.g. angular excess or flicker).

5.12. The AFS, if equipped with LED modules, and the LED module(s) themselves shall comply with the relevant requirements specified in Annex 11 to this Regulation. The compliance with the requirements shall be tested.

5.13. In case of an AFS incorporating light sources and/or LED module(s) producing the basic passing beam and having a total objective luminous flux of the lighting units as indicated under item 9.2.3 of the communication form conforming to the model in Annex 1 which exceeds 2 000 lumen per side a reference shall be made in item 9.2.4 of the communication form in Annex 1. The objective luminous flux of LED module(s) shall be measured as described in paragraph 5 of Annex 11.

5.14. In the case of the basic passing beam in the neutral state being produced exclusively by LED modules, the total objective luminous flux of these LED modules shall be equal or greater than 1 000 lumen per side, when measured as described in paragraph 5 of Annex 11.

6. ILLUMINATION

6.1. General provisions

6.1.1. Each system shall provide a class C passing beam according to paragraph 6.2.5 below and one or more passing beam(s) of additional class(es); it may incorporate one or more additional modes within each class of passing beam and the front-lighting functions according to paragraph 6.3 and/or 2.1.1.1 of this Regulation.

6.1.2. The system shall provide automatic modifications, such that good road illumination is achieved and no discomfort is caused, neither to the driver nor to other road users.

6.1.3. The system shall be considered acceptable if it meets the relevant photometric requirements of paragraphs 6.2 and 6.3.

6.1.4. Photometric measurements shall be performed according to the applicant's description:

6.1.4.1. at neutral state according to paragraph 1.9;

6.1.4.2. at V-signal, W-signal, E-signal, T-signal according to paragraph 1.10, whichever apply;

6.1.4.3. if applicable, at any other signal(s) according to paragraph 1.10 and combinations of them, according to the applicant's specification.

6.2. Provisions concerning passing beam

The system shall, prior to the subsequent test procedures, be set to the neutral state, emitting the class C passing beam.

6.2.1. For each side of the system (vehicle) the passing beam in its neutral state shall produce from at least one lighting unit a 'cut-off' as defined in Annex 8 to this Regulation or,

6.2.1.1. the system shall provide other means, e.g. optical features or temporary auxiliary beams, allowing for unambiguous and correct aiming.

6.2.1.2. Annex 8 does not apply to the traffic-change function as described in paragraph 5.8 through 5.8.2.1 above.

6.2.2 The system or part(s) thereof shall be so aimed that the position of the cut–off complies with the requirements indicated in Table 2 of Annex 3 to this Regulation.

6.2.3. When so aimed, the system or part(s) thereof, if its approval is sought solely for provision of the passing beam, needs to comply with the requirements set out in the relevant paragraphs below; if it is intended to provide additional lighting or light signalling functions according to the scope of this Regulation, it shall comply in addition with the requirements set out in the relevant paragraphs below, if not being adjustable independently.

6.2.4. Where a system or any part(s) thereof so aimed do not meet the requirements as indicated in paragraph 6.2.3 above, its alignment may, according to the instructions of the manufacturer, be changed, within 0,5 deg to the right or left and vertically 0,2 deg up or down, with respect to the initial aiming.

6.2.5. When emitting a specified mode of the passing beam, the system shall meet the requirements in the respective section (C, V, E, W) of part A of Table 1 (photometric values) and in Table 2 (Emax and 'cut-off' positions) of Annex 3 to this Regulation, as well as Section 1 ('cut-off' requirements) of Annex 8 to this Regulation.

6.2.6. A bending mode may be emitted, provided that:

6.2.6.1. the system meets the respective requirements of part B of Table 1 (photometric values) and item 2 of Table 2 ('cut-off' provisions) of Annex 3 to this Regulation, when measured according to the procedure indicated in Annex 9, relevant to the category (either category 1 or category 2) of the bending mode, for which approval is sought;

6.2.6.2. Emax of the illumination does not lie outside of the rectangle extending from the uppermost vertical position specified in Table 2 of Annex 3 to this Regulation for the respective passing beam class, to 2 deg below H-H and from 45 deg left to 45 deg right of the system reference axis;

6.2.6.3. When the T-signal corresponds to the vehicle's smallest turn radius to the left (or right), the sum of the illuminance values provided by all contributors of the right or the left side of the system shall be at least 3 lx at one or more points in the zone extending from H-H to 2 deg below H-H and from 10 to 45 deg left (or right);

6.2.6.4. if approval is sought for a category 1 bending mode, the use of the system is restricted to vehicles where provisions are taken such that the horizontal position of the 'kink' of the 'cut-off' which is provided by the system, complies with the relevant provisions of paragraph 6.22.7.4.5(i) of Regulation No 48;

6.2.6.5. if approval is sought for a category 1 bending mode, the system is designed so that, in the case of a failure affecting the lateral movement or modification of the illumination, it must be possible to obtain automatically either photometric conditions corresponding to paragraph 6.2.5 above or a state with respect to the photometric conditions which yields values not exceeding 1,5 lx in the zone IIIb, as defined in Annex 3 to this Regulation, and at least 4 lx in a point of 'segment Emax';

6.2.6.5.1. however, this is not needed, if for positions relative to the system reference axis up to 5 deg left, at 0,3 deg up from H-H, and greater than 5 deg left, at 0,57 deg up, a value of 1 lx is in no case exceeded.

6.2.7. The system shall be checked on the basis of the relevant instructions of the manufacturer, indicated in the safety concept according to paragraph 2.2.2.1 above.

6.2.8. A system or part(s) thereof, designed to meet the requirements of both right-hand and left-hand traffic must, in each of the two setting positions, according to 5.4 above meet the requirements specified for the corresponding direction of traffic.

6.2.9. The system shall be so made that:

6.2.9.1. any specified passing beam mode provides at least 3 lx at point 50V from each side of the system;

the mode(s) of the Class V passing beam are exempted from this requirement;

6.2.9.2. four seconds after switching on the system, which has not been operated for 30 minutes or more, at least 5 lx must be reached at point 50V of the class C passing beam;

6.2.9.3. other modes:

when signal inputs according to paragraph 6.1.4.3 of this Regulation apply, the requirements of the paragraph 6.2 shall be fulfilled.

6.3. Provisions concerning driving beam

The system shall, prior to the subsequent test procedures, be set to the neutral state.

6.3.1. The lighting unit(s) of the system shall be adjusted, according to the instructions of the manufacturer, such that the area of maximum illumination is centred on the point (HV) of intersection of the lines H-H and V-V;

6.3.1.1. any lighting unit(s) which is/are not independently adjustable, or, for which the aiming was done with respect to any measurements under paragraph 6.2, shall be tested in its/their unchanged position.

6.3.2. When measured according to the provisions laid down in Annex 9 to this Regulation the illumination shall meet the following requirements.

6.3.2.1. HV shall be situated within the isolux 80 per cent of maximum illumination of the driving beam.

6.3.2.1.1. This maximum value (E_M) shall not be less than 48 lx. The maximum value shall in no circumstances exceed 240 lx;

6.3.2.1.2. The maximum intensity (I_M) of each installation unit providing or contributing to the maximum intensity of the driving beam, expressed in thousands of candelas shall be calculated by the formula:

$$I_M = 0{,}625\ E_M$$

6.3.2.1.3. The reference mark (I'_M) of this maximum intensity, referred to in paragraph 4.2.2.9 above, shall be obtained by the ratio:

$$I'_M = \frac{I_M}{3} = 0{,}208\ E_M$$

This value shall be rounded off to the value of: 5 - 10 - 12,5 - 17,5 - 20 - 25 - 27,5 - 30 - 37,5 - 40 - 45 - 50.

6.3.2.2. Starting from point HV, horizontally to the right and left, the illumination of the driving beam shall be not less than 24 lx up to 2,6 deg and not less than 6 lx up to 5,2 deg.

6.3.3. The illumination or part thereof emitted by the system may be automatically laterally moved (or modified to obtain an equivalent effect), provided that:

6.3.3.1. the system meets the requirements of the paragraphs 6.3.2.1.1 and 6.3.2.2 above with each lighting unit measured according to the relevant procedure indicated in Annex 9.

6.3.4. The system shall be so made that:

6.3.4.1. the lighting unit(s) of the right side and of the left side provide each at least half of the minimum illumination value of the driving beam as specified by the paragraph 6.3.2.2 above:

6.3.4.2. four seconds after switching on the system, which has not been operated for 30 minutes or more, at least 42 lx must be reached at point HV of the driving beam;

6.3.4.3. When signal inputs according to paragraph 6.1.4.3 of this Regulation apply, the requirements of the paragraph 6.3 shall be fulfilled.

6.3.5. If the specified beam requirements are not met, a reaiming of the beam position within 0,5 deg up or down and/or 1 deg to the right or left, with respect to its initial aiming is allowed; in the revised position all photometric requirements shall be met. These provisions do not apply to lighting units as indicated under paragraph 6.3.1.1 of this Regulation.

6.4. Other provisions

In the case of a system or part(s) thereof with adjustable lighting units the requirements of paragraphs 6.2 (passing beam), and 6.3 (driving beam) are applicable for each mounting position indicated according to paragraph 2.1.3 (adjustment range). For verification the following procedure shall be used:

6.4.1. Each applied position is realised on the test goniometer with respect to a line joining the centre of reference and point HV on an aiming screen. The adjustable system or part(s) thereof is then moved into such a position that the light pattern on the screen corresponds to the relevant aiming prescriptions;

6.4.2. with the system or part(s) thereof initially fixed according to paragraph 6.4.1, the device or part(s) thereof must meet the relevant photometric requirements of paragraphs 6.2 and 6.3;

6.4.3. additional tests shall be made after the reflector/system or part(s) thereof has been moved vertically ± 2 deg or at least into the maximum position if less than 2 deg, from its initial position by means of the system or part(s) thereof adjusting device. Having reaimed the system or part(s) thereof as a whole (by means of the goniometer for example) in the corresponding opposite direction the light output in the following directions shall be controlled and lie within the required limits:

6.4.3.1. passing beam: points HV and 75R, or 50R if applicable; driving beam: I_M and point HV (percentage of I_M);

6.4.4. if the applicant has indicated more than one mounting position, the procedure of paragraphs 6.4.1 to 6.4.3 shall be repeated for all other positions;

6.4.5. if the applicant has not asked for special mounting positions, the system or part(s) thereof shall be aimed for measurements of paragraphs 6.2 (passing beam) and 6.3 (driving beam) with the relevant adjusting device(s) of the system or part(s) thereof in its mean position. The additional test of paragraph 6.4.3 shall be made with the system or part(s) thereof, moved into its extreme positions (instead of ± 2 deg) by means of the relevant adjusting device(s).

6.4.6. It shall be stated by means of a form conforming to the model in Annex 1 to this Regulation, which lighting unit(s) provide a 'cut-off' as defined in Annex 8 to this Regulation, that projects into a zone extending from 6 deg left to 4 deg right and upwards from a horizontal line positioned at 0,8 deg down.

6.4.7. It shall be stated by means of a form conforming to the model in Annex 1 to this Regulation, which class E passing beam mode(s), if any, comply with a 'data set' of Table 6 of Annex 3 to this Regulation.

7. COLOUR

7.1. The colour of the light emitted shall be white.

C. FURTHER ADMINISTRATIVE PROVISIONS

8. MODIFICATION OF THE SYSTEM TYPE AND EXTENSION OF APPROVAL

8.1. Every modification of the system type shall be notified to the administrative department which approved the system type. The said department may then either:

8.1.1. Consider that the modifications made are unlikely to have appreciable adverse effects and that in any event the system still complies with the requirements; or

8.1.2. Require a further test report from the Technical Service responsible for conducting the tests.

8.2. Confirmation or refusal of approval, specifying the alterations, shall be communicated by the procedure specified in paragraph 4.1.4 above to the Contracting Parties to the Agreement which apply this Regulation.

8.3. The competent authority issuing the extension of approval shall assign a series number to each communication form drawn up for such an extension and inform thereof the other Parties to the 1958 Agreement applying this Regulation by means of a communication form conforming to the model in Annex 1 to this Regulation.

9. CONFORMITY OF PRODUCTION

The conformity of production procedures shall comply with those set out in the Agreement, Appendix 2 (E/ECE/324-E/ECE/TRANS/505/Rev.2) with the following requirements:

9.1. a system approved under this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements set forth in paragraphs 6 and 7;

9.2. the minimum requirements for conformity of production control procedures set fourth in Annex 5 to this Regulation shall be complied with;

9.3. the minimum requirements for sampling by an inspector set forth in Annex 7 to this Regulation shall be complied with;

9.4. the authority which has granted type approval may at any time verify the conformity control methods applied in each production facility. The normal frequency of these verifications shall be once every two years;

9.5. systems or part(s) thereof with apparent defects are disregarded;

9.6. the reference mark is disregarded.

10. PENALTIES FOR NON-CONFORMITY OF PRODUCTION

10.1. The approval granted in respect of a type of system pursuant to this Regulation may be withdrawn if the requirements are not complied with or if a system or part(s) thereof bearing the approval mark does not conform to the type approved.

10.2. If a Contracting Party to the Agreement applying this Regulation withdraws an approval it has previously granted, it shall forthwith so notify the other Contracting Parties applying this Regulation by means of a communication form conforming to the model in Annex 1 to this Regulation.

11. PRODUCTION DEFINITELY DISCONTINUED

11.1. If the holder of the approval completely ceases to manufacture a type of system approved in accordance with this Regulation, he shall so inform the authority, which granted the approval. Upon receiving the relevant communication, that authority shall inform thereof the other Contracting Parties to the 1958 Agreement applying this Regulation by means of a communication form conforming to the model in Annex 1 to this Regulation.

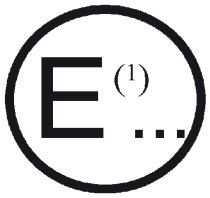
12. NAMES AND ADDRESSES OF TECHNICAL SERVICES RESPONSIBLE FOR CONDUCTING APPROVAL TESTS, AND OF ADMINISTRATIVE DEPARTMENTS

12.1. The Contracting Parties to the 1958 Agreement applying this Regulation shall communicate to the United Nations Secretariat the names and addresses of the Technical Services responsible for conducting approval tests and of the administrative departments which grant approval and to which forms certifying approval or extension or refusal or withdrawal of approval, or production definitely discontinued, issued in other countries, are to be sent.

ANNEX 1

COMMUNICATION

(maximum format: A4 (210 × 297 mm))



issued by: Name of administration:

.....

.....

.....

concerning (2): APPROVAL GRANTED
APPROVAL EXTENDED
APPROVAL REFUSED
APPROVAL WITHDRAWN
PRODUCTION DEFINITELY DISCONTINUED

of a type of system pursuant to Regulation No 123

Approval No ..... Extension No .....

1. Trade name or mark of the system: .....

2. Manufacturer's name for the type of system: .....

3. Manufacturer's name and address: .....

4. If applicable, name and address of manufacturer's representative: .....

.....

5. Submitted for approval on: .....

6. Technical Service responsible for conducting approval tests: .....

.....

7. Date of report issued by that service: .....

8. Number of report issued by that service: .....

9. Brief description:

9.1. Category as described by the relevant marking (3) .....

9.2. Number and category(ies) of replaceable light sources: .....

9.2.1. Number and specific identification code(s) of LED module, if applicable

9.2.2. Number and specific identification code(s) of electronic light source control gear(s), if applicable

9.2.3. Total objective luminous flux as described in paragraph 5.13 exceeds 2 000 lumen: yes/no (4)

9.3. Indications according to paragraph 6.4.6 of this Regulation (which lighting unit(s) provide a 'cut-off' as defined in Annex 8 to this Regulation, that projects into a zone extending from 6 deg left to 4 deg right and upwards from a horizontal line positioned at 0,8 deg down) .....

9.4. The vehicle(s) for which the system is intended as original equipment .....

9.5. Whether approval is sought for a system which is not intended to be included as part of the approval of a vehicle type according to Regulation No 48 ..... yes/no (4)

9.5.1. if in the affirmative: information sufficient to identify the vehicle(s) for which the system is intended .....
.....

9.6. Indications according to paragraph 6.4.7 of this Regulation (which class E passing beam mode(s), if any, comply with a 'data set' of Table 6 of Annex 3 to this Regulation) .....

9.7. Whether approval is sought for a system intended to be installed on vehicles only, which provide means for a stabilisation/limitation of the system's supply ..... yes/no [4]

10. Approval mark(s) position(s): .....

11. Reason(s) for extension of approval: .....

12. Approval granted/extended/refused/withdrawn [4] .....

13. Place: .....

14. Date: .....

15. Signature: .....

16. The list of documents deposited with the Administrative Service, which has granted approval is annexed to this communication and may be obtained on request .....

17. The system is designed to provide passing beams of [5]:

17.1. Class C Class V Class E Class W

17.2. with the following mode(s), identified by the designation(s), if it applies [7]

Mode no C 1	Mode no V ...	Mode no E ...	Mode no W ...
Mode no C ...	Mode no V ...	Mode no E ...	Mode no W ...
Mode no C ...	Mode no V ...	Mode no E ...	Mode no W ...

17.3. where the lighting units, indicated below are energised [5], [6], [7] for the mode No ...

(a) if no bend lighting applies:

left side	No 1 ☐	No 3 ☐	No 5 ☐	No 7 ☐	No 9 ☐	No 11 ☐
right side	No 2 ☐	No 4 ☐	No 6 ☐	No 8 ☐	No 10 ☐	No 12 ☐

(b) if bend lighting of category 1 applies:

l.s.	No 1 ☐	No 3 ☐	No 5 ☐	No 7 ☐	No 9 ☐	No 11 ☐
r.s.	No 2 ☐	No 4 ☐	No 6 ☐	No 8 ☐	No 10 ☐	No 12 ☐

(c) if bend lighting of category 2 applies:

l.s.	No 1 ☐	No 3 ☐	No 5 ☐	No 7 ☐	No 9 ☐	No 11 ☐
r.s.	No 2 ☐	No 4 ☐	No 6 ☐	No 8 ☐	No 10 ☐	No 12 ☐

Note: Indications according to paragraph 17.3(a) through 17.3(c) above are needed additionally for each further mode.

17.4. The lighting units marked below are energised, when the system is in its neutral state [5], [6]

l.s.	No 1 ☐	No 3 ☐	No 5 ☐	No 7 ☐	No 9 ☐	No 11 ☐
r.s.	No 2 ☐	No 4 ☐	No 6 ☐	No 8 ☐	No 10 ☐	No 12 ☐

17.5. The lighting units marked below are energised, when the system is in its traffic change function ([5]), ([6]), ([7])

(a) if no bend lighting applies:

l.s.	No 1 ☐	No 3 ☐	No 5 ☐	No 7 ☐	No 9 ☐	No 11 ☐
r.s.	No 2 ☐	No 4 ☐	No 6 ☐	No 8 ☐	No 10 ☐	No 12 ☐

(b) if bend lighting of category 1 applies:

l.s.	No 1 ☐	No 3 ☐	No 5 ☐	No 7 ☐	No 9 ☐	No 11 ☐
r.s.	No 2 ☐	No 4 ☐	No 6 ☐	No 8 ☐	No 10 ☐	No 12 ☐

(c) if bend lighting of category 2 applies:

l.s.	No 1 ☐	No 3 ☐	No 5 ☐	No 7 ☐	No 9 ☐	No 11 ☐
r.s.	No 2 ☐	No 4 ☐	No 6 ☐	No 8 ☐	No 10 ☐	No 12 ☐

18. The system is designed to provide a main beam ([5]), ([6]), ([7]):

18.1. yes ☐ no ☐

18.2. with the following mode(s), identified by the designation(s), if it applies:

main beam mode No M_1

main beam mode No M …

main beam mode No M …

18.3. where the lighting units marked below are energised, for mode No …

(a) if no bend lighting applies:

l.s.	No 1 ☐	No 3 ☐	No 5 ☐	No 7 ☐	No 9 ☐	No 11 ☐
r.s.	No 2 ☐	No 4 ☐	No 6 ☐	No 8 ☐	No 10 ☐	No 12 ☐

(b) if bend lighting applies:

l.s.	No 1 ☐	No 3 ☐	No 5 ☐	No 7 ☐	No 9 ☐	No 11 ☐
r.s.	No 2 ☐	No 4 ☐	No 6 ☐	No 8 ☐	No 10 ☐	No 12 ☐

Note: Indications according to paragraph 18.3(a) and 18.3(b) above are needed additionally for each further mode.

18.4. The lighting units marked below are energised, when the system is in its neutral state ([5]), ([6])

l.s.	No 1 ☐	No 3 ☐	No 5 ☐	No 7 ☐	No 9 ☐	No 11 ☐
r.s.	No 2 ☐	No 4 ☐	No 6 ☐	No 8 ☐	No 10 ☐	No 12 ☐

([1]) Distinguishing number of the country which has granted/extended/refused/withdrawn approval (see the provisions of the regulation concerning approval).
([2]) Strike out what does not apply.
([3]) Indicate the appropriate marking as foreseen according to this Regulation for each installation unit or assembly of installation units.
([4]) Strike out what does not apply.
([5]) Mark with an X where applicable.
([6]) To be extended if more units are provided.
([7]) To be continued if more modes are provided.

ANNEX 2

EXAMPLES OF ARRANGEMENTS OF APPROVAL MARKS

Example 1

a ≥ 8 mm (glass lens)

a ≥ 5 mm (plastic lens)

Figure 1

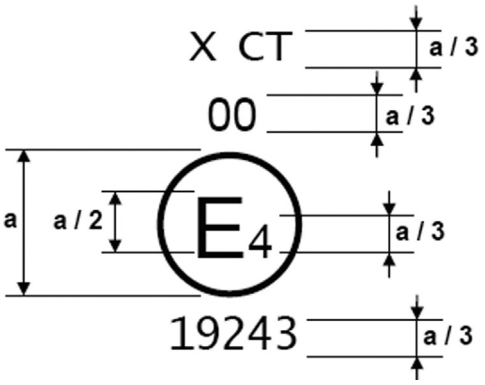
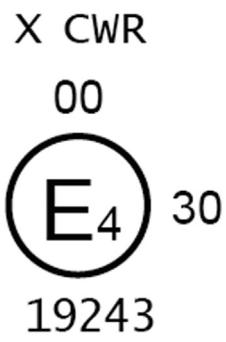


Figure 2



The installation unit of a system, bearing one of the above approval marks has been approved in the Netherlands (E4) pursuant to this Regulation under Approval Number 19243, meeting the requirements of this Regulation in its original form (00). The passing beam is designed for right-hand traffic only. The letters 'CT' (Figure 1) indicate that it concerns a passing beam with bending mode and the letters 'CWR' (Figure 2) indicate that it concerns a class C passing beam and a class W passing beam and a driving beam.

Number 30 indicates that the maximum luminous intensity of the driving beam is between 86 250 and 101 250 candelas.

Note: The approval number and additional symbols shall be placed close to the circle surrounding the letter 'E' and either above or below that letter 'E', or to the right or left of that letter. The digits of the approval number shall be on the same side of that letter 'E' and face in the same direction.

The use of Roman numerals as approval numbers should be avoided so as to prevent any confusion with other symbols.

Example 2

Figure 3

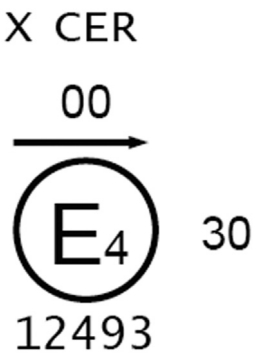


Figure 4a

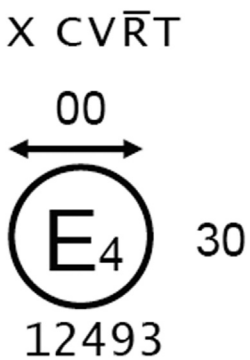
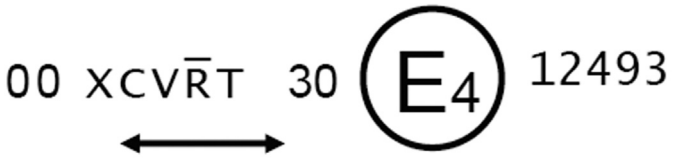


Figure 4b



The installation unit of a system, bearing the above approval mark, meets the requirements of this Regulation in respect of both the passing beam and the driving beam and is designed:

Figure 3: class C passing beam with class E passing beam for left-hand traffic only.

Figures 4a and 4b: class C passing beam with class V passing beam for both traffic systems by means of an appropriate adjustment of the setting of the optical element or the light source on the vehicle, and a driving beam. Class C passing beam, class V passing beam and driving beam comply with bending lighting provisions, as indicated by the letter 'T'. The score above 'R' indicates that the driving beam function is provided by more than one installation unit on that side of the system.

Example 3

Figure 5

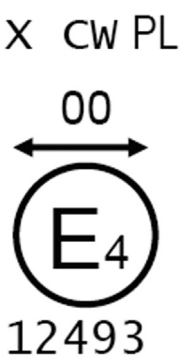
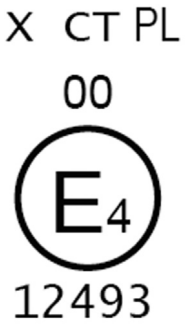


Figure 6



The installation unit, bearing the above approval mark is incorporating a lens of plastic material and meeting the requirements of this Regulation in respect of the passing beam only and is designed:

Figure 5: class C passing beam and class W passing beam for both traffic systems.

Figure 6: class C passing beam with bending mode for right-hand traffic only.

Example 4

Figure 7

Figure 8

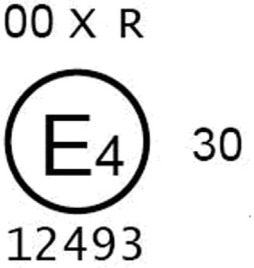


Figure 7: the installation unit, bearing this approval mark is meeting the requirements of this Regulation in respect of the class C passing beam with class V passing beam and designed for left-hand traffic only.

Figure 8: the installation unit, bearing this approval mark is a (separate) installation unit of a system, meeting the requirements of this Regulation in respect of the driving beam only.

Example 5

Identification of an installation unit incorporating a lens of plastic material meeting the requirements of this Regulation

Figure 9

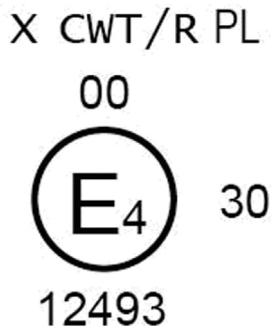


Figure 10

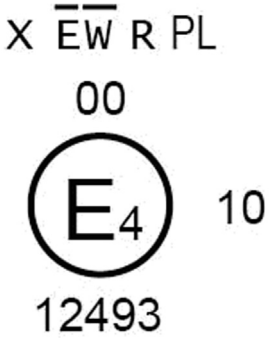


Figure 9: in respect to the class C passing beam, the class W passing beam both with bending modes and a driving beam, and designed for right-hand traffic only.

The passing beam and its modes shall not be operated simultaneously with the driving beam in and/or another reciprocally incorporated headlamp.

Figure 10: in respect to the class E passing beam, the class W passing beam, designed for right-hand traffic only and a driving beam. The score above 'E' and 'W' indicates that these passing beam classes are provided on that side of the system by more than this installation unit.

Example 6

Simplified marking for grouped, combined or reciprocally incorporated lamps, when approved according to other than this Regulation, (Figure 11) (The vertical and horizontal lines schematise the shape of the light-signalling device. They are not part of the approval mark).

These two examples correspond to two installation units on one side of a system, bearing an approval mark comprising (Model A and B):

Installation unit 1

A front position lamp approved in accordance with the 02 series of amendments to Regulation No 7;

One or more lighting unit(s), with a class C passing beam with bending mode provided to work with one or more other installation unit(s) on the same side of the system (as indicated by the score above 'C') and a class V passing beam, both designed for right- and left-hand traffic and a driving beam with a maximum intensity comprised between 86 250 and 101 250 candelas (as indicated by the number 30), approved in accordance with the requirements of this Regulation in its original form (00) and incorporating a lens of plastic material;

A daytime running light approved in accordance with the 00 series of amendments to Regulation No 87;

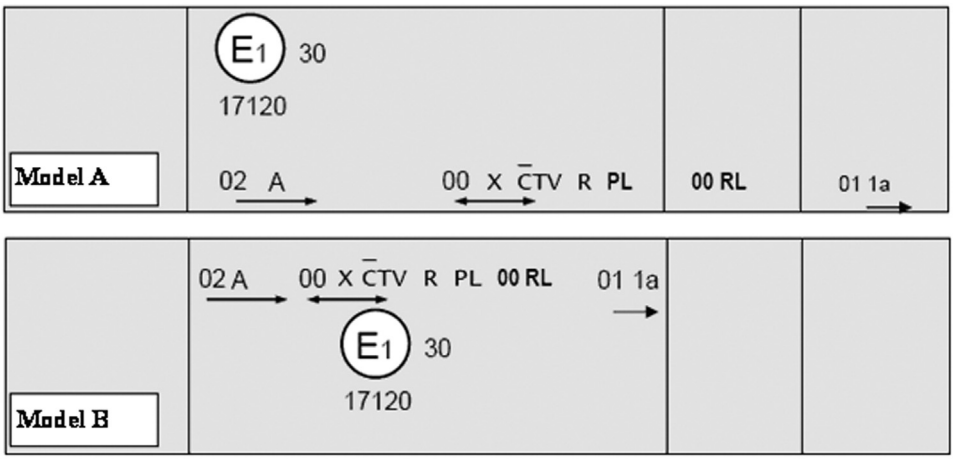
A front direction indicator lamp of category 1a approved in accordance with the 01 series of amendments to Regulation No 6.

Installation unit 3

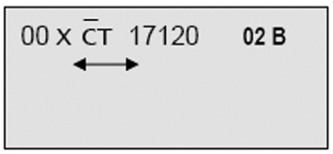
A front fog lamp approved in accordance with the 02 series of amendments to Regulation No 19, or a class C passing beam with bending mode, designed for right- and left-hand traffic, provided to work with one or more other installation unit(s) on that side of the system, as indicated by the score above 'C'.

Installation unit 1 of the system

Figure 11



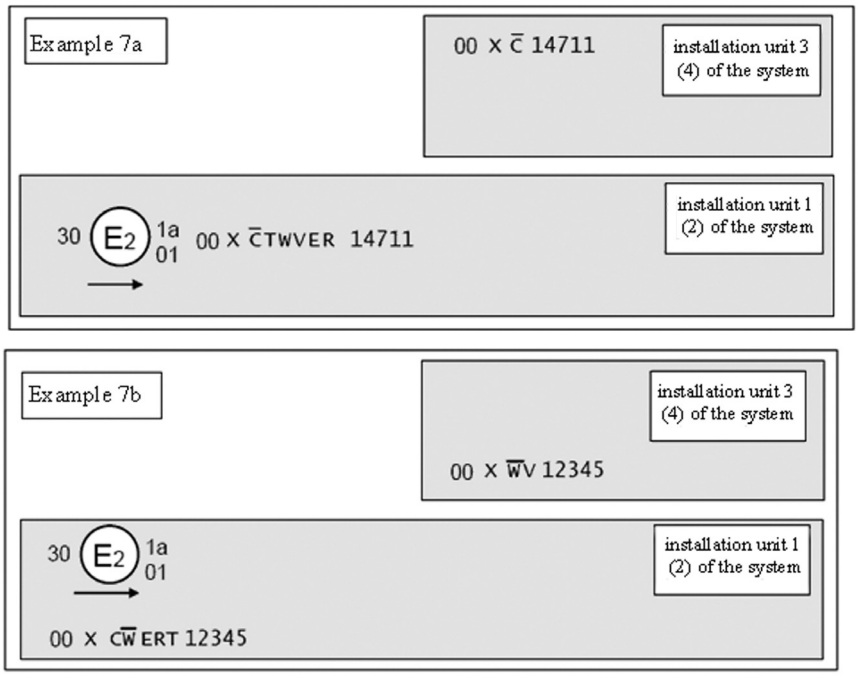
Installation unit 3 of the system



Example 7

Arrangement of approval marks relative to a system (Figure 12)

Figure 12



These two examples correspond to an adaptive front-lighting system composed of two installation units (providing the same functions) per side of the system (units 1 and 3 for the left side, and units 2 and 4 for the right side).

The installation unit 1 (or 2) of the system bearing the above approval marks meeting the requirements of this Regulation (00 series of amendments) in respect of both a class C passing beam for left-hand traffic and a driving beam with a maximum luminous intensity comprised between 86 250 and 101 250 candelas (indicated by the number 30), grouped with a front direction indicator lamp of category 1a, approved in accordance with the 01 series of amendments to Regulation No 6.

In example 7a: the installation unit 1 (or 2) of the system comprises a class C passing beam with bending mode, a class W passing beam, a class V passing beam and a class E passing beam. The score above 'C' indicates that the class C passing beam is provided by two installation units on that side of the system.

The installation unit 3 (or 4) is designed to provide a second part of the class C passing beam on that side of the system as indicated by the score above 'C'.

In example 7b: the installation unit 1 (or 2) of the system is designed to provide a class C passing beam, a class W passing beam and a class E passing beam. The score above 'W' indicates that the class W passing beam is provided by two installation units on that side of the system. The letter 'T' to the right, following the listed symbols (and left of the approval number) indicates that each, the class C passing beam, the class W passing beam, the class E passing beam, and the driving beam are providing a bending mode.

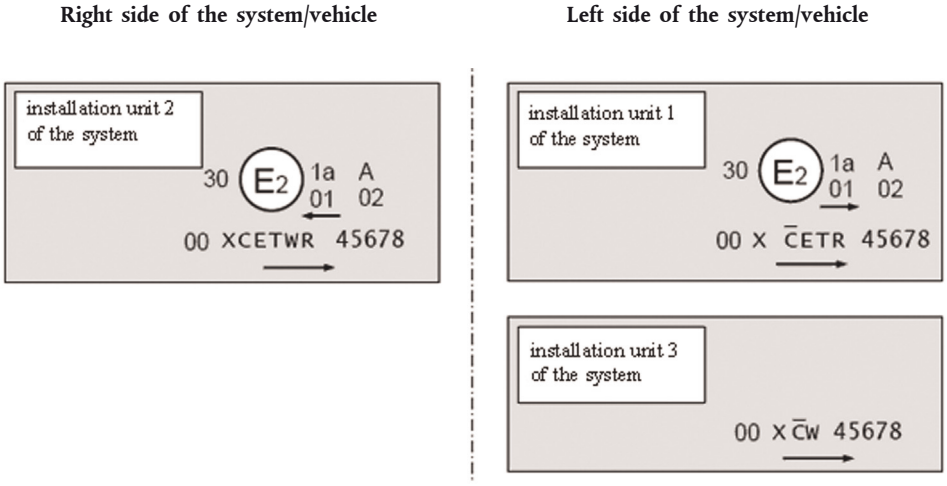
The installation unit 3 (or 4) of the system is designed to provide the second part of the class W passing beam on that side of the system (as indicated by the score above 'W'), and the class V passing beam.

Example 8

Arrangement of approval marks relative to both sides of a system (Figure 13)

This example corresponds to an adaptive front-lighting system composed of two installation units for the left side of the vehicle and one installation unit for the right side.

Figure 13



The system bearing the above approval marks meets the requirements of this Regulation (00 series of amendments) in respect of both a passing beam for left-hand traffic and a driving beam with a maximum intensity comprised between 86 250 and 101 250 candelas (as indicated by the number 30) grouped with a front direction indicator lamp of category 1a, approved in accordance with the 01 series of amendments to Regulation No 6 and a front position lamp approved in accordance with the 02 series of amendments to Regulation No 7.

The installation unit 1 of the system (left side) is designed to contribute to the class C passing beam and the class E passing beam. The score above 'C' indicates that on that side more than one installation unit contributes to the class C passing beam. The letter 'T' to the right following the listed symbols indicates that each, the class C passing beam and the class E passing beam are providing a bending mode.

The installation unit 3 of the system (left side) is designed to provide the second part of the class C passing beam of that side (as indicated by the score above 'C') and a class W passing beam.

The installation unit 2 of the system (right side) is designed to contribute to the class C passing beam, a class E passing beam, both with bending mode and a class W passing beam.

Note: In the above examples No 6, No 7 and No 8 the different installation units of the system shall bear the same approval number.

Figure 14

The LED module bearing the light source module identification code shown above has been approved together with an AFS initially approved in Italy (E3) under Approval Number 17325.

ANNEX 3

PASSING BEAM PHOTOMETRIC REQUIREMENTS (*)

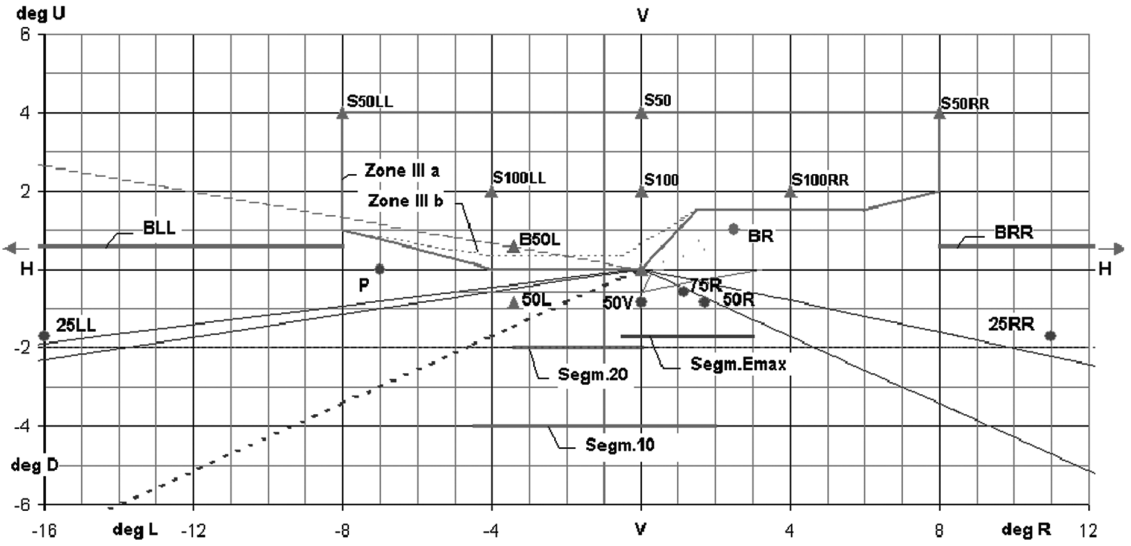
For the purpose of this Annex:

'above it' means vertically above, only; 'below it' means vertically below, only.

Angular positions are expressed in deg up (U) or down (D) from H-H respectively right (R) or left (L) from V-V.

Figure 1

Angular positions of passing beam photometric requirements (indicated for right-hand traffic)



(*) Note: measurement procedure prescribed in Annex 9 to this Regulation.

Table 1

Passing beam photometric requirements

tabled requirements expressed in lux at 25m		Position/deg			passing beam							
		horizontal		vertical	class C		class V		class E		class W	
No	Element	at/from	to	at	min	max	min	max	min	max	min	max
Part A												
1	B50L (4)	L 3,43		U 0,57		0,4		0,4		0,7 (8)		0,7
2	HV (4)	V		H		0,7		0,7				
3	BR (4)	R 2,5		U 1	0,2	2	0,1	1	0,2	2	0,2	3
4	Segment BRR (4)	R 8	R 20	U 0,57		4		1		4		6
5	Segment BLL (4)	L 8	L 20	U 0,57		0,7		1		1		1
6	P	L 7		H	0,1						0,1	
7	Zone III (as specified by Table 3 of this Annex)					0,7		0,7		1		1
8a	S50, S50LL, S50RR (5)			U 4	0,1 (7)				0,1 (7)		0,1 (7)	
9a	S100, S100LL, S100RR (5)			U 2	0,2 (7)				0,2 (7)		0,2 (7)	
10	50 R	R 1,72		D 0,86			6					
11	75 R	R 1,15		D 0,57	12				18		24	
12	50 V	V		D 0,86	6		6		12		12	
13	50 L	L 3,43		D 0,86	4,2	15 (9)	4,2	15 (9)	8		8	30 (9)
14	25 LL	L 16		D 1,72	1,4		1		1,4		4	
15	25 RR	R 11		D 1,72	1,4		1		1,4		4	
16	Segment 20 and below it	L 3,5	V	D 2								20 (2)
17	Segment 10 and below it	L 4,5	R 2,0	D 4		14 (1)		14 (1)		14 (1)		8 (2)
18	E_{max} (3)				20	50	10	50	20	90 (8)	35	80 (2)
Part B (bending modes): Part A applies, however with the lines Nos. 1, 2, 7, 13 and 18 being replaced by those listed hereunder												
1	B50L (4)	L 3,43		U 0,57		0,6		0,6				0,9
2	HV (4)					1		1				
7	Zone III (as specified by Table 3 of this Annex)					1		1		1		1
13	50L	L 3,43		D 0,86	2		2		4		4	
18	E_{max} (6)				12	50	6	50	12	90 (8)	24	80 (2)

(1) max 18 lx, if the system is designed to provide also a class W passing beam.
(2) requirements according to the provisions indicated in Table 4 below apply in addition
(3) Position requirements according to the provisions of Table 2 below ('Segment E_{max}').
(4) the contribution of each side of the system, when measured according to the provisions of Annex 9 to this Regulation shall not be less than 0,1 lx.
(5) Position requirements according to the provisions of Table 5 below.
(6) Position requirements as indicated in paragraph 6.2.6.2 of this Regulation
(7) One pair of position lamps, being incorporated with the system or being intended to be installed together with the system may be activated according to the indications of the applicant.
(8) Requirements according to the provisions indicated in Table 6 below apply in addition.
(9) The max. value may be multiplied by 1,4, if it is guaranteed according to the manufacturer's description that this value will not be exceeded in use, either by means of the system or, if the system's use is confined to vehicles, providing a corresponding stabilisation/limitation of the system's supply, as indicated in the communication form.

Table 2

Passing beam elements angular position/extend, additional requirements

	angular position/extend in deg	Class C passing beam		Class V passing beam		Class E passing beam		Class W passing beam	
No	beam part designation and requirement	horizontal	vertical	horizontal	vertical	horizontal	vertical	horizontal	vertical
2.1.	E_{max} shall not be positioned outside of the rectangle extending (above 'segment E_{max}')	0,5 L to 3 R	0,3 D to 1,72 D		0,3 D to 1,72 D	0,5 L to 3 R	0,1 D to 1,72 D	0,5 L to 3 R	0,3 D to 1,72 D
2.2.	the 'cut-off' and part(s) of shall: — comply with the requirements of paragraph 1 of Annex 8 to this Regulation and be positioned with its 'kink' at V-V and								
	— be positioned with its 'flat horizontal part'		at V = 0,57 D		not above 0,57 D not below 1,3 D		not above 0,23 D (*) not below 0,57 D		not above 0,23 D not below 0,57 D

(*) Requirements according to the provisions indicated in Table 6 below apply in addition.

Table 3

Passing beam zones III, defining corner points

Angular Position in Deg	Corner Point No	1	2	3	4	5	6	7	8
Zone III a for class C or class V Passing Beam	horizontal	8 L	8 L	8 R	8 R	6 R	1,5 R	V-V	4 L
	vertical	1 U	4 U	4 U	2 U	1,5 U	1,5 U	H-H	H-H
Zone III b for class W or class E Passing Beam	horizontal	8 L	8 L	8 R	8 R	6 R	1,5 R	0,5 L	4 L
	vertical	1 U	4 U	4 U	2 U	1,5 U	1,5 U	0,34 U	0,34 U

Table 4

Additional provisions for class W passing beam, expressed in lx at 25m

4.1.	Definition and Requirements for Segments E, F1, F2, and F3 (not shown in Fig. 1 above)
	Not more than 0,2 lx are allowed: a) on a segment E extending at U 10 deg from L 20 to R 20 deg and (b) on three vertical segments F1, F2 and F3 at horizontal positions L10 deg, V and R 10 deg, each extending from U 10 to U 60 deg.
4.2.	Alternative/Additional Set of Requirements for E_{max}, segment 20 and segment 10: Table 1 Part A or B applies, however with the max requirements in lines No 16, 17 and 18 being replaced by those indicated hereunder
	If, according to the applicants specification according to paragraph 2.2.2(e) of this Regulation a class W passing beam is designed to produce on segment 20 and below it not more than 10 lx and on segment 10 and below it not more than 4 lx, the design value for E_{max} of that beam shall not exceed 100 lx

Table 5

Overhead sign requirements, angular position of measurement points

Point Designation	S50LL	S50	S50RR	S100LL	S100	S100RR
Angular Position in Deg	4 U/8 L	4 U/V-V	4 U/8 R	2 U/4 L	2 U/V-V	2 U/4 R

Table 6

Additional provisions for class E passing beam

Table 1 Part A or B and Table 2 above apply, however with the lines No 1 and 18 of Table 1 and item 2.2 of Table 2 being replaced as indicated hereunder

Item	Designation	Line 1 of Table 1 above, Part A or B	Line 18 of Table 1 above, Part A or B	Item 2.2 of Table 2 above
No	Data Set	EB50L in lx at 25m	Emax in lx at 25m	cut-off flat part aimed in deg
		max	max	not above
6.1.	E1	0,6	80	0,34 D
6.2.	E2	0,5	70	0,45 D
6.3.	E3	0,4	60	0,57 D

Appendix to Table 1

For information only: Passing beam photometric values of Table 1 above, expressed in candelas

tabled requirements expressed in cd		Position/deg			passing beam							
		horizontal		vertical	class C		class V		class E		class W	
No	Element	at/from	to	at	min	max	min	max	min	max	min	max
Part A												
1	B50L (4)	L 3,43		U 0,57		250		250		438 (8)		438
2	HV (4)	V		H		438		438				
3	BR (4)	R 2,5		U 1	125	1 250	63	625	125	1 250	125	1 875
4	Segment BRR (4)	R 8	R 20	U 0,57		2 500		625		2 500		3 750
5	Segment BLL (4)	L 8	L 20	U 0,57		438		625		625		625
6	P	L 7		H	63						63	
7	Zone III (as specified by Table 3 of this Annex)					438		438		625		625
8a	S50, S50LL, S50RR (5)			U 4	63 (7)				63 (7)		63 (7)	
9a	S100, S100LL, S100RR (5)			U 2	125 (7)				125 (7)		125 (7)	
10	50 R	R 1,72		D 0,86			3 750					
11	75 R	R 1,15		D 0,57	7 500				11 250		15 000	
12	50 V	V		D 0,86	3 750		3 750		7 500		7 500	
13	50 L	L 3,43		D 0,86	2 625	9 375	2 625	9 375	5 000		5 000	18 750
14	25 LL	L 16		D 1,72	875		625		875		2 500	
15	25 RR	R 11		D 1,72	875		625		875		2 500	
16	Segment 20 and below it	L 3,5	V	D 2								12 500 (2)
17	Segment 10 and below it	L 4,5	R 2,0	D 4		8 750 (1)		8 750 (1)		8 750 (1)		5 000 (2)
18	E_{max} (3)				12 500	31 250	6 250	31 250	12 500	56 250 (8)	21 875	50 000 (2)
Part B (bending modes): Part A applies, however with the lines No 1, 2, 7, 13 and 18 being replaced by those listed hereunder												
1	B50L (4)	L 3,43		U 0,57		375		375				563
2	HV (4)					625		625				
7	Zone III (as specified by Table 3 of this Annex)					625		625		625		625
13	50L	L 3,43		D 0,86	1 250		1 250		2 500		2 500	
18	E_{max} (6)				7 500	31 250	3 750	31 250	7 500	56 250 (8)	15 000	50 000 (2)

(1) max 11 250 cd, if the system is designed to provide also a class W passing beam
(2) requirements according to the provisions indicated in Table 4 below apply in addition
(3) Position requirements according to the provisions of Table 2 below ('Segment E_{max}')
(4) the contribution of each side of the system, when measured according to the provisions of Annex 9 to this Regulation shall not be less than 63 cd
(5) Position requirements according to the provisions of Table 5 below
(6) Position requirements as indicated in paragraph 6.2.6.2 of this Regulation
(7) One pair of position lamps, being incorporated with the system or being intended to be installed together with the system may be activated according to the indications of the applicant
(8) Requirements according to the provisions indicated in Table 6 below apply in addition.

ANNEX 4

Tests for stability of photometric performance of systems in operation

TESTS ON COMPLETE SYSTEMS

Once the photometric values have been measured according to the prescriptions of this Regulation, in the point of Emax for driving beam and in points HV, 50V and B50L (or R), whichever applies for passing beam, a complete system sample shall be tested for stability of photometric performance in operation.

For the purpose of this Annex:

(a) 'complete system' shall be understood to mean the complete right and left side of a system itself including electronic light source control-gear(s) and/or supply and operating device(s) and those surrounding body parts and lamps which could influence its thermal dissipation. Each installation unit of the system and lamp(s) and/or LED module, if any, of the complete system may be tested separately;

(b) 'test sample' in the following text means correspondingly either the 'complete system' or the installation unit under test;

(c) the expression 'light source' shall be understood to comprise also any single filament of a filament lamp, LED modules or light emitting parts of a LED module.

The tests shall be carried out:

(a) in a dry and still atmosphere at an ambient temperature of 23 °C ± 5 °C, the test sample being mounted on a base representing the correct installation on the vehicle;

(b) in case of replaceable light sources: using a mass production filament light source, which has been aged for at least one hour, or a mass production gas-discharge light source, which has been aged for at least 15 hours or a mass production LED module which has been aged for at least 48 hours and cooled down to ambient temperature before starting the tests as specified in this Regulation. The LED modules supplied by the applicant shall be used.

The measuring equipment shall be equivalent to that used during system approval tests of the test samples of the system. The system or part(s) thereof shall, prior to the subsequent tests, be set to the neutral state.

The test sample shall be operated on passing beam without being dismounted from or readjusted in relation to its test fixture. The light source used shall be a light source of the category specified for that headlamp.

1. TEST FOR STABILITY OF PHOTOMETRIC PERFORMANCE

1.1. Clean test sample

Each test sample shall be operated for 12 hours as described in paragraph 1.1.1 and checked as prescribed in paragraph 1.1.2.

1.1.1. Test procedure

1.1.1.1. Test sequence

(a) in the case where a test sample is designed to provide only one lighting function (driving beam or passing beam) and not more than one class in case of passing beam, the corresponding light source(s) is/are lit for the time [1] specified in paragraph 1.1 above;

(b) in the case where a test sample provides more than one function or class of passing beam according to this Regulation: if the applicant declares that each specified function or class of passing beam of the test sample has its own light source(s), being exclusively lit [2] at a time, the test shall be carried out in accordance with this condition, activating [1] the most power consuming mode of each specified function or class of passing beam successively for the same (equally divided) part of the time specified in paragraph 1.1.

In all other cases, [1] [2] the test sample shall be subjected to the following cycle test for each, the mode(s) of class C passing beam, the class V passing beam, the class E passing beam and the class W passing beam, whatever is provided or partly provided by the test sample, for the same (equally divided) part of the time specified in paragraph 1.1:

[1] When the 'test sample' is grouped and/or reciprocally incorporated with signalling lamps, the latter shall be lit for the duration of the test, except for a daytime running lamp. In the case of a direction indicator lamp, it shall be lit in flashing operation mode with an on/off time ratio of approximately one to one.

[2] Should additional light sources be simultaneously lit when headlamp flashing is used, this shall not be considered as being normal use of the light sources simultaneously.

15 minutes, first, e.g. class C passing beam mode lit with its most power-consuming mode for straight road conditions;

5 minutes, same passing beam mode lit as before and, additionally, all light sources [3] of the test sample, which are possible to be lit at the same time, according to the applicant's declaration;

after having reached the said (equally divided) part of the time specified in paragraph 1.1, the above cycle test shall be performed with the second, third and fourth class of passing beam, if applicable, in the above order.

(c) In the case where a test sample includes other grouped lighting function(s), all the individual functions shall be lit simultaneously for the time specified in (a) or (b) above for individual lighting functions, according to the manufacturer's specifications.

(d) In the case of a test sample designed to provide a passing beam bending mode with an additional light source being energised, said light source shall simultaneously be switched on for 1 minute, and switched off for 9 minutes during the activation of the passing beam only, specified in (a) or (b) above.

1.1.1.2. Test voltage

The voltage shall be applied to the terminals of the test sample as follows:

(a) In case of replaceable filament light source(s) operated directly under vehicle voltage system conditions:

The test shall be performed at 6,3 V, 13,2 V or 28,0 V as applicable, except if the applicant specifies that the test sample may be used at a different voltage. In this case, the test shall be carried out with the filament light source whose wattage is the highest that can be used.

(b) In case of replaceable gas discharge light source(s):

The test voltage for the electronic light source control-gear is 13,5 ± 0,1 volts for 12 V vehicle voltage system, or otherwise specified in the application for approval.

(c) In the case of non-replaceable light source operated directly under vehicle voltage system conditions:

All measurements on lighting units equipped with non-replaceable light sources (filament light sources and/or others) shall be made at 6,3 V, 13,2 V or 28,0 V or at other voltages according to the vehicle voltage system as specified by the applicant respectively.

(d) In the case of light sources, replaceable or non-replaceable, being operated independently from vehicle supply voltage and fully controlled by the system, or, in the case of light sources supplied by a supply and operating device, the test voltages as specified above shall be applied to the input terminals of that device. The test laboratory may require from the manufacturer the supply and operating device or a special power supply needed to supply the light source(s).

(e) LED module(s) shall be measured at 6,75 V, 13,5 V or 28,0 V respectively, if not otherwise specified within this Regulation. LED module(s) operated by an electronic light source control gear, shall be measured as specified by the applicant.

(f) Where signalling lamps are grouped, combined or reciprocally incorporated into the test sample and operating at voltages other than the nominal rated voltages of 6 V, 12 V or 24 V respectively, the voltage shall be adjusted as declared by the manufacturer for the correct photometric functioning of that lamp.

[3] All light sources of lighting functions even if no approval is sought according to this Regulation must be taken into account, except those covered by footnote 2.

1.1.2. Test results

1.1.2.1. Visual inspection:

Once the test sample has been stabilised to the ambient temperature, the test sample lens and the external lens, if any, shall be cleaned with a clean, damp cotton cloth. It shall then be inspected visually; no distortion, deformation, cracking or change in colour of either the test sample lens or the external lens, if any, shall be noticeable.

1.1.2.2. Photometric test:

To comply with the requirements of this Regulation, the photometric values shall be verified in the following points:

Class C passing beam, and each specified other passing beam class: 50V, B50L (or R), and HV, if applicable.

Driving beam, under neutral state conditions: point of Emax.

Another aiming may be carried out to allow for any deformation of the test sample base due to heat (the change of the position of the cut-off line is covered in paragraph 2 of this Annex).

A 10 per cent discrepancy between the photometric characteristics and the values measured prior to the test is permissible including the tolerances of the photometric procedure.

1.2. Dirty test sample

After being tested as specified in paragraph 1.1 above, the test sample shall be operated for one hour as described in paragraph 1.1.1 for each function or class of passing beam [4], after being prepared as prescribed in paragraph 1.2.1, and checked as prescribed in paragraph 1.1.2; after each test a sufficient cooling down period must be assured.

1.2.1. Preparation of the test sample

Test mixture

1.2.1.1. For a system or parts thereof with the outside lens in glass: A mixture of water and polluting agent to be applied to the test sample shall be composed of:

9 parts by weight of silica sand with a particle size of 0-100 μm corresponding to distribution prescribed in paragraph 2.1.3,

1 part by weight of vegetable carbon dust (beechwood) with a particle size of 0-100 μm,

0,2 parts by weight of NaCMC [5], and

an appropriate quantity of distilled water with a conductivity of less than 1 mS/m.

1.2.1.2. For a system or parts thereof with the outside lens in plastic material:

The mixture of water and polluting agent to be applied to the test sample shall be composed of:

9 parts by weight of silica sand with a particle size of 0-100 μm corresponding to distribution prescribed in paragraph 2.1.3,

1 part by weight of vegetable carbon dust (beechwood) with a particle size of 0-100 μm,

0,2 parts by weight of NaCMC [5],

5 parts by weight of sodium chloride (pure at 99 per cent),

13 parts by weight of distilled water with a conductivity of less than 1 mS/m, and

2 ± 1 parts by weight of surface-actant.

[4] The class W passing beam, if any, is disregarded for lighting units providing or contributing to any other passing beam class or lighting function.

[5] NaCMC represents the sodium salt of carboxymethylcellulose, customarily referred to as CMC. The NaCMC used in the dirt mixture shall have a degree of substitution (DS) of 0,6-0,7 and a viscosity of 200-300 cP for a 2 per cent solution at 20 °C.

1.2.1.3. Particle-size distribution

Particle size (in μm)	Particle-size distribution in (%)
0 to 5	12 ± 2
5 to 10	12 ± 3
10 to 20	14 ± 3
20 to 40	23 ± 3
40 to 80	30 ± 3
80 to 100	9 ± 3

1.2.1.4. The mixture must not be more than 14 days old.

1.2.1.5. Application of the test mixture to the test sample:

The test mixture shall be uniformly applied to the entire light- emitting surface(s) of the test sample and then left to dry. This procedure shall be repeated until the illuminating value has dropped to 15-20 per cent of the values measured for each following point under the conditions described in this Annex:

point Emax in driving beam, under neutral state conditions,

50V for a class C passing beam, and each specified passing beam mode.

2. TEST FOR CHANGE IN VERTICAL POSITION OF THE 'CUT-OFF' LINE UNDER THE INFLUENCE OF HEAT

This test consists of verifying that the vertical drift of the cut-off line under the influence of heat does not exceed a specified value for a system or part(s) of emitting a class C (basic) passing beam, or each specified passing beam mode.

If the test sample consists of more than one lighting unit or more than one assembly of lighting units which provide a cut-off, each of these is understood to be a test sample for the purpose of this test and must be tested separately.

The test sample tested in accordance with paragraph 1 shall be subjected to the test described in paragraph 2.1, without being removed from or readjusted in relation to its test fixture.

If the test sample has a moving optical part, only the position closest to the average vertical angular stroke and/or the initial position according to the neutral state is chosen for this test.

The test is confined to signal input conditions corresponding to a straight road, only.

2.1. Test

For the purpose of this test, the voltage shall be adjusted as specified in paragraph 1.1.1.2.

The test sample shall be operated and tested on class C passing beam, class V passing beam, class E passing beam and class W passing beam, whatever applies.

The position of the cut-off line in its horizontal part between VV and the vertical line passing through point B50L (or R) shall be verified 3 minutes (r3) and 60 minutes (r60) respectively after operation.

The measurement of the variation in the cut-off line position as described above shall be carried out by any method giving acceptable accuracy and reproducible results.

2.2. Test results

2.2.1. The result expressed in milliradians (mrad) shall be considered as acceptable for a passing beam test sample, when the absolute value $\Delta r_I = |r_3 - r_{60}|$ recorded on the test sample is not more than 1,0 mrad $\Delta r_I \leq 1{,}0$ mrad).

2.2.2. However, if this value is more than 1,0 mrad but not more than 1,5 mrad (1,0 mrad < $\Delta r_I \leq$ 1,5 mrad), a second test sample shall be tested as described in paragraph 2.1 after being subjected three consecutive times to the cycle as described below, in order to stabilise the position of mechanical parts of the test sample on a base representative of the correct installation on the vehicle:

Operation of the passing beam for one hour, (the voltage shall be adjusted as specified in paragraph 1.1.1.2);

Period of rest for one hour.

The system or part thereof shall be considered as acceptable if the mean value of the absolute values Δr_I measured on the first test sample and Δr_{II} measured on the second test sample is not more than 1,0 mrad.

$$\left(\frac{\Delta r_I + \Delta r_{II}}{2} \leq 1{,}0\ mrad\right)$$

ANNEX 5

Minimum requirements for conformity of production control procedures

1. GENERAL

1.1. The conformity requirements shall be considered satisfied from a mechanical and a geometrical standpoint, if the differences do not exceed inevitable manufacturing deviations within the requirements of this Regulation. This condition also applies to colour.

1.2. With respect to photometric performances, the conformity of mass-produced systems shall not be contested if, when testing photometric performances of any system chosen at random and equipped with a light source energised, and if applicable corrected, as prescribed in paragraphs 1 and 2 of Annex 9 to this Regulation:

1.2.1. no value measured and corrected according to the prescriptions of paragraph 2 of Annex 9 to this Regulation deviates unfavourably by more than 20 per cent from the value prescribed in this Regulation;

1.2.1.1. For the following values of the passing beam and its modes, the maximum unfavourable deviation may be respectively:

maximum values at point B50L 0,2 lx equivalent 20 per cent and 0,3 lx equivalent 30 per cent;

maximum values at zone III, HV and segment BLL: 0,3 lx equivalent 20 per cent and 0,45 lx equivalent 30 per cent;

maximum values at segments E, F1, F2 and F3: 0,2 lx equivalent 20 per cent and 0,3 lx equivalent 30 per cent;

minimum values at BR, P, S 50, S 50LL, S 50RR, S 100, S 100LL, S 100RR, and those required by footnote 4 of Table 1 in Annex 3 to this Regulation (B50L, HV, BR, BRR, BLL): half of the required value equivalent 20 per cent and three quarter of the required value equivalent 30 per cent;

1.2.1.2. for the driving beam, HV being situated within the isolux 0,75 Emax, a tolerance of + 20 per cent for maximum values and – 20 per cent for minimum values is observed for the photometric values at any measuring point specified in paragraph 6.3.2 of this Regulation.

1.2.2. If the results of the test described above do not meet the requirements, the alignment of the system may be changed, provided that the axis of the beam is not displaced laterally by more than 0,5 deg to the right or left and not by more than 0,2 deg up and down, each independently and with respect to the first aiming.

These provisions do not apply to lighting units as indicated under paragraph 6.3.1.1 of this Regulation.

1.2.3. If the results of the tests described above do not meet the requirements, tests shall be repeated using another standard (etalon) light source and/or another supply and operating device.

1.3. With respect to the verification of the change in vertical position of the 'cut-off' line for passing beam under the influence of heat, the following procedure shall be applied:

One of the sampled systems shall be tested according to the procedure described in paragraph 2.1 of Annex 4 after being subjected three consecutive times to the cycle described in paragraph 2.2.2 of Annex 4.

The system shall be considered as acceptable if Dr does not exceed 1,5 mrad.

If this value exceeds 1,5 mrad but is not more than 2,0 mrad, a second sample shall be subjected to the test after which the mean of the absolute values recorded on both samples shall not exceed 1,5 mrad.

1.4. The chromaticity co-ordinates shall be conformed to.

2. MINIMUM REQUIREMENTS FOR VERIFICATION OF CONFORMITY BY THE MANUFACTURER

For each type of system the holder of the approval mark shall carry out at least the following tests, at appropriate intervals. The tests shall be carried out in accordance with the provision of this Regulation.

If any sampling shows non-conformity with regard to the type of test concerned, further samples shall be taken and tested. The manufacturer shall take steps to ensure the conformity of the production concerned.

2.1. Nature of tests

Tests of conformity in this Regulation shall cover the photometric characteristics and the verification of the change in vertical position of the cut-off line for passing beam under the influence of heat.

2.2. Methods used in tests

2.2.1. Tests shall generally be carried out in accordance with the methods set out in this Regulation.

2.2.2. In any test of conformity carried out by the manufacturer, equivalent methods may be used with the consent of the competent authority responsible for approval tests. The manufacturer is responsible for proving that the applied methods are equivalent to those laid down in this Regulation.

2.2.3. The application of paragraphs 2.2.1 and 2.2.2 requires regular calibration of test apparatus and its correlation with measurement made by a competent authority.

2.2.4. In all cases the reference methods shall be those of this Regulation, particular for the purpose of administrative verification and sampling.

2.3. Nature of sampling

Samples of systems shall be selected at random from the production of a uniform batch. A uniform batch means a set of systems of the same type, defined according to the production methods of the manufacturer.

The assessment shall, in general, cover series production from individual factories. However, a manufacturer may group together records concerning the same type from several factories provided these operate under the same quality system and quality management.

2.4. Measured and recorded photometric characteristics

The sampled headlamps shall be subjected to photometric measurements at the points provided for in the regulation, the reading being limited:

to points Emax, HV ([1]), 'HL' and 'HR' ([2]) in the case of a driving beam,

to points B50L, HV if applicable, 50V, 75R if applicable, and 25LL in the case of the passing beam*(s)* (see Figure 1 in Annex 3).

2.5. Criteria governing acceptability

The manufacturer is responsible for carrying out a statistical study of the test results and for defining, in agreement with the Competent Authority, criteria governing acceptability of his products in order to meet the specification laid down for verification of conformity of products in paragraph 9.1 of this Regulation.

The criteria governing acceptability shall be such that, with a confidence level of 95 per cent, the minimum probability of passing a spot check in accordance with Annex 7 (first sampling) would be 0,95.

([1]) When the driving beam is reciprocally incorporated with the passing beam, HV in the case of the driving beam shall be the same measuring point as in the case of the passing beam.

([2]) 'HL' and 'HR': points on 'H-H' located at 2,6 deg to the left and to the right of point HV respectively.

ANNEX 6

Requirements for systems incorporating lenses of plastic material: testing of lens or material samples and complete systems or part(s) of systems

1. GENERAL SPECIFICATIONS

1.1. The samples supplied pursuant to paragraph 2.2.4 of this Regulation shall satisfy the specifications indicated in paragraphs 2.1 to 2.5 below.

1.2. The two samples of complete systems or part thereof supplied pursuant to paragraph 2.2.3 of this Regulation and incorporating lenses of plastic material shall, with regard to the lens material, satisfy the specifications indicated in paragraph 2.6 below.

1.3. The samples of lenses of plastic material or samples of material shall be subjected, with the reflector to which they are intended to be fitted (where applicable), to approval tests in the chronological order indicated in Table A reproduced in Appendix 1 to this Annex.

1.4. However, if the system manufacturer can prove that the product has already passed the tests prescribed in paragraphs 2.1 to 2.5 below, or the equivalent tests pursuant to another regulation, those tests need not be repeated; only the tests prescribed in Appendix 1, Table B, shall be mandatory.

1.5. If the system or part thereof is designed for right-hand installation only, or for left-hand installation only, tests pursuant to this Annex may be done on one sample only, at the choice of the applicant.

2. TESTS

2.1. Resistance to temperature changes

2.1.1. Tests

Three new samples (lenses) shall be subjected to five cycles of temperature and humidity (RH = relative humidity) change in accordance with the following programme:

3 hours at 40 °C ± 2 °C and 85-95 per cent RH;

1 hour at 23 °C ± 5 °C and 60-75 per cent RH;

15 hours at - 30 °C ± 2 °C;

1 hour at 23 °C ± 5 °C and 60-75 per cent RH;

3 hours at 80 °C ± 2 °C;

1 hour at 23 °C ± 5 °C and 60-75 per cent RH;

Before this test, the samples shall be kept at 23 °C ± 5 °C and 60-75 per cent RH for at least four hours.

Note: The periods of one hour at 23 °C ± 5 °C shall include the periods of transition from one temperature to another which are needed in order to avoid thermal shock effects.

2.1.2. Photometric measurements

2.1.2.1. Method

Photometric measurements shall be carried out on the samples before and after the test.

These measurements shall be made according to Annex 9 to this Regulation, at the following points:

B50L and 50V for the class C passing beam lighting;

E_{max} for the driving beam of a system.

2.1.2.2. Results

The variation between the photometric values measured on each sample before and after the test shall not exceed 10 per cent including the tolerances of the photometric procedure.

2.2. Resistance to atmospheric and chemical agents

2.2.1. Resistance to atmospheric agents

Three new samples (lenses or samples of material) shall be exposed to radiation from a source having a spectral energy distribution similar to that of a black body at a temperature between 5 500 K and 6 000 K. Appropriate filters shall be placed between the source and the samples so as to reduce as far as possible radiation with wavelengths smaller than 295 nm and greater than 2 500 nm. The samples shall be exposed to an energetic illumination of 1 200 W/m^2 ± 200 W/m^2 for a period such that the luminous energy that they receive is equal to 4 500 MJ/m^2 ± 200 MJ/m^2. Within the enclosure, the temperature measured on the black panel placed on a level with the samples 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 min^{-1}.

The samples shall be sprayed with distilled water of conductivity lower than 1 mS/m at a temperature of 23 °C ± 5 °C, in accordance with the following cycle:

spraying: 5 minutes; drying: 25 minutes.

2.2.2. Resistance to chemical agents

After the test described in paragraph 2.2.1 above and the measurement described in paragraph 2.2.3.1 below have been carried out, the outer face of the said three samples shall be treated as described in paragraph 2.2.2.2 with the mixture defined in paragraph 2.2.2.1 below.

2.2.2.1. Test mixture

The test mixture shall be composed of 61,5 per cent n-heptane, 12,5 per cent toluene, 7,5 per cent ethyl tetrachloride, 12,5 per cent trichloroethylene and 6 per cent xylene (volume per cent).

2.2.2.2. Application of the test mixture

Soak a piece of cotton cloth (as per ISO 105) until saturation with the mixture defined in paragraph 2.2.2.1 above and, within 10 seconds, apply it for 10 minutes to the outer face of the sample at a pressure of 50 N/cm^2, corresponding to an effort of 100 N applied on a test surface of 14 × 14 mm.

During this 10-minute period, the cloth pad shall be soaked again with the mixture so that the composition of the liquid applied is continuously identical with that of the test mixture prescribed.

During the period of application, it is permissible to compensate the pressure applied to the sample in order to prevent it from causing cracks.

2.2.2.3. Cleaning

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 described in paragraph 2.3 (Resistance to detergents) at 23 °C ± 5 °C. Afterwards the samples shall be carefully rinsed with distilled water containing not more than 0,2 per cent impurities at 23 °C ± 5 °C and then wiped off with a soft cloth.

2.2.3. Results

2.2.3.1. 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 in transmission $\Delta t = (T_2-T_3)/T_2$ measured on the three samples according to the procedure described in Appendix 2 to this Annex shall not exceed 0,020 ($\Delta t_m < 0{,}020$).

2.2.3.2. 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, whose mean variation $\Delta d = (T_5-T_4)/T_2$ measured on the three samples according to the procedure described in Appendix 2 to this Annex shall not exceed 0,020 ($\Delta d_m < 0{,}020$).

2.2.4. Resistance to light source radiation

If necessary the following test shall be done:

Flat samples of each light transmitting plastic component of the system are exposed to the light of the light source. The parameters such as angles and distances of those samples shall be the same as in the system. These samples shall have the same colour and surface treatment, if any, as the parts of the system.

After 1 500 hours of continuous exposure, the colorimetric specification of the transmitted light must be met with a new light source, and the surface of the samples shall be free of cracks, scratches, scaling or deformation.

The UV-resistance testing of internal materials to light source radiation is not necessary if light sources according to Regulation No 37 and/or low-UV-type gas discharge light sources and/or low-UV-type LED modules are being applied or if provisions are taken, to shield the relevant system components from UV radiation, e.g. by glass filters.

2.3. Resistance to detergents and hydrocarbons

2.3.1. Resistance to detergents

The outer face of three samples (lenses or samples of material) 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 parts distilled water containing not more than 0,02 per cent impurities and one part alkylaryl sulphonate.

At the end of the test, the samples shall be dried at 50 °C ± 5 °C. The surface of the samples shall be cleaned with a moist cloth.

2.3.2. Resistance to hydrocarbons

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 per cent n-heptane and 30 per cent toluene (volume per cent), and shall then be dried in the open air.

2.3.3. Results

After the above two tests have been performed successively, the mean value of the variation in transmission $\Delta t = (T_2-T_3)/T_2$ measured on the three samples according to the procedure described in Appendix 2 to this Annex shall not exceed 0,010 ($\Delta t_m < 0{,}010$).

2.4. Resistance to mechanical deterioration

2.4.1. Mechanical deterioration method

The outer face of the three new samples (lenses) shall be subjected to the uniform mechanical deterioration test by the method described in Appendix 3 to this Annex.

2.4.2. Results

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 according to the procedure described in Appendix 2 in the area specified in paragraph 2.2.4.1.1 of this Regulation. The mean value of the three samples shall be such that:

$\Delta t_m < 0{,}100$; $\Delta d_m < 0{,}050$.

2.5. Test of adherence of coatings, if any

2.5.1. Preparation of the sample

A surface of 20 mm × 20 mm in area of the coating of a lens shall be cut with a razor blade or a needle into a grid of squares approximately 2 mm × 2 mm. The pressure on the blade or needle shall be sufficient to cut at least the coating.

2.5.2. Description of the test

Use an adhesive tape with a force adhesion of 2 N/(cm of width) ± 20 per cent measured under the standardised conditions specified in Appendix 4 to this Annex. This adhesive tape, which shall be at least 25 mm wide, shall be pressed for at least five minutes to the surface prepared as prescribed in paragraph 2.5.1.

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.

2.5.3. Results

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 per cent of the gridded surface.

2.6. Tests of the complete system incorporating a lens of plastic material

2.6.1. Resistance to mechanical deterioration of the lens surface

2.6.1.1. Tests

The lens of system sample No 1 shall be subjected to the test described in paragraph 2.4.1 above.

2.6.1.2. Results

After the test, the results of photometric measurements carried out on the system or part thereof in accordance with this Regulation shall not exceed by more than 30 per cent the maximum values prescribed at points B50L and HV and not be more than 10 per cent below the minimum values prescribed at point 75R, if applicable.

2.6.2. Test of adherence of coatings, if any

The lens of installation unit sample No 2 shall be subjected to the test described in paragraph 2.5 above.

3. VERIFICATION OF THE CONFORMITY OF PRODUCTION

3.1. With regard to the materials used for the manufacture of lenses, the installation units of a series shall be recognised as complying with this Regulation if:

3.1.1. After the test for resistance to chemical agents and the test for resistance to detergents and hydrocarbons, the outer face of the samples exhibits no cracks, chipping or deformation visible to the naked eye (see paragraphs 2.2.2, 2.3.1 and 2.3.2);

3.1.2. After the test described in paragraph 2.6.1.1, the photometric values at the points of measurement considered in paragraph 2.6.1.2 are within the limits prescribed for conformity of production by this Regulation.

3.2. If the test results fail to satisfy the requirements, the tests shall be repeated on another sample of systems selected at random.

APPENDIX 1

CHRONOLOGICAL ORDER OF APPROVAL TESTS

A. Tests on plastic materials (lenses or samples of material supplied pursuant to paragraph 2.2.4 of this Regulation)

Samples	Lenses or samples of material										Lenses			
Tests	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.1. Limited photometry (para. 2.1.2)											X	X	X	
1.1.1. Temperature change (para. 2.1.1)											X	X	X	
1.2. Limited photometry (para. 2.1.2)											X	X	X	
1.2.1. Transmission measurement	X	X	X	X	X	X	X	X	X					
1.2.2. Diffusion measurement	X	X	X				X	X	X					
1.3. Atmospheric agents (para. 2.2.1)	X	X	X											
1.3.1. Transmission measurement	X	X	X											
1.4. Chemical agents (para. 2.2.2)	X	X	X											
1.4.1. Diffusion measurement	X	X	X											
1.5. Detergents (para. 2.3.1)				X	X	X								
1.6. Hydrocarbons (para. 2.3.2)				X	X	X								
1.6.1. Transmission measurement				X	X	X								
1.7. Deterioration (para. 2.4.1)							X	X	X					
1.7.1. Transmission measurement							X	X	X					
1.7.2. Diffusion measurement							X	X	X					
1.8. Adherence (para. 2.5)														X
1.9. Resistance to light source radiation (para. 2.2.4)										X				

B. Tests on complete systems or part(s) thereof (supplied pursuant to paragraph 2.2.3 of this Regulation).

Tests	Complete Systems	
	Sample No	
	1	2
2.1. Deterioration (para. 2.6.1.1)	X	
2.2. Photometry (para. 2.6.1.2)	X	
2.3. Adherence (para. 2.6.2)		X

APPENDIX 2

Method of measurement of the diffusion and transmission of light

1. EQUIPMENT (see Figure 1 below)

The beam of a collimator K with a half divergence $\beta/2 = 17{,}4 \times 10^{-4}$ rad is limited by a diaphragm D_τ with an opening of 6 mm against which the sample stand is placed.

A convergent achromatic lens L_2, corrected for spherical aberrations links the diaphragm D_τ with the receiver R; the diameter of the lens L_2 shall be such that it does not diaphragm the light diffused by the sample in a cone with a half top angle of $\beta/2 = 14$ deg.

An annular diaphragm D_D, with angles $\alpha_o/2 = 1$ deg and $\alpha_{max}/2 = 12$ deg is placed in an image focal plane of the lens L_2.

The non-transparent central part of the diaphragm is necessary in order to eliminate the light arriving directly from the light source. It shall be possible to remove the central part of the diaphragm from the light beam in such a manner that it returns exactly to its original position.

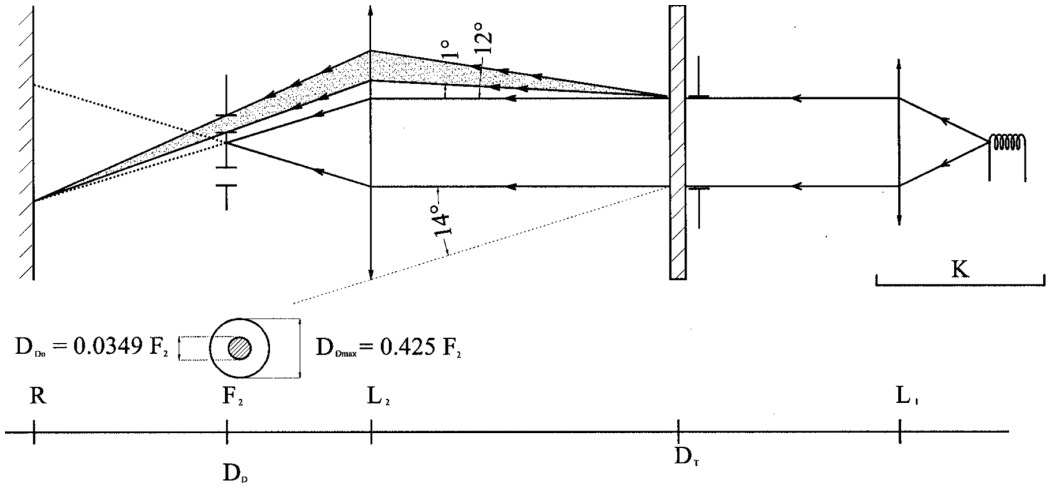
The distance L_2 D_τ and the focal length F_2 of the lens L_2 shall be so chosen that the image of D_τ completely covers the receiver R.

For L_2 it is recommended to use a focal distance of about 80 mm.

When the initial incident flux is referred to 1 the absolute precision of each reading shall be better than 0,001.

Figure 1

Optical set up for measurement of variations in diffusion and transmission



2. MEASUREMENTS

The following readings shall be taken:

Reading	With sample	With central part of D_D	Quantity represented
T_1	No	No	Incident flux in initial reading
T_2	Yes (before test)	No	Flux transmitted by the new material in a field of 24 deg
T_3	Yes (after test)	No	Flux transmitted by the tested material in a field of 24 deg
T_4	Yes (before test)	Yes	Flux diffused by the new material
T_5	Yes (after test)	Yes	Flux diffused by the tested material

APPENDIX 3

SPRAY TESTING METHOD

1. TEST EQUIPMENT

1.1. Spray gun

The spray gun used shall be equipped with a nozzle 1,3 mm in diameter allowing a liquid flow rate of 0,24 ± 0,02 l/minute at an operating pressure of 6,0 bars - 0/+ 0,5 bar.

Under these operation conditions the fan pattern obtained shall be 170 mm ± 50 mm in diameter on the surface exposed to deterioration, at a distance of 380 mm ± 10 mm from the nozzle.

1.2. Test mixture

The test mixture shall be composed of:

Silica sand of hardness 7 on the Mohs' scale, with a grain size between 0 and 0,2 mm and an almost normal distribution, with an angular factor of 1,8 to 2;

Water of hardness not exceeding 205 g/m^3 for a mixture comprising 25 g of sand per litre of water.

2. TEST

The outer surface of the lamp lenses shall be subjected once or more than once to the action of the sand jet produced as described above. 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 described in Appendix 2, is such that: $\Delta d = (T_5 - T_4)/T_2 = 0{,}0250 \pm 0{,}0025$.

Several reference samples may be used to check that the whole surface to be tested has deteriorated homogeneously.

APPENDIX 4

ADHESIVE TAPE ADHERENCE TEST

1. PURPOSE

This method allows determining under standard conditions the linear force of adhesion of an adhesive tape to a glass plate.

2. PRINCIPLE

Measurement of the force necessary to unstick an adhesive tape from a glass plate at an angle of 90 deg.

3. SPECIFIED ATMOSPHERIC CONDITIONS

The ambient conditions shall be at 23 °C ± 5 °C and 65 ± 15 per cent relative humidity.

4. TEST PIECES

Before the test, the sample roll of adhesive tape shall be conditioned for 24 hours in the specified atmosphere (see paragraph 3 above).

Five test pieces each 400 mm long shall be tested from each roll. These test pieces shall be taken from the roll after the first three turns were discarded.

5. PROCEDURE

The test shall be under the ambient conditions specified in paragraph 3.

Take the five test pieces while unrolling the tape radially at a speed of approximately 300 mm/s, then apply them within 15 seconds in the following manner:

Apply the tape to the glass plate progressively with a slight length- wise rubbing movement of the finger, without excessive pressure, in such a manner as to leave no air bubble between the tape and the glass plate.

Leave the assembly in the specified atmospheric conditions for 10 minutes.

Unstick about 25 mm of the test piece from the plate in a plane perpendicular to the axis of the test piece.

Fix the plate and fold back the free end of the tape at 90 deg. Apply force in such a manner that the separation line between the tape and the plate is perpendicular to this force and perpendicular to the plate.

Pull to unstick at a speed of 300 mm/s ± 30 mm/s and record the force required.

6. RESULTS

The five values obtained shall be arranged in order and the median value taken as a result of the measurement. This value shall be expressed in Newton per centimetre of width of the tape.

ANNEX 7

MINIMUM REQUIREMENTS FOR SAMPLING BY AN INSPECTOR

1. GENERAL

1.1. The conformity requirements shall be considered satisfied from a mechanical and a geometrical standpoint, if the differences do not exceed inevitable manufacturing deviations within the requirements of this Regulation. This condition also applies to colour.

1.2. With respect to photometric performances, the conformity of mass-produced systems shall not be contested if, when testing photometric performances of any system chosen at random and equipped with a light source energised, and if applicable corrected, as prescribed in paragraphs 1 and 2 of Annex 9 to this Regulation.

1.2.1. no value deviates unfavourably by more than 20 per cent from the value prescribed in this Regulation;

1.2.1.1. For the following values of the passing beam and its modes, the maximum unfavourable deviation may be respectively:

(a) maximum values at point B50L 0,2 lx equivalent 20 per cent and 0,3 lx equivalent 30 per cent;

(b) maximum values at zone III, HV and segment BLL: 0,3 lx equivalent 20 per cent and 0,45 lx equivalent 30 per cent;

(c) maximum values at segments E, F1, F2 and F3: 0,2 lx equivalent 20 per cent and 0,3 lx equivalent 30 per cent;

(d) minimum values at BR, P, S50, S50LL, S50RR, S100, S100LL, S100RR, and those required by footnote 4 of Table 1 in Annex 3 to this Regulation (B50L, HV, BR, BRR, BLL): half of the required value is equivalent to 20 per cent and three quarters of the required value equivalent to 30 per cent;

1.2.1.2. for the driving beam, HV being situated within the isolux 0,75 Emax, a tolerance of + 20 per cent for maximum values and – 20 per cent for minimum values is observed for the photometric values at any measuring point specified in paragraph 6.3.2 of this Regulation.

1.2.2. If the results of the test described above do not meet the requirements, the alignment of the system may be changed, provided that the axis of the beam is not displaced laterally by more than 0,5 deg to the right or left and not by more than 0,2 deg up and down. These provisions do not apply to lighting units as indicated under paragraph 6.3.1.1 of this Regulation.

1.2.3. If the results of the tests described above do not meet the requirements, tests shall be repeated using another standard (etalon) light source and/or another supply and operating device.

1.2.4. Systems with apparent defects are disregarded.

1.2.5. The reference mark is disregarded.

2. FIRST SAMPLING

In the first sampling four systems are selected at random. The first sample of two is marked A, the second sample of two is marked B.

2.1. The conformity is not contested

2.1.1. Following the sampling procedure shown in Figure 1 of this Annex the conformity of mass-produced systems shall not be contested if the deviations of the measured values of the systems in the unfavourable directions are:

2.1.1.1. Sample A

A1:	one system		0 per cent
	one system	not more than	20 per cent
A2:	both systems	more than	0 per cent
		but not more than	20 per cent
	go to sample B		

2.1.1.2. Sample B

B1:	both systems		0 per cent

2.1.2. or if the conditions of paragraph 1.2.2 for sample A are fulfilled.

2.2. The conformity is not contested

2.2.1. Following the sampling procedure shown in Figure 1 of this Annex the conformity of mass-produced systems shall be contested and the manufacturer requested to make his production meet the requirements (alignment) if the deviations of the measured values of the systems are:

2.2.1.1. Sample A

A3:	one system	not more than	20 per cent
	one system	more than	20 per cent
		but not more than	30 per cent

2.2.1.2. Sample B

B2:	in the case of A2		
	one system	more than	0 per cent
		but not more than	20 per cent
	one system	not more than	20 per cent
B3:	in the case of A2		
	one system		0 per cent
	one system	more than	20 per cent
		but not more than	30 per cent

2.2.2. or if the conditions of paragraph 1.2.2 for sample A are not fulfilled.

2.3. Approval withdrawn

Conformity shall be contested and paragraph 10 applied if, following the sampling procedure shown in Figure 1 of this Annex, the deviations of the measured values of the systems are:

2.3.1. Sample A

A4:	one system	not more than	20 per cent
	one system	more than	30 per cent
A5:	Both systems	more than	20 per cent

2.3.2. Sample B

B4:	in the case of A2		
	one system	more than	0 per cent
		but not more than	20 per cent
	one system	more than	20 per cent
B5:	in the case of A2		
	both systems	more than	20 per cent
B6:	in the case of A2		
	one system		0 per cent
	one system	more than	30 per cent

2.3.3. or if the conditions of paragraph 1.2.2 for samples A and B are not fulfilled.

3. REPEATED SAMPLING

In the case of A3, B2, B3 a repeated sampling, third sample C of two systems, selected from stock manufactured after alignment, is necessary within two months' time after the notification.

3.1. The conformity is not contested

3.1.1. Following the sampling procedure shown in Figure 1 of this Annex the conformity of mass-produced shall not be contested if the deviations of the measured values of the are:

3.1.1.1. Sample C

C1:	one system		0 per cent
	one system	not more than	20 per cent
C2:	both systems	more than	0 per cent
		but not more than	20 per cent
	go to sample D		

3.1.1.2. Sample D

D1:	in the case of C2		
	both systems		0 per cent

3.1.2. or if the conditions of paragraph 1.2.2 for sample C are fulfilled.

3.2. The conformity is not contested

3.2.1. Following the sampling procedure shown in Figure 1 of this annex the conformity of mass-produced headlamps shall be contested and the manufacturer requested to make his production meet the requirements (alignment) if the deviations of the measured values of the headlamps are:

3.2.1.1. Sample D

D2:	in the case of C2		
	one system	more than	0 per cent
		but not more than	20 per cent
	one system	not more than	20 per cent

3.2.1.2. or if the conditions of paragraph 1.2.2 for sample C are not fulfilled.

3.3. Approval withdrawn

Conformity shall be contested and paragraph 10 applied if, following the sampling procedure shown in Figure 1 of this Annex, the deviations of the measured values of the systems are:

3.3.1. Sample C

C3:	one system	not more than	20 per cent
	one system	more than	20 per cent
C4:	both systems	more than	20 per cent

3.3.2. Sample D

D3:	in the case of C2		
	one system		0 per cent
		or more than	0 per cent
	one system	more than	20 per cent

3.3.3. or if the conditions of paragraph 1.2.2 for samples C and D are not fulfilled.

4. CHANGE OF THE VERTICAL POSITION OF THE CUT-OFF LINE FOR PASSING BEAM

With respect to the verification of the change in vertical position of the cut-off line for passing beam under the influence of heat, the following procedure shall be applied:

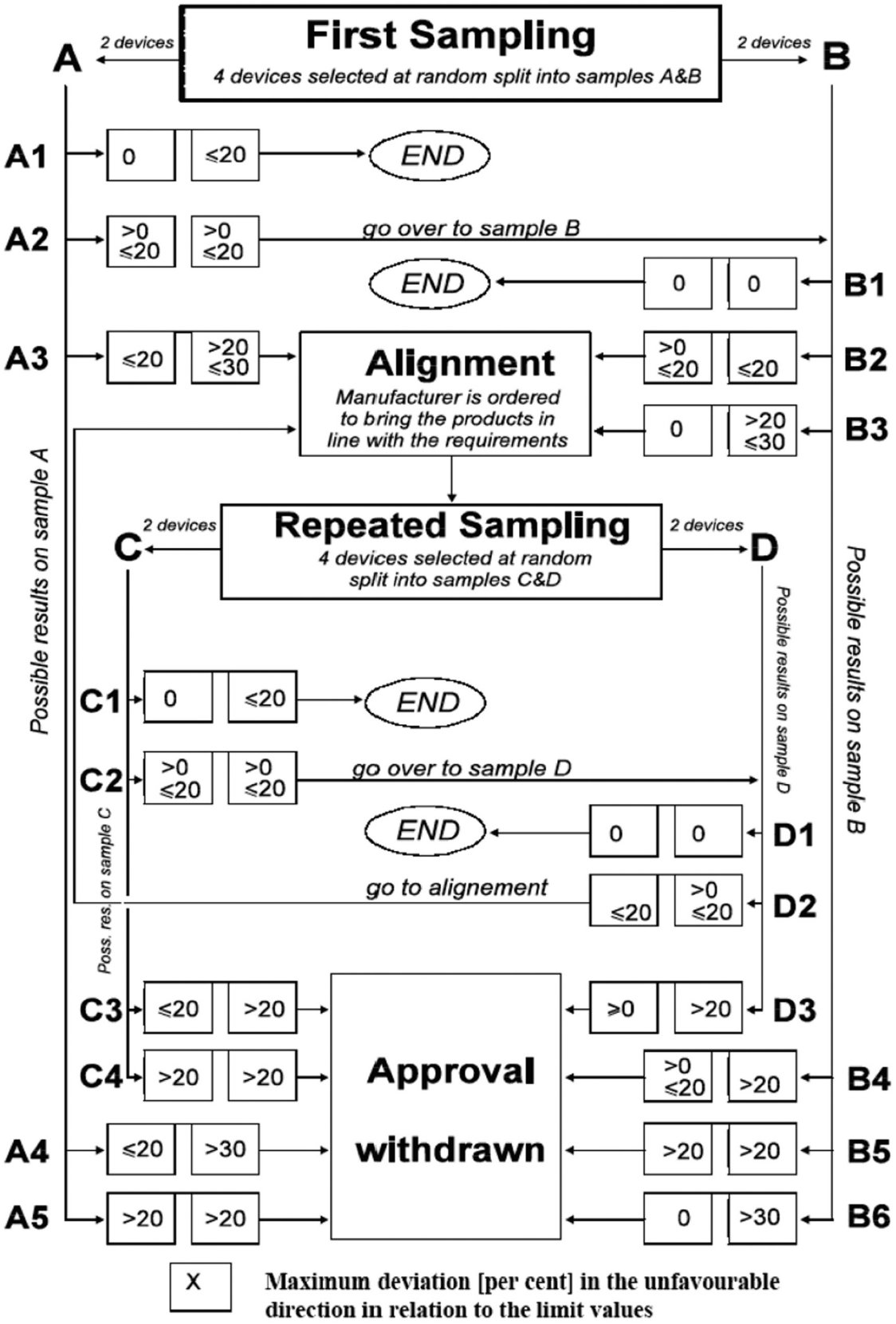
One of the systems of sample A after sampling procedure in Figure 1 of this Annex shall be tested according to the procedure described in paragraph 2.1 of Annex 4 after being subjected three consecutive times to the cycle described in paragraph 2.2.2 of Annex 4.

The system shall be considered as acceptable if Δr does not exceed 1,5 mrad.

If this value exceeds 1,5 mrad but is not more than 2,0 mrad, the second system of sample A shall be subjected to the test after which the mean of the absolute values recorded on both samples shall not exceed 1,5 mrad.

However, if this value of 1,5 mrad on sample A is not complied with, the two systems of sample B shall be subjected to the same procedure and the value of Δr for each of them shall not exceed 1,5 mrad.

Figure 1



Note: In this Figure, 'device' means 'system'.

ANNEX 8

PASSING BEAM 'CUT-OFF' AND AIMING PROVISIONS [1]

1. CUT-OFF DEFINITION

The 'cut-off', when projected on the aiming screen as defined in Annex 9 to this Regulation, shall be sufficiently sharp to permit aiming; it shall comply with the following requirements.

1.1. Shape (see Fig. A.8-1)

The 'cut-off' shall provide

— a horizontal 'flat part' towards the left, and

— a raised 'shoulder part' to the right;

in addition it shall be such, that after being aimed in accordance with the provisions in paragraphs 2.1 to 2.5 below:

1.1.1. The 'flat part' shall not deviate vertically by more than

— 0,2 deg up or down from its horizontal median line within 0,5 deg and 4,5 deg left of V-V, and

— 0,1 deg up or down within two thirds of said length.

1.1.2. The raised 'shoulder part'

— shall have a sufficiently defined left edge, and,

— the line whose origin is at the intersection of line A and the V-V line to be constructed as a tangent to this edge, shall have an inclination versus the line H-H of at least 10 deg and not exceeding 60 deg (see Fig. A.8-1 below).

2. VISUAL AIMING PROCEDURE

2.1. The system shall, prior to the subsequent test procedures, be set to the neutral state.

The instructions below apply to the beams of those lighting units, which are specified by the applicant to be aimed.

2.2. The beam shall be vertically positioned so, that the 'flat part' of its 'cut-off' is situated at the nominal vertical position (line A) according to the respective requirements indicated in Table 2 of Annex 3 to this Regulation; this shall be deemed to be fulfilled, if the horizontal median line of the 'flat part' of the 'cut-off' is situated at line A (see Fig. A.8-2 below);

2.3. The beam shall be horizontally positioned so that its raised 'shoulder' is situated to the right of the V-V line and touching it (see Fig. A.8-2 below);

2.3.1. if a partial beam provides a horizontal 'cut-off' only: no special requirements for horizontal adjustment apply if not specified by the applicant.

2.4. Any 'cut-off' of a lighting unit not designed to be separately aimed according to the applicant's specification must comply with the relevant requirements.

2.5. Lighting units when aimed using a method specified by the applicant in accordance with the provisions of the paragraphs 5.2 and 6.2.1.1 of this Regulation: the shape and position of the 'cut-off', if any, shall comply with the respective requirements of Table 2 of Annex 3 to this Regulation.

[1] Optionally to be completed by additional general provisions under study in GRE.

2.6. For each further mode of passing beam.

The shape and position of the 'cut-off', if any, shall comply automatically with the respective requirements of Table 2 of Annex 3 to this Regulation.

2.7. A separate initial aiming and/or adjustment process according to the applicant's specification, based on the provisions of paragraphs 2.1 through 2.6 above, may apply to lighting units intended to be installed separately.

Figures

Figure A.8-1 *Shape of the "cut-off"line*

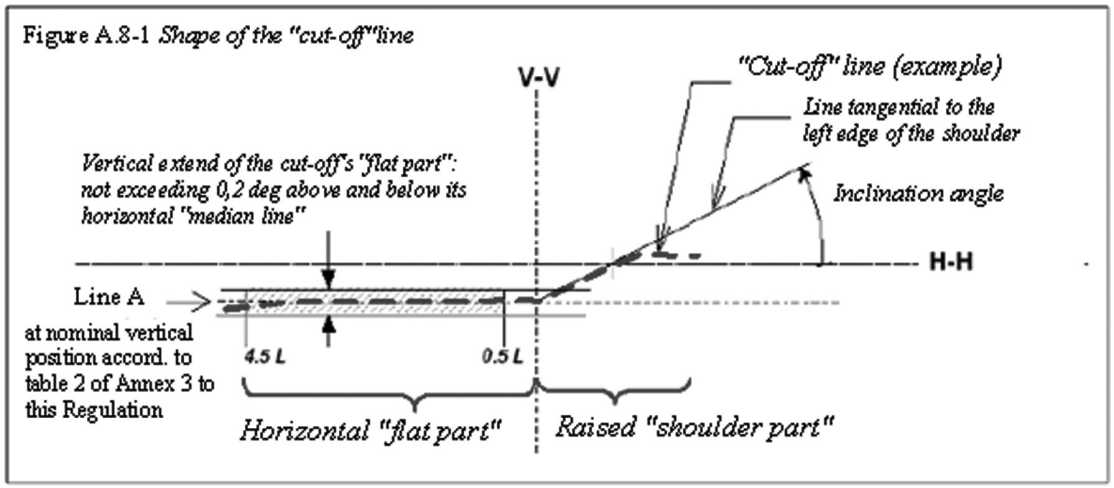
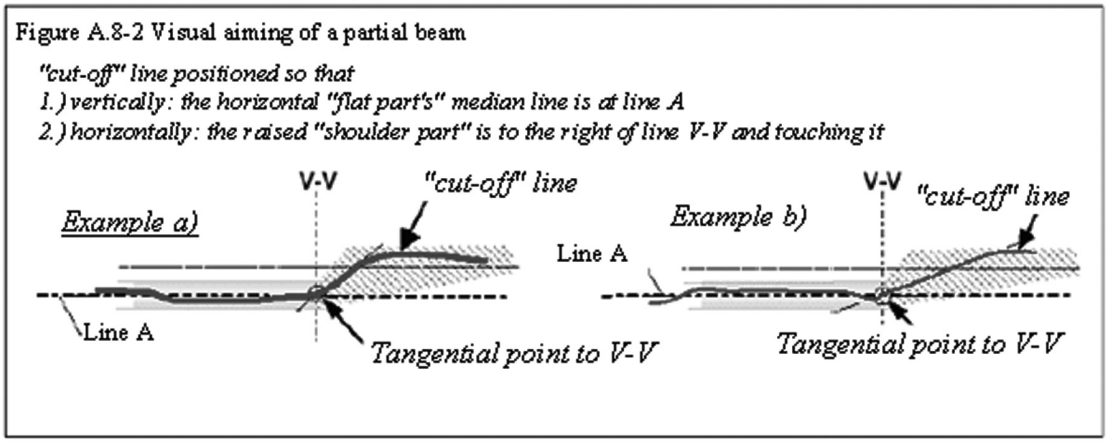


Figure A.8-2 Visual aiming of a partial beam



Note: The 'cut-off' is shown schematically, projected on the aiming screen.

ANNEX 9

PHOTOMETRIC MEASUREMENT PROVISIONS

1. GENERAL PROVISIONS

1.1. The system or part(s) thereof shall be mounted on a goniometer with a fixed horizontal axis and moveable axis perpendicular to the fixed horizontal axis.

1.2. The illuminance values shall be determined by means of a photoreceptor contained within a square of 65 mm side and set up to a distance of at least 25 m forward of the centre of reference of each lighting unit perpendicular to the measurement axis from the origin of the goniometer;

1.3. During photometric measurements, stray reflections should be avoided by appropriate masking.

1.4. The luminous intensities are measured and specified in form of illuminance values perpendicular to the direction of measurement, and, for a nominal distance of 25 m.

1.5. The angular co-ordinates are specified in deg on a sphere with a vertical polar axis according to CIE publication No 70, Vienna 1987, i.e. corresponding to a goniometer with a horizontal ('elevation') axis fixed to the ground and a second, moveable ('rotation') axis perpendicular to the fixed horizontal axis.

1.6. Any equivalent photometric method is acceptable, if the accordingly applicable correlation is observed.

1.7. Any offset of the centre of reference of each lighting unit, with respect to the goniometer rotation axes, should be avoided. This applies especially to the vertical direction and to lighting units producing a 'cut-off'.

An aiming screen shall be used and may be located at a shorter distance than that of the photoreceptor.

1.8. The photometric requirements for each single measuring point (angular position) of a lighting function or mode as specified in this Regulation apply to half of the sum of the respective measured values from all lighting units of the system applied for this function or mode, or, from all lighting units as indicated in the respective requirement;

1.8.1. However in those cases where a provision is specified for one side only, the division by the factor of 2 does not apply. These cases are: paragraphs 6.2.6.3, 6.2.9.1, 6.3.2.1.2, 6.3.2.1.3, 6.4.6, and note 4 of Table 1 of Annex 3.

1.9. The lighting units of the system shall be measured individually;

however, simultaneous measurements may be performed on two or more lighting units of an installation unit, being equipped with the same light source types with respect to their power supply (either power controlled or not), if they are sized and situated such that their illuminating surfaces are completely contained in a rectangle of not more than 300 mm in horizontal extend and not more than 150 mm vertical extend, and, if a common centre of reference is specified by the manufacturer.

1.10. The system shall prior to the subsequent test procedures be set to the neutral state.

1.11. The system or part(s) thereof shall be so aimed before starting the measurements that the position of the 'cut–off' complies with the requirements indicated in the Table 2 of Annex 3 to this Regulation. Parts of a system measured individually and having no 'cut-off' shall be installed on the goniometer under the conditions (mounting position) specified by the applicant.

2. MEASUREMENT CONDITIONS WITH RESPECT TO LIGHT SOURCES

2.1. In the case of replaceable filament lamps operated directly under vehicle voltage system conditions:

The system or parts thereof shall be checked by means of an uncoloured standard (etalon) filament lamp(s) designed for a rated voltage of 12 V. During checking of the system or part of, the voltage at the terminals of the filament lamp(s) shall be regulated so as to obtain the reference luminous flux as indicated at the relevant data sheet of Regulation No 37.

The system or parts thereof shall be considered acceptable if the requirements of paragraph 6 of this Regulation are met with at least one standard (etalon) filament lamp, which may be submitted with the system.

2.2. In the case of a replaceable gas-discharge light source:

The system or parts thereof using a replaceable gas-discharge light source shall comply with the photometric requirements set out in the relevant paragraphs of this Regulation with at least one standard (etalon) light source, which has been aged during at least 15 cycles, as specified in Regulation No 99. The luminous flux of this gas-discharge light source may differ from the objective luminous flux specified in Regulation No 99.

In this case, the measured photometric values shall be corrected accordingly. They shall be multiplied by a factor of 0,7 prior to the check for compliance.

2.3. In the case of a non-replaceable light source operating directly under vehicle voltage system conditions:

All measurements on lamps equipped with non-replaceable light sources (filament lamps and other) shall be made at 6,75 V, 13,5 V or 28,0 V, or at a voltage as specified by the applicant with respect to any other vehicle voltage system. The measured photometric values shall be multiplied by a factor of 0,7 prior to the check for compliance.

2.4. In the case of a light source, replaceable or non-replaceable, which is operated independently from vehicle supply voltage and fully controlled by the system, or in the case of a light source supplied by a special power supply, the test voltage as specified in paragraph 2.3 above shall be applied to the input terminals of that system/power supply. The test laboratory may require from the manufacturer this special power supply needed to supply the light sources.

The measured photometric values shall be multiplied by a factor of 0,7 prior to the check for compliance, except if this correction factor is already applied according to the provisions of paragraph 2.2 above.

2.5. LED module(s) shall be measured at 6,75 V, 13,5 V or 28,0 V respectively, if not otherwise specified within this Regulation. LED module(s) operated by an electronic light source control gear, shall be measured as specified by the applicant.

The measured photometric values shall be multiplied by a factor of 0,7 prior to the check for compliance.

3. MEASUREMENT CONDITIONS WITH RESPECT TO BENDING MODES

3.1. In the case of a system or part(s) thereof, which provide a bending mode, the requirements of paragraphs 6.2 (passing beam), and/or 6.3 (driving beam) of this Regulation apply for all states, corresponding to the turn radius of the vehicle. For verification with respect to the passing beam and the driving beam the following procedure shall be used:

3.1.1. The system shall be tested in the neutral state (central/straight), and, in addition in the state(s) corresponding to the smallest turn radius of the vehicle in both directions using the signal generator, if applicable.

3.1.1.1. Compliance with the requirements of paragraphs 6.2.6.2, 6.2.6.3 and 6.2.6.5.1 of this Regulation shall be checked for both category 1 and category 2 bending modes without additional horizontal reaim.

3.1.1.2. Compliance with the requirements of paragraphs 6.2.6.1 and 6.3 of this Regulation, whichever applies, shall be checked:

(a) in case of a category 2 bending mode: without additional horizontal reaim;

(b) in case of a category 1 or a driving beam bending mode: after having horizontally reaimed the relevant installation unit (by means of the goniometer for example) in the corresponding opposite direction.

3.1.2. When testing a category 1 or category 2 bending mode, for a turn radius of the vehicle other than specified in paragraph 3.1.1 above: it shall be observed whether the light distribution is substantially uniform and no undue glare occurs. If this can not be confirmed the compliance with the requirements laid down in Table 1 of Annex 3 to this Regulation shall be checked.

ANNEX 10

DESCRIPTION FORMS

maximum format: A4 (210 × 297 mm)

ADAPTIVE FRONT-LIGHTING SYSTEM DESCRIPTION FORM No 1

AFS control signals relevant to the lighting functions, and modes of functions provided by the system

AFS Control Signal	function/mode(s) of, being influenced by the signal (1)					technical characteristics (2) (use separate sheet, if needed)
	Passing beam				driving beam	
	Class C	Class V	Class E	Class W		
None/default	☒				☐	
V-Signal	☐	☐	☐	☐	☐	
E-Signal	☐	☐	☐	☐	☐	
W-Signal	☐	☐	☐	☐	☐	
T-Signal	☐	☐	☐	☐	☐	
other Signals (3)	☐	☐	☐	☐	☐	

(1) Mark in the respective box(es) with an cross (X) the combination(s) which apply.
(2) To be indicated in terms of:
(a) physical nature (electrical current/voltage, optical, mechanical, hydraulic, pneumatic, …),
(b) information type (continuous/analogous, binary, digitally coded, …),
(c) time dependent properties (time constant, resolution, …),
(d) signal status when the respective conditions according to paragraph 6.22.7.4 of Regulation No 48 are fulfilled,
(e) signal status in case of failure (with reference to the system input).
(3) According to the applicant's description; use separate sheet, if needed.

ADAPTIVE FRONT-LIGHTING SYSTEM DESCRIPTION FORM No 2

Cut-off status, adjustment devices and adjustment procedures relevant to the lighting units

Lighting unit No (1)	Cut-off status (2)		Adjustment device				Characteristics & additional provisions (if any) (5)
	The lighting unit provides or contributes to one or more passing beam cut-off(s),		vertical		horizontal		
	as defined in Annex 8 to this Regulation (3)	and provisions of paragraph 6.4.6 of this Regulation apply (3)	individual ('master') (3) (6)	linked to 'master' unit No (4)	individual ('master') (3) (6)	linked to 'master' unit No (4)	
1	yes/no	yes/no	yes/no	…	yes/no	…	
2	yes/no	yes/no	yes/no	…	yes/no	…	
3	yes/no	yes/no	yes/no	…	yes/no	…	
4	yes/no	yes/no	yes/no	…	yes/no	…	
5	yes/no	yes/no	yes/no	…	yes/no	…	
6	yes/no	yes/no	yes/no	…	yes/no	…	
7	yes/no	yes/no	yes/no	…	yes/no	…	

(1) Designation of each individual lighting unit of the system as indicated in Annex 1 to this Regulation and as shown in the drawing according to paragraph 2.2.1 of this Regulation; use separate sheet(s) if needed.
(2) Relevant to provisions of paragraph 6.22.6.1.2 of Regulation No 48.
(3) Strike out what does not apply.
(4) Indicate corresponding lighting unit(s) number(s), if applicable.
(5) Information such as e.g.: the order of adjustment of lighting units or assemblies of lighting units, any additional provisions for the adjustment process.
(6) The adjustment of a 'master' lighting unit may also adjust (an)other lighting unit(s).

ANNEX 11

Requirements for LED modules and AFS including LED modules

1. GENERAL SPECIFICATIONS

1.1. Each LED module sample submitted shall conform to the relevant specifications of this Regulation when tested with the supplied electronic light source control-gear(s), if any.

1.2. LED module(s) shall be so designed as to be and to remain in good working order when in normal use. They shall moreover exhibit no fault in design or manufacture. A LED module shall be considered to have failed if any one of its LEDs has failed.

1.3. LED module(s) shall be tamperproof.

1.4. The design of removable LED module(s) shall be such that:

1.4.1. When the LED module is removed and replaced by another module provided by the applicant and bearing the same light source module identification code, the photometric specifications of the AFS shall be met;

1.4.2. LED modules with different light source module identification codes within the same lamp housing, shall not be interchangeable.

2. MANUFACTURE

2.1. The LED(s) on the LED module shall be equipped with suitable fixation elements.

2.2. The fixation elements shall be strong and firmly secured to the LED(s) and the LED module.

3. TEST CONDITIONS

3.1. Application

3.1.1. All samples shall be tested as specified in paragraph 4 below.

3.1.2. The kind of light sources on a LED MODULE shall be light-emitting diodes (LED) as defined in Regulation No 48 paragraph 2.7.1 in particular with regard to the element of visible radiation. Other kinds of light sources are not permitted.

3.2. Operating conditions

3.2.1. LED module operating conditions

All samples shall be tested under the conditions as specified in paragraphs 6.1.4 and 6.1.5 of this Regulation. If not specified differently in this Annex LED modules shall be tested inside the AFS as submitted by the manufacturer.

3.2.2. Ambient temperature

For the measurement of electrical and photometric characteristics, the AFS shall be operated in a dry and still atmosphere at an ambient temperature of 23 °C ± 5 °C.

3.3. Ageing

Upon the request of the applicant the LED module shall be operated for 15 h and cooled down to ambient temperature before starting the tests as specified in this Regulation.

4. SPECIFIC SPECIFICATIONS AND TESTS

4.1. Colour rendering

4.1.1. Red content

In addition to measurements as described in paragraph 7 of this Regulation:

The minimum red content of the light of a LED module or AFS incorporating LED module(s) tested at 50 V shall be such that:

$$k_{red} = \frac{\int_{\lambda = 610\ nm}^{780\ nm} E_e(\lambda)V(\lambda)d\lambda}{\int_{\lambda = 380\ nm}^{780\ nm} E_e(\lambda)V(\lambda)d\lambda} \geq 0{,}05$$

where:

$E_e(\lambda)$ (unit: W) is the spectral distribution of the irradiance;

$V(\lambda)$ (unit: 1) is the spectral luminous efficiency;

(λ) (unit: nm) is the wavelength.

This value shall be calculated using intervals of one nanometre.

4.2. UV-radiation

The UV-radiation of a low-UV-type LED module shall be such that:

$$k_{UV} = \frac{\int_{\lambda = 250\ nm}^{400\ nm} E_e(\lambda)S(\lambda)d\lambda}{k_m \int_{\lambda = 380\ nm}^{780\ nm} E_e(\lambda)V(\lambda)d\lambda} \leq 10^{-5}\ W/lm$$

where:

$S(\lambda)$(unit: 1) is the spectral weighting function;

k_m = 683 lm/W is the maximum value of the luminous efficacy of radiation.

(For definitions of the other symbols see paragraph 4.1.1 above).

This value shall be calculated using intervals of one nanometre. The UV-radiation shall be weighted according to the values as indicated in the Table UV below:

λ	S(λ)
250	0,430
255	0,520
260	0,650
265	0,810
270	1,000
275	0,960
280	0,880
285	0,770
290	0,640
295	0,540
300	0,300

λ	S(λ)
305	0,060
310	0,015
315	0,003
320	0,001
325	0,00050
330	0,00041
335	0,00034
340	0,00028
345	0,00024
350	0,00020

λ	S(λ)
355	0,00016
360	0,00013
365	0,00011
370	0,00009
375	0,000077
380	0,000064
385	0,000530
390	0,000044
395	0,000036
400	0,000030

Table UV: Values according to 'IRPA/INIRC Guidelines on limits of exposure to ultraviolet radiation'. Wavelengths (in nanometre) chosen are representative; other values should be interpolated.

4.3. Temperature stability

4.3.1. Illuminance

4.3.1.1. For each existing class of passing beam and for the driving beam, a photometric measurement shall be carried out after one minute of operation of the respective lighting units and for the following test points:

Passing beam: 50V

Driving beam: HV

4.3.1.2. Operation of the lighting units mentioned in paragraph 4.3.1.1 above shall then be continued until photometric stability has occurred; this condition is considered to be fulfilled if the variation of the illuminance for the test points indicated in paragraph 4.3.1.1 above is less than 3 per cent within any 15 minute period. After photometric stability has occurred, aiming for complete photometry shall be performed and the photometric values at all required test points shall be determined.

4.3.1.3. The ratio between the photometric values measured after one minute of operation and those measured after photometric stability has occurred shall be calculated for the test points indicated in paragraph 4.3.1.1 above. This ratio shall then be applied to all other applicable test points to determine their photometric values after one minute of operation.

4.3.1.4. The illuminance values determined after one minute of operation and after occurrence of photometric stability shall comply with applicable photometric requirements.

4.3.2. Colour

The colour of the light emitted measured after one minute and measured after photometric stability has been obtained, as described in paragraph 4.3.1.2 of this Annex, shall both be within the required colour boundaries.

5. The measurement of the objective luminous flux of LED module(s) producing the principal passing beam shall be carried out as follows:

5.1. The LED module(s) shall be in the configuration as described in the technical specification as defined in paragraph 2.2.2 of this Regulation. Optical elements (secondary optics) shall be removed by the Technical Service at the request of the applicant by the use of tools. This procedure and the conditions during the measurements as described below shall be described in the test report.

5.2. Three LED modules of each type shall be submitted by the applicant with the light source control gear, if applicable, and sufficient instructions.

Suitable thermal management (e.g. heat sink) may be provided, to simulate similar thermal conditions as in the corresponding AFS application.

Before the test each LED module shall be aged for at least seventy-two hours under the same conditions as in the corresponding AFS application.

In the case of an integrating sphere is used, the sphere shall have a minimum diameter of one meter, and at least ten times the maximum dimension of the LED module, whichever is the largest. The flux measurements can also be performed by integration using a goniophotometer. The prescriptions in the CIE – Publication 84 – 1989, regarding the room temperature, positioning, etc., shall be taken into consideration.

The LED module shall be burned in for approximately one hour in the closed sphere or goniophotometer.

The flux shall be measured after stability has occurred, as explained in paragraph 4.3.1.2 of this Annex.

The average of the measurements of the three samples of each type of LED module shall be deemed to be its objective luminous flux.

IV

(Acts adopted before 1 December 2009 under the EC Treaty, the EU Treaty and the Euratom Treaty)

COMMISSION DECISION

of 17 September 2008

on State aid C 61/07 (ex NN 71/07) — Greece Olympic Airways Services/Olympic Airlines

(notified under document C(2008) 5073)

(Only the Greek text is authentic)

(Text with EEA relevance)

(2010/7777/EC)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Community, and in particular the first subparagraph of Article 88(2) thereof,

Having regard to the Agreement on the European Economic Area, and in particular Article 62(1)(a) thereof,

Having called on interested parties to submit their comments pursuant to the above Articles [1], and having regard to these comments,

Whereas:

1. PROCEDURE

(1) By letter dated 19 December 2007, the Commission informed Greece of its decision to initiate the procedure provided for in Article 88(2) of the Treaty in respect of a number of financial flows and transfers which gave rise to issues of State aid concern in connection with the financing and operations of Olympic Airways Services SA and Olympic Airlines SA.

(2) On 14 January 2008 Greece requested an extension of the deadline for its reply which was accepted by the Commission. Greece transmitted its comments on 13 February 2008.

(3) The Commission's decision to initiate the procedure was published in the *Official Journal of the European Union* [2]. The Commission invited interested parties to submit their comments on the measures in question within one month of the publication date.

(4) The Commission received comments on the subject from interested parties. It transmitted the comments to Greece by electronic mail of 9 April 2008. Greece was given the opportunity to respond to these comments, the Commission received Greece's observations by electronic mail dated 13 May 2008.

2. DESCRIPTION OF THE FACTS

2.1. The parties

2.1.1. *Olympic Airways Services SA*

(5) Olympic Airways Services SA is the current name of the company formerly known as Olympic Airways SA [3]. It is primarily involved in the provision of ground-handling and aircraft maintenance/engineering services in Greece and does not operate any aircraft. It is 100 % state-owned.

2.1.2. *Olympic Airlines SA*

(6) Olympic Airlines SA began operation in December 2003 and was established from the flight divisions of Olympic Airways. It operates scheduled air services within Greece on intra-EU and inter-continental routes. It is 100 % state-owned [4].

[1] OJ C 50, 23.2.2008, p. 13.
[2] See footnote 1.

[3] Olympic Airways SA was formally renamed Olympic Airways – Services SA. An amendment of the Articles of Association of Olympic Airways SA was published in the Greek Govt. Gazette no. 1485/19.2.2004, SA issue, on 19 February 2004. The amendment concerned the provision of article 1, on the basis of which the company was renamed 'Olympic Airways – Services SA' and its duration was set for 46 years, namely up to 31/12/2049 inclusive. The amendment also concerned the provision of article 2. The main purpose of the company is ground handling servicing, engine and aircraft overhaul workshop operations, representation and agency of airline operators etc. Hereafter in this decision the terms 'Olympic Airways' is used to mean both 'Olympic Airways SA' up to February 2004 and 'Olympic Airways – Services SA' thereafter.

[4] On 14 September 2005 the Commission adopted a final negative decision (Decision 2005/2706/EC – not yet published) concerning aid granted by the Hellenic Republic to Olympic Airways and Olympic Airlines.

2.2. **Measures under investigation**

(7) The opening decision investigated the following four areas:

— Potential State aid to Olympic Airways Services SA through forbearance of debts The Hellenic Republic may have granted illegal and incompatible State aid to this company through its continued forbearance towards Olympic Airways in relation to its tax and social security debts since January 2005 ([5]).

— Potential State aid to Olympic Airways Services SA by means of arbitral panel awards The Hellenic Republic may have granted illegal and incompatible State aid to Olympic Airways Services in connection with payments made in respect of a number of arbitral panel decisions. These decisions result from a number of damages actions taken by this company against the State.

— Potential State aid to Olympic Airlines SA: The Hellenic Republic may have granted illegal and incompatible State aid by means of aircraft lease payments and non-execution of its debts (including tax and social security liabilities) against this indebted State owned company since June 2005 ([6]).

— Potential State aid to Olympic Airways Services SA and to Olympic Airlines by means of special creditor protection: meaning that no legal action or individual or collective enforcement measures (includes precautionary measures and injunctions) may be taken, in Greece or abroad, against either company by any private creditor. This legal protection is not granted to any other entity in Greece and is specific to these companies. Any other company in Greece seeking such creditor protection would have to go into bankruptcy.

(8) The potential State aid to Olympic Airways Services by means of the arbitral panel awards requires further, more detailed examination. It is therefore excluded from the scope of the current decision and will be dealt with in a separate later Commission decision.

2.2.1. *Tax and social security debts of Olympic Airways Services since December 2004*

(9) In its 2005 Decision the Commission identified a pattern of behaviour whereby the State did not collect its taxation and social security liabilities from Olympic Airways when these fell due, these debts would then be 'certified' against the company but no execution of this debt would be undertaken by the State. Over time the company would make partial payments by instalment ([7]). In the 2005 Decision the Commission concluded that the delayed or under-payment of taxation and social security liabilities by Olympic Airways provided a cash flow benefit to this company at the expense of the State.

(10) In the 2005 Decision (Article 3 thereof) the Commission obliged Greece to 'immediately suspend all further payments of aid to Olympic Airways and Olympic Airlines'. On several occasions ([8]) the Commission requested the Greek authorities to provide information on how it had implemented this aspect of the decision. And to provide Commission services with information regarding the tax and social security contributions paid by this company to the State. Notwithstanding these repeated specific requests the Greek authorities have failed to provide adequate information in this regard.

(11) Far from providing the Commission services with information and confirmation that these companies are paying their tax and social security debts in full and on time the information provided by the Greek authorities to the Commission and to the European Courts is such as to suggest that the two companies Olympic Airways Services and Olympic Airlines cannot and do not discharge their ever-increasing debts to the public authorities.

(12) By letter dated 30 October 2006 ([9]) the Greek authorities provided the Commission services with a letter dated 13 June 2006 from an 'independent assessor' called 'Progressive Finance' on the subject of the financial situation of Olympic Airways. The expert based itself on the 2004 Balance Sheet (not provided to the Commission) and the 2006 Cash Flow. The expert concluded that, on the basis of the information at its disposal, the company's negative financial situation was directly related to its obligations to the State and to the social security administration and the outstanding State aid issues. 'Progressive Finance' also stated that on the basis of the 2006 Cash Flow, the company is not considered creditworthy and it had no possibility of contracting and servicing a loan to repay the State aid identified in the 2005 Decision.

([5]) The 2005 Decision only took into account aid granted to Olympic Airways up to and including December 2004.

([6]) The 2005 Decision only took into account aid granted to Olympic Airlines up to and including May 2005.

([7]) For example in 2003-2004 Olympic Airways made payments of EUR 7,7 million relating to a Settlement Agreement for years prior to 2003.

([8]) Commission letters of 25 August 2006 (ref D (2006) 217009) and of 16 July 2007 (ref D (2007) 313288).

([9]) Ref.: 3082.07/004/A/9749.

(13) Furthermore, in the context of Case T-423/05 R, Olympic Airways was asked by the President of the Court of First Instance to provide the Court with information on its capacity to repay the State aid identified by the Commission and its level of indebtedness.

(14) By letter dated 27 November 2006 the company provided the Court with a report by the independent expert PriceWaterhouseCoopers on the possibility of a repayment by instalments of aid and an assessment of the aid that had been repaid following the negative Commission Decisions of 2002 and 2005.

(15) Olympic Airways' expert (PwC) calculated the amounts to be recovered as a result of the 2005 Decision at EUR 411 million, which it said could be refunded in 48 monthly instalments and which, having regard to the debts owed to the Social Security administration, could be extended to 96 instalments only following a legislative modification. The expert however acknowledged that 'the analysis of Olympic Airway's cash flows as they were provided us by the company (and which, for lack of time could not be subject to a detailed control as to their exactitude and their exhaustiveness) leads to the conclusion that the eventuality of a total or partial repayment of the amounts due is not possible'.

(16) In its opening of the investigative procedure the Commission reached the preliminary conclusion that the obligation to suspend all further payments of aid to Olympic Airways contained in Article 3 of the 2005 Decision has not been respected. Furthermore, the Commission came to the preliminary conclusion that Olympic Airways is not paying its tax and social security liabilities in full and on time and cannot even pay its existing debts and that this behaviour is only possible due to the forbearance of the State.

2.2.2. *State aid to Olympic Airlines since 2005*

(17) In relation to Olympic Airlines the Commission in its 2005 Decision identified as State aid granted to Olympic Airlines the 'Acceptance by Olympic Airways and by Greece of lease payments from Olympic Airlines for the sub-leasing of aircraft which are lower than the amounts paid for head leases …'

(18) The Hellenic Republic ([10]) did not dispute the fact that the State and Olympic Airways had sub-leased the aircraft in question to Olympic Airlines at rates lower than those of the original leases, it did however take issue with the assessment that this amounted to State aid. The Hellenic Republic's contention was that as Olympic Airlines paid the market price for these sub leases it obtained no advantage.

([10]) Letter of 16 November 2006.

(19) As previously mentioned, Article 3 of the 2005 Decision required Greece to immediately suspend all State aid payments. Notwithstanding repeated reminders of the Commission ([11]) of the obligation to 'immediately suspend all further payments of aid to Olympic Airways and Olympic Airlines' and requests to furnish the Commission with information that Olympic Airlines is currently paying or has paid the head lease payments in respect of the leased aircraft identified in the 2005 Decision, the Greek authorities have failed to do so.

(20) In relation to the financial situation of Olympic Airlines, the Commission has asked Greece to provide it with information regarding the current financial situation of Olympic Airlines and how the company is currently operating. The information provided by the Greek authorities prior to the opening of procedure has not reassured the Commission. The Commission does not understand how the company finances its day-to-day operations and addresses its losses. The Commission expressed doubts as to whether the company is paying its taxes and social liabilities to the State in full and on time or whether, it benefits from the forbearance from the State in this regard.

(21) In the opening decision the Commission noted that although Olympic Airlines began operations in December 2003 with little or no debt ([12]), in 2004 it already suffered an operating loss of EUR 94,5 million on a turnover of EUR 616,7 million and a net loss for the year before taxation of EUR 87,1 million. In 2005 Olympic Airlines posted a net loss of EUR 123,7 million ([13]) on revenues of EUR 643 million for 2005 ([14]). It had been widely reported by the media ([15]) that the losses of the company for 2006 will be in excess of EUR 120 million. On this basis, since it commenced services in December 2003, Olympic Airlines has lost a total of over EUR 330 million over the first three years of operations.

2.2.3. *State aid to Olympic Airways Services SA and to Olympic Airlines SA by means of special creditor protection*

(22) Article 22 of Law No 3404/05 ([16]) provides that 'up to and including 28 February 2006 no legal action or individual or collective enforcement measures (includes

([11]) Letters of 25 August 2006 (ref. D (2006) 217009) and 16 July 2007 TREN (ref. D (2007) 313288).

([12]) All long-term debt was left with Olympic Airways and of the taxes, social security and other duties due to the Greek State only one month's liabilities were transferred to Olympic Airlines.

([13]) Source Reuters, 20 December 2006.

([14]) It does not seem that the company has published audited accounts since December 2003

([15]) Source Kathimerini, 21 September 2007.

([16]) 'Regulation of matters relating to the university and technological fields within higher education and other provisions' (Greek Government Gazette A 260).

precautionary measures and injunctions) may be taken, in Greece or abroad, against Olympic Airlines S.A., Olympic Airways – Services S.A., Olympic Aviation S.A., their assets or any part of their assets which is necessary for or useful to such assets; any such legal action currently ongoing and the consequences of any such measures shall be suspended for the abovementioned period of time. The Greek State is exempted from these restrictions.' The validity of this provision was extended three times, initially until 31 October 2006 ([17]) subsequently to 31 October 2007 ([18]) and finally to 31 October 2008.

(23) This provision effectively prohibited the enforcement of rulings, in Greece or abroad, against any company within the Olympic Group. The effect of this law is to unilaterally shield these companies from their obligations as ruled by a court of law, halting the procedures intended to enforce such obligations, and blocking the possibility of precautionary measures.

(24) The Commission concluded that this provision therefore gives Olympic Airways and the other companies within the group preferential treatment, granting it a type of legal protection not afforded to other domestic or foreign airlines or indeed any other economic operator. Any other company in Greece seeking such creditor protection would have to go into bankruptcy.

2.3. **Initial assessment by the Commission**

2.3.1. *Existence of aid*

2.3.1.1. Tax and social security debts of Olympic Airways Services since December 2004

(25) In opening the investigative procedure the Commission concluded that the State forbearance in relation to its tax and social security debts of Olympic Airways Services accumulated since January 2005 clearly constituted a grant of State resources aimed at one undertaking which is in competition with others and as such constituted State aid.

2.3.1.2. State aid to Olympic Airlines since 2005

(26) In opening the investigative procedure the Commission concluded that the suspected discounted aircraft lease payments and non-execution of State debts (including tax and social security liabilities) in favour of Olympic Airlines since May 2005 involve State resources aimed at specific undertakings in competition with others and as such constituted State aid.

([17]) Article 28 of Law No 3446/2006 (Greek Government Gazette A 49, 10.3.2006).

([18]) Article 35(B) of Law No 3492/2006 (Greek Government Gazette A 210, 5.10.2006).

2.3.1.3. State aid by means of special creditor protection

(27) The Commission also concluded that the special creditor protection afforded to both companies is similar to bankruptcy protection. In this regard it is settled jurisprudence ([19]) that in situations where a Member State has put in place a system derogating from the rules of ordinary law relating to insolvency in favour of an undertaking such a system is to be regarded as State aid where it is established that the undertaking has been permitted to continue trading in circumstances in which it would not have been permitted to do so if the rules of ordinary law relating to insolvency had been applied, or if it has enjoyed further advantages from the State.

2.3.2. *Compatibility of aid*

(28) In opening the investigation in relation to the public financing believed to have been given to Olympic Airways Services by means of forbearance of debts (including tax and social security) and the special creditor protection the Commission expressed serious doubts as whether any of these measures could be declared compatible with the common market, as none of the exceptions to the general prohibition of State aid seemed to apply.

(29) Similarly with regard to the public financing believed to have been given to Olympic Airlines by means of forbearance of debts (including tax and social security), reduced aircraft lease payments and the special creditor protection the Commission expressed serious doubts whether any of this can be declared compatible with the common market, as none of the exceptions to the general prohibition of State aid seems to apply.

3. **COMMENTS FROM GREECE**

(30) The Hellenic Republic began its observations by underlining the importance of clarifying the time period which is being examined in the current investigation. The opening of procedure is stated in relation to Olympic Airways to cover from December 2004 and in relation to Olympic Airlines from May 2005. The Hellenic Republic takes issue with this and points out that for example, the sum of EUR 12 267 250 (capital plus interest) referred to in the third line of the table in paragraph 138 of the 2005 Decision relates to a debt of Olympic Airways – Services S.A. of 9 March 2005 which was a debt to the tax authorities. In the opinion of the Greek authorities the starting point for the Commission's current investigation under Article 88(2) EC has to be the date on which the 2005 Decision was issued (14 September 2005).

([19]) C-295/97, *Industrie Aeronautiche e Meccaniche Rinaldo Piaggio SpA* v *International Factors Italia SpA (Ifitalia).*

(31) Furthermore, the Hellenic Republic stated that it had already recovered the aid covering the period referred to by the 2005 Decision. By letter dated 21 November 2007 the Hellenic Republic informed the Commission that it had fully implemented the 2005 Decision.

3.1. **Tax and social security debts of Olympic Airways Services since December 2004**

(32) In relation to this heading of aid the Hellenic Republic contends that the company holds a tax and social security clearance form. This means that at present the Greek State has no claim against the company which the company is obliged to settle immediately. The company is not obliged to immediately pay any debts to the tax authorities that remain unpaid due to the fact that it successfully sought judicial remedies and has obtained judgements from the competent national courts. There is no claim for due debts from the Civil Aviation Authority relating to Olympic Airways Services. Certain older debts of Olympic Airways Services to the IKA (Social Security) Fund are being paid via monthly instalments, in line with the generally applicable provisions of Law 3518/2006. Consequently, Greece argues that there is no 'prolonged forbearance' by the Greek State in relation to the purported non-payment of debts.

(33) The Hellenic Republic acknowledged that the company's delay in publishing the balance sheets is not in line with its obligations under national law. However, it informed the Commission that it has already taken suitable measures to ensure that this matter is dealt with. The Board of Directors of Olympic Airways Services has already taken a decision to appoint an auditing firm to update its financial statements. The company has already drawn up draft balance sheets for the years 2004 to 2006. The company has established an impression of its financial situation for 2007 in a Balance Sheet Estimate.

(34) The draft balance sheets for the 2004-2006 periods show that the company was in the red with equity of […] (*) million at the end of 2006 and had taxes and duties and social security debts of EUR 1 098 million. However, at the end of the 2007 period the company had significantly improved its equity which now stands at […]*million. Its tax, duties and social security debts now stand at […]*million.

(35) According to the information provided (based on estimates provide by the company), the breakdown of debts to the State and social security providers on 31.12.2007 was as follows:

(in EUR million)

	Olympic Airways Services debts	Amounts	Total
Social security debts	Balance of old debts to the IKA fund paid in monthly instalments	[…]*	
Social security debts	Non-due debts of Olympic Airways Services for the month of December and the Christmas bonus (payable by the end of February 2008)	[…]*	
Social Security debts			[…]*
Taxes – duties	Certified debts to FABE Tax Office suspended due to successful judicial remedies (from tax audits up to 30.4.2007)	[…]*	
	Olympic Airways Services estimates of taxes and fines from May to December 2007	[…]*	
Taxes – duties			[…]*
Grand total			[…]*

(36) As far as social security debts are concerned, Olympic Airways Services has paid all its debts to the IKA Fund and has made arrangements for the repayment of old debts for the period up to and including 31.10.2006 under Law 3518/2006. For accounting purposes, the company is shown in the 2007 financial statement assessments as having a liability to social security providers whose total amount is the debt repayment facility amount on 31.12.2007 plus contributions for the month of December and the 2007 Christmas bonus.

(37) The Hellenic Republic has pointed out in relation to the repayment facility for old Olympic Airways Services debts to the IKA Fund and repayment via monthly instalments that under both Community legislation and well established case law the repayment of debts to the State is to be effectuated in accordance with the rules of national law. This is in compliance with Community law where the specific legal framework does not introduce any discrimination between debtors. In this regard the Hellenic Republic also cites the Commission Communication on the application of the State aid rules to measures relating to direct business taxation ([20]) where the Commission states that taxation measures which apply to all economic operators operating within the territory of a Member State are, prima facie, general measures.

(*) Business secret.

([20]) OJ C 384, 10.12.1998, p. 3.

(38) In this case, the procedures to collect old IKA Fund debts which are contained in national law apply without any discrimination to all debtors, including Olympic Airways Services, in accordance with the general legislative framework governing the payment of debts to the State. Consequently in the view of Greece there is no specificity and therefore no infringement of Article 87(1) EC.

(39) As far as its tax debts are concerned, Olympic Airways Services has paid all certified debts to the tax office (FABE and FAEE Tax Offices) apart from those debts for which it successfully obtained judicial remedies before the Greek courts. Consequently, its only outstanding debts are those which are not due and payable under national law.

(40) In the 2007 balance sheet estimate, the company is shown as having tax – duties liability covering all amounts in the said table which relate to the year 2007. Overall, those amounts (plus fines and surcharges) come to EUR […]* million. However, the Hellenic Republic states that the company is not under obligation to pay the Greek State any of the aforementioned debts at present since the company has been successful in obtaining judicial remedies on these matters.

(41) Furthermore, the 2007 balance sheet estimates contains an estimate from the company about probable debts of EUR […]* million.

(42) In this regard the Hellenic Republic asks that the Commission draw a distinction between (a) those debts which are presented for accounting purposes in the company's books and (b) those debts which are payable at present to the Greek State in accordance with the generally applicable provisions of national law. Examination of any issues being reviewed by the Commission in the context of this procedure could only focus on the latter.

(43) On the basis of the information provided the Hellenic Republic opines that there is no issue of transfer of state resources in this case within the meaning of Article 87(1) EC, and even less so any issue of favourable treatment of Olympic Airways Services.

3.2. **State aid to Olympic Airlines from 2005 onwards**

(44) In relation to the sub-lease of aircraft to Olympic Airlines by Olympic Airways Services and the Greek State, the Greek authorities state that Olympic Airlines had the financial ability to conclude operating leases directly with market players and that Olympic Airlines was never favoured by concluding operating leases since these leases were concluded at current market rates and thus there was no concealed State aid.

(45) Furthermore, in selecting Olympic Airlines, Olympic Airways Services had acted just as any private investor in the same position would have acted, since not only did it manage to cut its monthly losses in the best possible manner, but it also ensured that that loss would be limited over time given the stated intention of Olympic Airlines to re-negotiate and take over the head leases.

(46) The Hellenic Republic also wished to point out that the lease payments made by Olympic Airlines for operating sub-leases should not be compared with lease payments for finance leases, with which in its view the Commission has erroneously compared them. These are in effect dissimilar types of leases.

(47) In relation to Olympic Airlines' tax and social security debts the Hellenic Republic states that there has been no forbearance on non-payment, Olympic Airlines has fully settled its social security debts. In relation to its tax debts, the delay in payment of only a part of its tax debts to the Greek State for a limited period since the 2005 Decision does not constitute 'prolonged forbearance' on the part of the Greek State. In any event the Greek State states that it has already taken all the measures required under national law to certify and then collect the greater part of the company's arrears. Moreover, the company has already submitted a request for repayment of its certified tax debts in 48 instalments under the generally applicable rules of national law.

3.2.1. *Sub-leasing of aircraft*

(48) The sub-leasing of the aircraft at a price below that of the lease payments in the head leases does not constitute State aid because there was no favourable treatment of Olympic Airlines nor did that company obtain any benefit which it would not have obtained anyway in light of market conditions. The Greek authorities argue that the Commission did not examine at all the level of the lease payments in light of the private investor test and employed a flawed methodology by taking into account the difference between the head lease and the sub-lease of the aircraft instead of examining whether the sub-lease was concluded at market rates.

3.2.2. *Finance leases and operating leases*

(49) The Hellenic Republic considers that the Commission was clearly in error in not distinguishing between finance and operating leases.

(50) Firstly, the Hellenic Republic pointed out that of all the aircraft leased by Olympic Airlines, four A340-300 aircraft had been sub-leased to that company by Olympic Airways Services which had those aircraft on the basis of finance leases. From December 2004 the Greek State replaced Olympic Airways Services in the

said finance leases from December 2004 onwards (for the first pair) and from April 2005 onwards (for the second pair). From then to now those aircraft have been sub-leased to Olympic Airlines by the Greek State.

(51) Greece explains that a finance lease is a lease under which the risks and benefits deriving from ownership of an asset are effectively transferred (Title may or may not eventually be transferred). In reality it equates to purchase subject to condition of payment of the price in instalments. An operating lease is any lease that is not a finance lease. Consequently, the lease payment under a finance lease corresponds to the amount of the instalment to repay the value of the aircraft so that in the end the finance lessee is the owner of the aircraft at the end of the lease. The monthly lease payment paid by the Greek State to the lessors for the aircraft will cease in 2011 since the aircraft will become its full property then.

(52) The Greek State's decision to sub-lease the aircraft at prices below the finance lease payments paid under the head lease is not a grant of State aid to Olympic Airlines since (a) it is justified by the different nature of the two types of contracts and (b) the lease payments paid in the context of operating subleases reflect the market rates for leases of similar aircraft at the critical time when the contracts are concluded.

(53) Consequently, it is self evident that the lease payment under a finance lease is higher than the lease payment under a simple operating lease since such payment also includes gradual repayment of the value of the aircraft. On the contrary, Olympic Airlines paid the Greek State a lease payment only for operating the aircraft without any expectation under the contract of acquiring ownership in the future.

(54) In relation to the operating leases for aircraft operated by Olympic Airlines, the Hellenic Republic informed the Commission that all such subleases for aircraft between Olympic Airways Services and Olympic Airlines have expired apart from one (for an A300-600 aircraft). In a number of cases contracts were renegotiated and renewed (at various dates between 2005 and 2007) between Olympic Airlines and the initial lessors, without the intermediation of Olympic Airways Services based on current market rates.

(55) More specifically, in the case of four leases for DHC 8-102 aircraft, four leases for B-737-400 Aircraft, one lease for a B-737-300 aircraft and three leases for B-717-200 aircraft, where the lessee had been Olympic Airways Services, the position of lessee in the head operating lease is now Olympic Airlines

(56) In the opinion of Greece, Olympic Airways Services' decision to generate income from the aircraft and cut its losses by subleasing them to Olympic Airlines was fully justified in commercial terms and in line with the private investor test. Moreover, by signing these subleases Olympic Airways Services released itself from the aircraft safeguarding and maintenance costs and benefited from ground handling and maintenance services it provided to Olympic Airlines for those aircraft.

3.2.3. *Debts and current financial situation of Olympic Airlines*

(57) Over the period 2004 -2007 Olympic Airlines reported revenues up some 16,5 % and managed to curtail its cost increases (fuel excluded) to 9,7 %.

(58) Under the provisions of Law 2190/1920 the company is obliged to complete preparation of its financial statements for 2007 by the end of April 2008. Greece provided the following table to explain Olympic Airlines financial situation.

INCOME – EXPENSES	2007 Estimates	2006	2005	2004
TOTAL INCOME	[…]*	[…]*	[…]*	[…]*
	[…]*	[…]*	[…]*	[…]*
AIRCRAFT FUEL	[…]*	[…]*	[…]*	[…]*
OTHER PROPORTIONAL EXPENSES	[…]*	[…]*	[…]*	[…]*
TOTAL PROPORTIONAL EXPENSES	[…]*	[…]*	[…]*	[…]*
RESULTS BEFORE FIXED EXPENSES	[…]*	[…]*	[…]*	[…]*
	[…]*	[…]*	[…]*	[…]*
AIRCRAFT LEASE PAYMENTS	[…]*	[…]*	[…]*	[…]*
OTHER EXPENSES	[…]*	[…]*	[…]*	[…]*
TOTAL	[…]*	[…]*	[…]*	[…]*
EBITDA	[…]*	[…]*	[…]*	[…]*
	[…]*	[…]*	[…]*	[…]*
TOTAL DEPRECIATION	[…]*	[…]*	[…]*	[…]*
RESULTS	[…]*	[…]*	[…]*	[…]*
OTHER FINANCIAL EXPENSES	[…]*	[…]*	[…]*	[…]*
TOTAL EXPENSES	[…]*	[…]*	[…]*	[…]*
EARNINGS BEFORE TAXES & EXTRAORDINARY ITEMS	[…]*	[…]*	[…]*	[…]*
EXTRAORDINARY RESULTS	[…]*	[…]*	[…]*	[…]*
EBT	[…]*	[…]*	[…]*	[…]*

(59) As set out in the table, Olympic Airlines' total income in 2004 was […]*million while total expenses were […]*before tax with the result that the company reported losses of EUR 87,1 million. The company's situation worsened over the following years. In 2007 its losses were […]*million.

(60) According to the Greek authorities, this change in Olympic Airlines' financial situation is to a large extent a consequence of its legal inability to increase its share capital ([21]) imposed by the sole shareholder (the Greek State) and by the complications which previous state aid decisions have created in the effort to include private funds in the company.

(61) The company has pointed out that a long-term shortage of capital has forced it to significantly increase costs particularly in relation to aircraft leases where short-term rather than long-term leases have made a major contribution to its negative results. Moreover, due to the shortage of capital there have been significant delays in introducing innovations to the production process within the company resulting in delay implementing of for example e-ticketing.

(62) These facts notwithstanding, the Greek authorities state that the company has regularly settled its debts to social security schemes and has no due debts to the main social security scheme, the IKA Fund.

(63) At present the company has delayed its debt payments to a certain number of creditors. More specifically, its total due debts (up to 31.12.2007) to Olympic Airways Services (and its subsidiary Olympic Aviation) were […]*, to Athens International Airport were […]*million and to Olympic Catering were […]*million.

(64) At present there is also some delay is paying certain debts the company has to the tax authorities and the CAA. According to data available to the Hellenic Republic, on 7 February 2008 the certified tax debts of Olympic Airways Services stood at […]* million for the period up to 31.12.2007. Of that amount only […]*million has become due and payable at present.

(65) The company has delayed making lease payments for aircraft to the Greek State in the total sum of […]*million. The company has also not paid the Greek State the sum of […]* million for aircraft maintenance reserves.

(66) The Hellenic Republic points out that the issue of prolonged forbearance of non-payment of Olympic Airlines' debts to the Greek State is raised for the first time in the 2005 Decision. It points out that the 2005 Decision found that following the investigation by Community experts the company had discharged its obligations in this regard for the period which had been examined (namely up to May 2005).

(67) Consequently the Hellenic Republic stresses that even if there are at present certain unpaid debts of Olympic Airlines to the State any delay in paying them only relates to a short time period. In the opinion of the State this is not sufficient on its own to establish a claim of prolonged forbearance by the Greek State in light of the conditions laid down in Community case law in this regard.

(68) According to case law, 'where a public body with responsibility for collecting social security contributions tolerates late payment of such contributions, its conduct undoubtedly gives the recipient undertaking a significant commercial advantage by mitigating, for that undertaking, the burden associated with normal application of the social security system' ([22]).

(69) However, in order for that economic advantage to be treated as State aid within the meaning of Article 87(1) EC it also needs to be shown that the undertaking would not have obtained that advantage under normal market conditions, in other words one needs to examine whether the organisation which received the contributions acted in the same way that a private creditor would do under the same circumstances.

(70) In the view of Greece, it is not easy to apply this criterion in practice since there is no standard of conduct for a private creditor. More specifically, depending on the financial prospects of the debtors and its viability, a creditor may decide to do nothing or utilise all legal means available to him to collect debts due. Therefore Greece opines that one should examine whether the public authority took all available legal steps to collect the debt and whether it did so without delay ([23]).

(71) In the Magefesa ([24]) case the court ruled that non-payment of tax and social security debts for many years (more than 8 years) indicated that the authorities were not using all lawful means to ensure payment of the debts.

(72) Likewise, in the Lenzing ([25]) case, the CFI considered that a) forbearance of non-payment of social security contributions for a period of at least 6 years which permitted debts to accumulate, b) forbearance of non-compliance with the debt repayment arrangement

([21]) In contrast with its main competitor on the domestic market, Aegean Airlines, which has increased its share capital repeatedly.

([22]) C-256/97, DM Transport [1999] ECR I-3913, para 19.

([23]) C-480/98, *Spain* v *Commission* (Magefesa) [2000] ECR I-8717, and C-276/02, *Spain* v *Commission* [2004] 1-8091.

([24]) See footnote 23.

([25]) T-36/99 *Lenzing AG* v *Commission* [2004] ECR II-3597, para. 131, 136,138 and 146.

which had been concluded and c) conclusion of a new debt repayment arrangement even though the authorities were able to claim immediate repayment of the total amount of the claims due to breach of the terms of the original arrangement – possibly by compulsory enforcement, did not meet the private creditor test and consequently was equivalent to State aid.

(73) Lastly in the Spain v. Commission case ([26]) the ECJ ruled the Spanish authorities, even though they needed three years to reach debt restructuring agreements with undertakings and even though they wrote off two thirds of the debts and concluded debt restructuring agreements of 10 years duration with a two year grace period acted in line with the private creditor tests and used all lawful means to collect the debts.

(74) In light of this the Hellenic Republic considers that there was no protracted forbearance on its part in relation to collection of debts due from Olympic Airlines.

3.3. **State aid via special creditor protection**

(75) In its response the Hellenic Republic argues that the legal provisions in question do not lead to a removal of the rights of the creditors of Olympic Airways and Olympic Airlines concerning the enforcement of their claims under national law but simply to a suspension thereof, which national case law has found to be compatible with national law (and in particular with the Constitution). They further note that the State (including all agencies of the State which could provide advantages via state resources) is expressly excluded from the scope of this creditor protection. Consequently, in their view there can be no State aid within the meaning of Article 87(1) EC. There would only be State aid if the Greek State had guaranteed payment of Olympic Airways Services' and/or Olympic Airlines' debts to creditors or if it made payments on behalf of those companies to suppliers and/or creditors.

(76) The Hellenic Republic does not disagree that this specific provision relates specifically to Olympic Airways Services and Olympic Airlines. However, the specificity of those provisions on its own is not sufficient to constitute an infringement of Article 87 EC as Article 22 of Law 3404/2005 does not confer any economic advantage.

(77) In the opinion of Greece, in order for there to be State aid under Article 87 EC it is vital that State resources actually be transferred ([27]). The creditor protection afforded from 17 October 2005 to 28 February 2006 and then following an extension to the original deadline to 31 October 2006 and then to 31 October 2007 and then to 31 October 2008 for Olympic Airways Services and Olympic Airlines only relates to debts to private creditors.

([26]) Case C-276/02, *Spain* v *Commission*.
([27]) C-248/84, *Germany* v *Commission* [1987] ECR 4013, paragraph 17.

(78) The rationale for excluding the Greek State from the scope of this provision was precisely to ensure compliance with the requirements of Community law on State aid as the explanatory report accompanying the law states.

(79) The Hellenic Republic would stress that the only case in which there would be an issue of State aid on the basis of special creditor protection for private creditors would be the case where the Greek State had guaranteed the payment of Olympic Airways Services and Olympic Airlines' debts to their creditors or where it made payments on behalf of the companies to their suppliers and/or creditors.

4. **COMMENTS FROM THIRD PARTIES**

4.1. **Olympic Airlines SA**

(80) Olympic Airlines' comments were fully in line with the response provided by the Hellenic Republic dated 11 February 2008.

(81) With respect to the sub-leasing of aircraft from the Greek State and Olympic Airways, Olympic Airlines is of the opinion that both Olympic Airways and the Greek State acted in a manner absolutely in accordance with the private investor test and there was no favourable treatment for Olympic Airlines. Furthermore it submits that the lease payments paid by Olympic Airlines to both Olympic Airways and the Greek State are in general terms in line with current market rates.

(82) Olympic Airlines also referred to the distinction that should be drawn between the case of a finance lease and an operating lease.

Finance leases

(83) The choice made by the Greek State to sub-lease the aircraft at prices below the finance lease prices paid in the head lease was not necessarily a grant of unlawful aid to Olympic Airlines. Firstly the difference in the level of lease payments is justified by the different nature of the two types of leases, and secondly by the fact that the lease payments paid in the context of operating leases reflect market rates for leasing similar aircraft at the critical point in time when the leases were concluded.

(84) In simple terms, the finance lessee acquires the right to expect to acquire ownership of the aircraft at the end of the finance lease, which would not occur in the case of an operating lease. Consequently, the lease payment under a finance lease corresponds to the amount of the instalment to repay the value of the aircraft so that in the

end the finance lessee is the owner of the aircraft at the end of the lease. In the specific case, the monthly lease payment paid by the Greek State to the lessors for the aircraft will cease in 2011 since the aircraft will become its full property then.

Operating Leases

(85) Olympic Airlines pointed out that all operating sub-leases for aircraft from Olympic Airways have now expired.

(86) The operating leases concluded between Olympic Airways and Olympic Airlines for such time as they were in effect (until the latter took its placed in the head leases) had been concluded at current market rates, as stated above. Consequently, there was no concealed State aid. Olympic Airlines repeated that it did not receive any favourable treatment under the said operating sub-leases since the lease payment agreed at the time they were concluded (11.12.2003) reflected the market rate as can be seen from the aforementioned Aviation Economics report. Following that Olympic Airlines directly concluded leases with the original lessors (in some cases in 2005 and in others in 2007) at current market rates.

(87) Moreover, the sole operating lease which had been concluded between Olympic Airways and Olympic Airlines in 2003 and which remained in effect until a few days ago, which related to an A 300-600 aircraft, had –like all the other contracts- been concluded at current market rates. This contract has now expired.

(88) The decision of Olympic Airways to sub-lease the said aircraft to Olympic Airlines was required under the circumstances and was in accordance with the conduct of any private investor in the same position. If it had not been done, Olympic Airways would have been called upon to pay immense amounts of compensation to the aircraft lessor, which it would no longer have been able to use due to removal of air carrier services from its business objectives in December 2003.

(89) It should be noted that under the lease concluded with the initial lessors, payment of the lease payments continued to be mandatory irrespective of whether the aircraft were used for flights by Olympic Airways. Given these circumstances, Olympic Airways' decision to generate income from the aircraft and to cut its losses by subleasing them to Olympic Airlines was fully justified in commercial terms and in line with private investor test. Moreover, by concluding these sub-leases Olympic Airways released itself from safeguarding and maintenance costs for the aircraft. It also benefited from the provision of ground handling and maintenance services to Olympic Airlines for these aircraft.

(90) In relation to the debts and current financial situation of Olympic Airlines the company confirmed the information already provided by the Hellenic Republic.

(91) In relation to the allegation of State aid to Olympic Airlines by means of the special creditor protection, the company takes the view that Article 22 of Law 3404/2005 conveys no financial benefit on Olympic Airlines.

(92) In conclusion, Olympic Airlines considers that after taking into consideration these comments the Commission will no longer have any doubts about the issues being examined.

4.2. **Olympic Airways Services SA**

(93) The comments received from Olympic Airways Services primarily referred to the arbitration panel proceedings and the awards. These are excluded from the scope of the present decision ([28]). In as much as these touched on the other issues covered by the present decision they were completely in line with the comments received from Olympic Airlines and with the response provided by the Hellenic Republic dated 11 February 2008.

4.3. **Aegean Airlines**

(94) Aegean Airlines is a competitor of Olympic Airlines, in its comments it particularly wished to address the issue of the arbitration panel awards. Aegean Airlines also pointed out that with 35 million passengers in the Greek aviation market and activity of more than 150 airlines Olympic Airlines covers 17 % of the market, as such it is not an 'essential' part of the market. What Aegean Airlines opine is needed in the Greek aviation market is fairness in regulation, equal treatment and no special subsidies, costs or rights for one market participant.

4.4. **HATTA**

(95) The Hellenic Association of Travel and Tourism Agencies (HATTA) represents more than 1 500 Greek travel agencies and tour operators and expresses great concerns about the future of Olympic Airlines and the impact it may have on the Greek tourism industry.

(96) HATTA expresses the opinion that Olympic Airlines should become a privately owned and managed company that will operate on a level playing field will other domestic and Community carriers. HATTA also wishes to underline the magnitude of the impact of potential bankruptcy of Olympic Airlines on the Greek economy; this in their view makes this case a political matter rather than a legal procedure.

([28]) See recital 8 above

(97) As tourism represents 18 % of the Greek GDP; if Olympic Airlines were to disappear they opine that there would not be sufficient commercial interest to fill the entire gap in flights that would be lost. What is at stake is not just the future of a State owned company but the future and stability of a sector upon which the Greek economy is greatly dependent.

4.5. **Ryanair**

(98) Ryanair states that it does not currently operate any routes to and from Greece, although it flies to less popular tourist destinations for western European travellers such as Riga in Latvia, Kaunas in Lithuania, and Constanta in Romania. Their lack of presence on the Greek market is they state, due to the artificial maintenance of Olympic Airlines and Olympic Airways Services through State aid. Should such State aid disappear, Ryanair would be in a much better position to become, with the fleet of aircraft at its disposal, a competitor of Olympic Airlines on a number of domestic and international routes to and from Greece. As a result Ryanair states that it is not only a party concerned, but its market position is substantially affected by the State aid in favour of Olympic Airlines/Olympic Airways Services.

(99) In Ryanair's view, the Article 88(2) EC investigation should have been initiated earlier and must be concluded without delay, well before the 18 month period. Ryanair points to the numerous state aid actions taken by the Commission in connection with Olympic Airways since 1994. Ryanair states that while superficially, these various actions and investigations concern distinct forms and instances of State aid, all of the aid measures are interrelated. They evidence a systematic, and thus far successful, effort by the Greek authorities to delay the whole process by constantly repackaging earlier and new aid into new forms — and then disputing, through any available means, that these measures constitute illegal State aid. The close links between different forms of State aid granted through various means over many years are also evident from the Commission's narrative.

(100) In the opinion of Ryanair, if the past is anything to go by, the detailed financial information required by the Commission will be incomplete and/or delayed; the Commission will, eventually, adopt a negative decision ordering recovery, which the Greek authorities will both appeal and ignore and by the time the Community Courts have upheld the Commission's decision and found that Greece has infringed its obligations, part or the whole of the State aid involved will have morphed into new forms of illegal support to Olympic Airlines/Olympic Airways Services.

(101) Ryanair state that the Commission has the power and duty to speed up the process significantly. In its view it would be outrageous if the formal investigation finally initiated by the Commission were to exhaust or even exceed the 18 month period provided by Article 7(6) of Council Regulation (EC) No 659/1999 of 22 March 1999 laying down detailed rules for the application of Article 93 of the EC Treaty ([29]) (hereafter the Procedural Regulation). Such a formalistic approach would only reward the Greek authorities' delaying tactics and provide a precedent for others to follow. Information provided on the amount of aid is incomplete because key data described as 'confidential' by the Greek authorities have not been properly disclosed.

(102) In the view of Ryanair there is no justification for treating certain information concerning amounts of aid and how this has been calculated as confidential. Its disclosure would not confer any competitive advantage to competitors or other parties, but would help them respond to the Commission's invitation with more concrete arguments, provide comparative data and expose flaws in Olympic Airlines/Olympic Airways Services' machinations that may escape the Commission's examination.

(103) In relation to the forbearance of tax and social security debts since December 2004, Ryanair points out that the indicative figures for Olympic Airways Services losses underline the seriousness of the case.

(104) In relation to the special creditor protection, Ryanair urges the Commission to clarify specifically the compensation rights that private parties will derive from this violation of the State aid rules.

5. **COMMENTS FROM GREECE ON THIRD PARTY COMMENTS**

(105) The Hellenic Republic declared itself to be in complete agreement with the observations made by Olympic Airways Services, Olympic Airlines and HATTA. However, in relation to the observations of Aegean Airlines and Ryanair, the Hellenic Republic disputes the comments made and according to the Hellenic Republic, the observations of Aegean Airlines and of Ryanair do not substantially add any new or critical information and or documentation to the investigation.

(106) In relation to the comments of Aegean Airlines the Hellenic Republic underlines that Aegean Airlines has been particularly successful on the Greek market over the last ten years and that this success ultimately works in favour of the final consumer – the passenger – thus proving the benefits of competition. The existence of competition in air travel constitutes the main position and aim of the Greek government.

([29]) OJ L 83, 27.3.1999, p. 1.

(107) The Greek authorities highlight what they see as a contradiction in Aegean Airline's observations in that it presents its main competitor – Olympic Airlines – as on the one hand, having significant activity, but on the other, being replaceable. In the view of the Hellenic Republic this assessment is founded on Olympic Airways supposedly having a small percentage of the total transfer of passengers to/from Greek airports, the Greek authorities dispute this assessment.

(108) The main aim of the Greek government constitutes the assurance of unhindered air travel service to Greek islands and remote areas, with the use of special provisions for the provision of public service (PSOs) where necessary. They point out that to date Aegean has not participated in any tender of the Civil Aviation Authority for PSOs.

(109) The Greek authorities take issue with the references by Aegean Airlines to the 'Olympic Airways Group', which in the view of the State is inaccurate as Olympic Airways Services does not participate in the share capital or in the management of Olympic Airlines, neither does it control the decisions of the latter's General Meeting, nor does it have the authority to appoint members to its Board of Directors. In particular, the two companies do not constitute one common financial unit, since the one company does not influence the financial policy of the other, nor is there a common interest between them; on the contrary, their business relations are conducted strictly on market terms.

(110) With regard to the financial situation of Olympic Airways, the Hellenic Republic observes that Aegean Airlines has not presented any information proving that the daily operation of Olympic Airways is ensured by means of state aid.

(111) In the view of the Hellenic Republic, Ryanair cannot be deemed as an 'interested party' in this case. This is because Ryanair does not carry out flights to and/or from Greece, so it cannot be maintained that it is affected in any way by the supposed granting of state aid to Olympic Airlines and Olympic Airways.

(112) In the view of Greece, Ryanair's claims that it does not carry out flights to and/or from Greece because of the long-term granting of a competition advantage to Olympic Airways and Olympic Airlines by the Greek government are not substantiated by the facts. The Greek authorities point out that other low-cost airlines are active on the Greek market, 'Easy Jet', 'Aer Lingus', 'Air Berlin', 'Sky Europe', 'Germanwings' and 'Virgin Express'. Both 'Easy Jet' ([30]) and 'Germanwings' ([31]) carry out daily flights to and from Athens International Airport, while they are also connected with other major Greek airports. Similarly, 'Air Berlin' carries out flights to a total of fifteen of the country's airports ([32]), with daily flights (more than one) to and from Athens International Airport.

(113) Second, there is no obstacle existing in Ryanair's entry to the Greek market due to alleged advantages in favour of Olympic Airlines, given that the two companies provide their services on the basis of two entirely different business models. As is evident from the entry of the above-mentioned low-cost airlines to the Greek market, the activity of Olympic Airline and Aegean would not impede or influence the entry of Ryanair, nor is there an issue of a restricted number of slots at Greek airports.

(114) The Greek authorities therefore find it odd that Ryanair claims that it is incapable of carrying out flights on the Greek market due to the alleged distortion of competition, as all the above-mentioned carriers, many of which are of a smaller size and higher cost than Ryanair, have done so successfully.

(115) The Hellenic Republic sums up the main views of the above-mentioned companies as follows:

5.1. **Regarding Olympic Airways Services tax and social insurance debts**

(116) As of 11 February 2008, the updated taxation and insurance records of Olympic Airways Services had already been proven. Regarding Olympic Airway's older debts to the Social Security Institute, an adjustment has been made to pay off these debts in monthly instalments, according to the general provisions of Law No 3518/2006, applicable to all Greek companies and natural persons ([33]).

(117) Consequently, in the view of Greece there can be no 'tolerance' and even less of 'perpetual tolerance' on behalf of the Greek Government as regards the non-payment of Olympic Airway's debts.

5.2. **Regarding alleged state aid to Olympic Airlines**

5.2.1. *State aid through aircraft subleases*

(118) Greece agrees with the declaration made by Olympic Airlines that it had the financial potential to conclude operating leasing contracts directly with the market. This is proved to be true as immediately after the expiry of each operating leasing contract, some of the initial lessors in the main contracts were directly contracted to Olympic Airlines at the current market rates, without the intermediation of Olympic Airways.

([30]) EasyJet is connected with Athens, Kerkyra, Myconos, Rhodes, Heraklion and Thessaloniki (see http://www.easyjet.com).

([31]) Germanwings is connected with Athens, Kerkyra, Kavala, Myconos, Rhodes, Heraklion and Thessaloniki (see http://www.aia.gr).

([32]) Air Berlin is connected with Athens, Kerkyra, Kavala, Myconos, Rhodes, Heraklion, Thessaloniki, Volos, Preveza, Zakynthos, Santorini, Kos, Samos, Karpathos, Lesvos (see http//www.aia.gr).

([33]) The provisions of Law No 3518/2006 have been included in the Hellenic Republic's Reply of 11 February 2008, paragraph 75.

(119) In turn, Olympic Airways, in selecting Olympic Airlines, acted out as any other private investor would have in the same position. On the one hand, it succeeded in reducing monthly damages in the best possible way and on the other hand, ensured that the damages in question were to be time-restricted given the stated intention of Olympic Airlines to renegotiate and enter itself into the main leasing contracts.

(120) Olympic Airlines were not favoured even in the case of the sub-leasing of four financial leases of Airbus A340-300 to the Greek Government as these contracts were drawn up at the market price. Regarding this matter, it should be mentioned that the lease charges paid by Olympic Airlines for operating leasing agreements can only be compared with the respective operating leasing charges on the market during the same period, and not the financial leasing charges, as the Commission erroneously worked out.

5.2.2. *State aid through Olympic Airlines' tax and social insurance debts*

(121) The Hellenic Republic observes that there is no 'perpetual tolerance' regarding this company's overdue payments.

5.3. **Regarding the special protection against creditors**

(122) The provisions of Law No 3404/05 imply a suspension rather than an elimination of the rights of Olympic Airways' and Olympic Airlines' creditors regarding the execution of their claims. This is compatible with Greek legislation.

(123) The credit protection that had been provided to Olympic Airlines and to Olympic Airways concerns only debts owed to private persons and not debts pertaining to the state, namely the Greek Government. Consequently, there can be no state aid within the meaning of Article 87(1) of the EC Treaty.

6. RESULTS OF THE EXPERT STUDY REQUESTED BY THE COMMISSION

(124) Before the Commission can engage in an assessment of the points raised in the opening of procedure and of the information furnished by Greece and the third parties, it was necessary to examine the current economic and financial situation of Olympic Airways Services and of Olympic Airlines.

(125) To this end the Commission engaged the services of an independent expert (Moore Stephens) to carry out a study of the financing and operations of both companies to determine what has happened since Commission 2005 decision.

(126) Moore Stephens (hereinafter 'the experts') carried out their study in Athens between 1 and 15 July 2008. In carrying out this study they were facilitated by the Hellenic authorities, Olympic Airways Services and Olympic Airlines as well as their advisers.

6.1. **Regarding Olympic Airways Services tax and social insurance debts**

(127) In respect of forbearance of taxes (including surcharges and fines) Moore Stephens have determined (based on an assessment of total liabilities by the tax authorities provided on 17 June 2008) that the sum owed by Olympic Airways Services is EUR […]* million. The balances as of 31 May 2008 represents the cumulative balances at that date which, except where otherwise noted, include amounts arising prior to 31 December 2004. This liability is arrived at after setting off EUR […]* million on the basis of arbitral panel awards i.e. (EUR […]* million – EUR […]* million). The liability includes:

— Outstanding income tax, VAT, stamp duty and withholding taxes ([34]) Passenger duty for airport development (Spatosimo),

— Airport parking and handling charges for airports other than AIA,

— ABN loan repayments made by Greek state on behalf of Olympic Airways Services.

(128) Moore Stephens note that this amount was subject to court appeal by Olympic Airways Services. The court issued a decision suspending the debt pending a final ruling. The suspension is in application of the general legal framework on requests for interim relief, which can be invoked by any individual or undertaking in litigation with the Greek State. The amount offset against the arbitral panel award represented that part of the total balance that was not subject to dispute by Olympic Airways Services.

(129) The surcharges included in the amount of EUR […]* million concern the period until June 2008.

(130) Current withholding taxes (mainly employee income tax) for the period May 2007 to May 2008 amounts to some EUR […]*million, while current withholding taxes (employee income tax) regarding personnel seconded to Olympic Aviation for the period Dec 2006 to May 2008) is some EUR […]*million.

([34]) Comprises withholding tax other than that payable for the periods set out in the table below.

(131) With regard to the forbearance of social security contributions these amount to some EUR […]* million for the period up to October 2006 allowing for the payment of EUR […]* million by the Greek State in September 2007 from funds received following the arbitral panel awards. The amount of EUR […]* million (including surcharges and fines) is what remains (in July 2008) to be paid by Olympic Airways Services in future instalments according to the general framework of Law 3518/2006. The Social Security Administration (IKA) has accepted a deposit of EUR […]* million euro from Olympic Airways Services.

(132) […]*.

(133) […]*.

(134) Further social security debts for the period November 2006 to May 2008 of […]*for Olympic Airways Services and EUR […]*million for persons seconded to Olympic Aviation were also noted.

(135) Notwithstanding all of the above, the Commission notes that Olympic Airways Services had obtained a confirmation from IKA that its liabilities were not overdue. Moore Stephens' findings can be summarised as follows

in EUR million

	Balance
Assessment of total liabilities by tax authorities provided on 17 June 2008 (suspended)	[…]*
Current withholding tax May 2007- May 2008 (mainly employee income tax)	[…]*
Current withholding tax December 2006 – May 2008 (Olympic Aviation)	[…]*
Social security debt up to October 2006	[…]*
Social Security debts November 2006 – May 2008	[…]*
Social Security debts November 2006 – May 2008 (Olympic Aviation)	[…]*
Debts of Olympic Airways Services to State as of June 2008 (excluding suspended debts)	[…]*
Total debts of Olympic Airways Services to State as of June 2008	[…]*

(136) Moore Stephens conclude that given that Olympic Airways Services have relied upon some […]* of arbitration panel awards in order to in part meet its tax and social security liabilities (EUR […]* million payment to tax authorities and EUR […]* million to IKA) if the Commission was to conclude that the continued forbearance of the State towards Olympic Airways Services since 2005 constituted State aid then Olympic Airways Services would be unable to repay this State aid based upon its current operating results and financial position.

6.2. **Regarding alleged state aid to Olympic Airlines**

6.2.1. *State aid through aircraft subleases*

(137) Moore Stephens noted an amount of EUR […]*million as being overdue to Greek State in respect of aircraft leases, Moore Stephens note that the amount in question as of 31 May 2005 was EUR […]*meaning that during the period covered by the present decision the Olympic Airlines ran up a debt of EUR […]*million to the State for aircraft leases. The amount payable is approximately EUR […]*million per month for the […]* and EUR […]*million per month for the maintenance reserves. Approximately EUR […]* million has been paid over the 36-month period, representing about 6 months' payments. Nothing was paid in 2007 or 2008.

6.2.2. *State aid through Olympic Airlines' tax and social insurance debts*

(138) The amount overdue for passenger duty for airport development (Spatosimo) as assessed by tax authorities is EUR […]* million. The total payable as of 31 May 2008 was EUR […]* million. Of this, EUR […]* million is payable in monthly instalments up to 2012 and has not been considered as overdue. Of the remaining balance of EUR […]* million, EUR […]*million is the subject of a court appeal by Olympic Airlines. The court issued a decision suspending this part of the debt pending a final ruling.

(139) Moore Stephens identified an amount of EUR […]* overdue to Olympic Airways Services and Olympic Aviation for services received as per various contracts for ground handling and maintenance services.

(140) A further sum of EUR […]* million for landing fees and parking charges payable to the Hellenic Civil Aviation Authority was also identified

in EUR million

		Balance
Overdue amount for aircraft leases	[…]*	[…]*
Lease payments due	[…]*	[…]*
Maintenance reserve due	[…]*	[…]*
Interest lease payment & maintenance reserve	[…]*	[…]*
Difference between head-leases and subleases	[…]*	[…]*
Spatosimo (Passenger duty for airport development - total due EUR 98 million of which EUR 59,9 million is subject to judicial suspension)	[…]*	[…]*
Amount overdue to other entities	[…]*	[…]*
Olympic Airways Services	[…]*	[…]*
Olympic Aviation	[…]*	[…]*
Landing fees and parking charges (other than AIA)	[…]*	[…]*
Debts of Olympic Airlines to State as of June 2008 (excluding suspended debts)	[…]*	[…]*
Total estimated debts of Olympic Airlines to State as of June 2008	[…]*	[…]*

6.3. **Regarding the special protection against creditors**

(141) Moore Stephens confirmed that the special creditor protection was extended to 31 October 2008 by Art. 21 of Law 3607/2007.

7. **ASSESMENT OF THE AID**

7.1. **Legal basis for appraisal of aid**

(142) By virtue of Article 87(1) of the EC Treaty 'any aid granted by a Member State or through State resources in any form whatsoever which distorts or threatens to distort competition by favouring certain undertakings or the production of certain goods shall, in so far as it affects trade between Member States, be incompatible with the common market.'

(143) The concept of State aid applies to any advantage granted directly or indirectly, financed out of State resources, granted by the State itself or by any intermediary body acting by virtue of powers conferred on it.

(144) The criteria laid down in Article 87(1) EC are cumulative. Therefore, in order to determine whether the notified measures constitute State aid within the meaning of Article 87(1) EC all of the following conditions need to be fulfilled. Namely, the financial support:

— is granted by the State or through State resources,

— favours certain undertakings or the production of certain goods,

— distorts or threatens to distort competition, and

— affects trade between Member States.

(145) The present decision relates only to aid granted since the period taken into consideration by the 2005 Decision.

7.2. **Existence of aid**

(146) The Commission has carried out a close and in-depth analysis of the comments received in the course of the opening of procedure as well as of the observations of Greece and of the expert study carried out into the accounts and operations of Olympic Airways Services and Olympic Airlines. In this regard it has decided to carry out its appraisal on the existence of aid under three main headings being;

— Potential State aid to Olympic Airways Services through forbearance of its tax and social security debts since December 2004 ([35]).

— Potential State aid to Olympic Airlines by means of aircraft lease payments and non-execution of its debts (including tax and social security liabilities) since May 2005 ([36]).

— Potential State aid to Olympic Airways Services and to Olympic Airlines by means of special creditor protection.

7.2.1. *State aid to Olympic Airways Services through forbearance of debts*

(147) As has been demonstrated by the Commission's expert, since the date of the adoption of 2005 Decision, Olympic Airways Services has deferred the payments of amounts due to the State and its tax and social security liabilities to the State have increased.

(148) Olympic Airways Services difficult and deteriorating tax and social security situation has been previously described. Olympic Airways Services' tax and social security liability as taken into consideration in the 2005 Decision was already large, at EUR 627 million, made up of an estimated EUR 431 million of unpaid tax and a further EUR 196 million of unpaid IKA contributions.

(149) In respect of its tax liabilities and notwithstanding a 'set-off' payment of EUR […]* million made following the arbitral panel awards the estimated total tax liability as of June 2008 and as set out in the table following paragraph 135 above is now estimated as being in the order of EUR […]* million. This deferral of payment of tax of at least EUR […]* million is imputable to the State.

(150) Olympic Airways Services has argued that the sum of EUR […]* million in respect of tax debts is suspended meaning that the company is 'tax current', this ignores the fact that while part of its tax debt to the State may have been deferred such deferral does not call the sum into question. While a Greek court may adjust this figure downwards, it is the conclusion of the Commission that the order of magnitude of the sum due by Olympic Airways Services to the State in the context of taxes will not change substantially. This opinion notwithstanding the Commission can conclude that the sum which Olympic Airways Services owes the State in respect of its tax liabilities is in the order of EUR […]* million.

(151) In relation to Olympic Airways Services' mounting tax liabilities, it is the State itself through the tax administration which tolerates the constant deferral and non-payment of various taxes and charges due by Olympic Airways Services.

(152) With respect to social security contributions the situation is similar. The social security debts identified in the 2005 decision as amounting to […]* have now risen to EUR […]* million as set out in the table following paragraph 135 above, notwithstanding the payment on 27 September 2007 of a once-off sum of EUR […]* million from the arbitration panel awards.

(153) In relation to these social security contributions, the body tasked with their collection (IKA) is a public body established by Greek Law ([37]), which has been made responsible, under State supervision for managing the social security system, and collecting mandatory social security contribution. It has the right ([38]) but not the obligation to enter into settlement agreements for late payments of debts. The ever increasing social security liability of Olympic Airways Services to the State is therefore, clearly imputable to the State.

([35]) See footnote 5.
([36]) See footnote 6.
([37]) Law 1846/1951, article 11.
([38]) Law 2676/1999.

(154) Both tax and social security funds are State resources and their forbearance therefore involves a transfer of State resources.

(155) This forbearance grants an advantage to Olympic Airways Services. The forbearance on the part of the State defers the payment of charges that the undertaking would normally have to pay in due time, providing the beneficiary with a source of operating capital. Olympic Airways Services is loss making and chronically indebted, therefore such a deferral cannot be considered a normal or usual behaviour of a market economy creditor; it is systematic and given the parlous financial situation of Olympic Airways Services as has been demonstrated by the Commission's expert there is no realistic prospect Olympic Airways services ever being in a position to repay these amounts to the State at any stage in the future. The forbearance affects trade between Member States and distorts competition as the markets concerned are fully liberalised.

(156) The Commission must therefore conclude that the forbearance of the State concerning Olympic Airways Services' unpaid and mounting tax and social security liabilities amount to State aid to Olympic Airways Services within the meaning of Article 87(1) of the Treaty. As this aid was never notified to the Commission it is therefore illegal.

7.2.2. *State aid to Olympic Airlines through forbearance of debts*

(157) As has been concluded by the Commission's expert, since the period taken into consideration by the 2005 decision Olympic Airlines has lost money and accumulated further debts to the State.

(158) In relation to leases for 4 A340 aircraft, during the period covered by the current investigation Olympic Airlines' debts to the State have reached EUR […]* million, the balance of this amount as of 31 May 2005 had been EUR […]*. This means that during the period covered by the present decision the Olympic Airlines ran up a debt of EUR […]* million to the State for unpaid aircraft leases.

(159) However, in the opinion of the Commission this amount does not fully reflect the amounts that Olympic Airlines owed the State in respect of these aircraft leases. As set out in the 2005 decision, following its take over of the headleases from Olympic Airways the State paid a price of between EUR […]*and EUR […]*per month in respect of each of these aircraft. However, as has been demonstrated by the Commission's expert, Olympic Airlines paid between USD […]* and USD […]*. In accepting such a lower amount the State 'accepts' to lose somewhere between EUR […]*and EUR […]*on each aircraft per month – making for a further State aid amount of at least EUR 36 million and up to EUR 50,4 million.

(160) In relation to the passenger duty for airport development (Spatosimo) the sum now owed by the company to the state is EUR […]* million. Olympic Airlines has argued that the total of this amount is not due as some EUR […]* million of this amount has been suspended by a judge pending a court decision. In this regard the Commission notes that such suspension does not remove the debt but only suspends its payment. In this regard the Commission can conclude that the sum which Olympic Airlines owes in respect of unpaid Spatosimo as of May 2008 is somewhere between EUR 38 million and EUR 98 million.

(161) A sum of EUR 86,3 million is owed by Olympic Airlines to two related entities being Olympic Airways Services and Olympic Aviation. As of 31 May 2005 the amount owed by Olympic Airlines to these companies was EUR 2,6 million which sum has mushroomed over the following three years, meaning that in the period under investigation by the present decision the debts due have increased by EUR 83,7 million. A further sum of EUR 4,5 million is owed for landing fees and parking charges at airports other than AIA and is payable to the Hellenic Civil Aviation Authority, Olympic Airlines has argued that the this amount is not due its payment has been suspended by a judge pending a court decision. Once again the Commission notes that such suspension does not remove the debt but only suspends its payment.

(162) All the forbearance described above, which amounts to EUR 326 million as set out in the table following paragraph 140 above, involves State resources as it relates to debts owed to the State, State bodies (the Hellenic Civil Aviation Authority) or State-owned undertakings (Olympic Airways Services and Olympic Aviation).

(163) As regards the imputability to the State of the forbearance shown by Olympic Airways Services and Olympic Aviation towards Olympic Airlines, the Commission notes that the imputability to the State of a measure taken by a public undertaking may be inferred from a set of indicators arising from the circumstances of the case and the context in which the measures were taken.

(164) In this regard the Commission notes that the State held 100 % of the shares of all three companies. In addition all the management and boards of these companies were appointed by the State. In these circumstances, it has to be concluded that the companies have been at all material times under the control of the State. Greece was able directly and indirectly (as the largest creditor of both Olympic Airways Services and of Olympic Airlines) to exercise dominant influence over all undertakings. Finally, this forbearance is concomitant to the

forbearance of the State itself and public bodies. As such the decisions of Olympic Airways Services and of Olympic Aviation to extend credit to Olympic Airlines and allow debts amounting to EUR 86,3 million to build up were not the acts of independent undertakings and are therefore imputable to the State.

(165) This forbearance also involves an advantage to Olympic Airlines by freeing it from the liabilities that it would otherwise have to bear.

(166) The difficult financial situation of Olympic Airlines has already been set out in detail. In 2004 the company reported losses of EUR 87,1 million, with each successive year it has continued to lose more money and in 2007 its losses were EUR […]* million. The business of Olympic Airlines is heavily cyclical, as evidenced by the negative cash flow in the months of October to March that is compensated for by positive cash flow in the months of April to September. This cycle repeats itself with deeper losses each year. The net inflows in the summer months never compensate in full the net outflows in the winter months so that, overall, the company loses more and more money. It can only exist thanks to the largesse of the State. It is far from clear if the company as it is presently structured can ever become cash-flow positive. It is therefore obvious that this forbearance cannot reflect the normal behaviour of a market economy creditor, it is systematic and given the difficult situation of Olympic Airlines there is little possibility that these debts will ever be paid.

(167) The Commission also notes that the measures involved affect inter-state trade and distort or threaten to distort competition inside this market as they involve a Community air carrier. The Commission therefore concludes that the continued forbearance on the part of the State, State bodies and State-owned undertakings of Olympic Airlines' tax and other operational liabilities constitute State aid to Olympic Airlines for the purposes of Article 87(1) of the Treaty. As this aid was never notified to the Commission it is therefore illegal.

7.2.3. *State aid by means of special creditor protection*

(168) According to settled case-law, the concept of aid encompasses advantages granted by public authorities which, in various forms, mitigate the charges which are normally included in the budget of an undertaking ([39]). Considerable advantage appears to be granted to Olympic Airways Services and to Olympic Airlines by means of the special and unique creditor protection it has been afforded by the State by means of the law specifically passed whereby the execution of any judgment against this company by any private creditor is postponed.

(169) In the present case, the special creditor protection has only been extended to Olympic Airways services and Olympic Airlines; it is thus a selective and specific measure within the meaning of Art. 87(1).

(170) It is settled jurisprudence that the concept of aid is wider than that of a subsidy because it embraces not only positive benefits, such as subsidies themselves, but also measures which, in various forms, mitigate the charges which are normally included in the budget of an undertaking and which, without therefore being subsidies in the strict meaning of the word, are similar in character and have the same effect ([40]).

(171) The expression 'aid', within the meaning of Article 87(1) of the Treaty, necessarily implies advantages granted directly or indirectly through State resources or constituting an additional charge for the State or for bodies designated or established by the State for that purpose ([41]).

(172) By analogy with what the Court held in *Ecotrade* ([42]) concerning Article 4c of the ECSC Treaty, several characteristics of special creditor protection make it possible to establish the existence of aid within the meaning of Article 87(1) of the Treaty.

(173) First, it is apparent that the special creditor protection applies only to Olympic Airways Services and Olympic Airlines both State-owned entities that owe particularly large debts to certain, mainly public, classes of creditors. Indeed as has already been shown in the present decision Olympic Airlines owes some EUR 86,3 million to Olympic Airways Services for unpaid services.

(174) It is also indisputable that the special creditor protection places Olympic Airways Services and Olympic Airlines in a more favourable situation than others, inasmuch as it allows them to continue trading in circumstances in which that would not be allowed if the ordinary insolvency rules were applied, since under those rules protection of creditors' interests is the determining factor. The fact that these two companies can continue their activity involves an additional burden for the public authorities as State owned bodies are among the principal creditors of the undertaking in difficulties, all the more so because, by definition, that undertaking owes debts of considerable value. Indeed, given the parlous financial situation of Olympics and the special creditor protection privately owned companies will in all likelihood not wish to do business with Olympic Airlines

([39]) See, inter alia, the judgments in Case 30/59 *De Gezamenlijke Steenkolenmijnen in Limburg* v *High Authority* [1961] ECR 1, Case C-387/92 *Banco Exterior de España* [1994] ECR I-877, paragraph 13; Case C-241/94 *France* v *Commission* [1996] ECR I-4551, paragraph 34; and Case C-256/97 *DM Transport* [1999] ECR I-3913, paragraph 19).

([40]) Case C-387/92 *Banco Exterior de Espana* v *Ayuntamiento de Valencia* [1994] ECR I-877, paragraph 13; Case C-200/97, *Ecotrade Srl* against *Altiforni e Ferriere di Servola SpA*, [1998] ECR I-07907, paragraph 34).

([41]) Joined Cases C-52/97 to C-54/97 *Viscido and Others* v *Ente Poste Italiane* [1998] ECR I-2629, paragraph 13.

([42]) Case C-200/97, see footnote 40.

or Olympic Airways Services on normal commercial terms as there is no realistic possibility to recover sums due. Moreover, given the large debts to publicly owned creditors (see recital 139), State-owned companies will lose resources as a result of the special creditor protection and taking into consideration that the continuous State support to Olympic Airlines and Olympic Airways Services can only be due to national industry policy considerations rather than that of a market creditor seeking repayments of sums due, the Commission can conclude that State resources are involved and that the measure is imputable to the State.

(175) In the light of the foregoing, it must be concluded that application to an undertaking of a system of special creditor protection of the kind existing in the present case which derogates 'from the rules of ordinary law relating to insolvency', is to be regarded as giving rise to the grant of State aid, within the meaning of Article 87(1) of the Treaty, where it is established that the undertaking

— has been permitted to continue trading in circumstances in which it would not have been permitted to do so if the rules of ordinary law relating to insolvency had been applied, or

— has enjoyed de facto waiver of public debts wholly or in part, which could not have been claimed by another insolvent undertaking under the application of the rules of ordinary law relating to insolvency ([43]).

(176) In the present case, with regard to the special and unique creditor protection afforded to Olympic Airways Services and to Olympic Airlines, the Commission notes that both the above criteria are complied with. The companies in question have been permitted to continue in business in circumstances in which they would not have been permitted to do so if the rules of ordinary law relating to insolvency had been applied. Furthermore and has been shown throughout this decision the companies in question have enjoyed several advantages from the State which could not have been claimed by another insolvent undertaking under the application of the rules of ordinary law relating to insolvency.

(177) The measures concerned affect trade between Member States as they concern companies which operate in a liberalised market. Therefore, they also distort or threaten to distort competition within this market as they are focused on specific undertakings competing with other Community operators.

(178) Under these conditions, having regard to the special creditor protection provided to Olympic Airways Services and Olympic Airlines the Commission concludes that this amounts to State aid. As this aid was never notified to the Commission it is therefore illegal.

([43]) Case C-295/97 Rinaldo Piaggio (paragraph 43 thereof).

7.3. **Compatibility of Aid**

7.3.1. *Compatibility of aid granted to Olympic Airlines through aircraft lease payments, forbearance of debts and special creditor protection*

(179) Having reached the conclusion that Olympic Airlines has received State aid since 2005, the Commission must then examine the measures in favour of this company in the light of Article 87(2) and (3) of the Treaty which provide for exemptions to the general rule of incompatibility set out in Article 87(1).

(180) The exemptions in Article 87(2) of the Treaty cannot apply in the present case because the aid measure does not have a social character and is not granted to individual consumers, nor do they make good the damage caused by natural disasters or exceptional occurrences nor are they granted to the economy of certain areas of the Federal Republic of Germany affected by its division.

(181) Further exemptions to the general prohibition on State aid are set out in Article 87(3). The exemptions in Articles 87(3)(b) and 87(3)(d) do not apply in this case because the aid does not promote the execution of an important project of common European interest or remedy a serious disturbance in the economy of a Member State nor does it promote culture and heritage conservation.

(182) Article 87(3)(a) and (c) of the Treaty contain derogation in respect of aid intended to promote the economic development of areas where the standard of living is abnormally low or where there is serious underemployment. Greece is a region falling entirely within the scope of Article 87(3)(a). Nevertheless the aid does not meet the criteria of the applicable 'Guidelines on National Regional Aid' ([44]).

(183) With regard to the derogation provided by Article 87(3)(c) of the Treaty in respect of aid to facilitate the development of certain economic activities where such aid does not adversely affect trading conditions to an extent contrary to the common interest, the Commission will have to examine whether this provision can apply to the current situation. In carrying out this examination the Commission has to have regard to the applicable guidelines relating to the aviation sector ([45]).

([44]) For the period 2000-2006, OJ C 74, 10.3.1998, p. 9, for the period 2007-2013, OJ C 54, 4.3.2006, p. 13.

([45]) 'Application of Articles 92 and 93 of the EC Treaty and Article 61 of the EEA Agreement to state aids in the aviation sector' (OJ C 350, 10.12.1994, p. 5) and 'Community Guidelines on financing airports and start-up aid to airlines departing from regional airports' (OJ C 312, 9.12.2005, p. 1).

(184) In this context, it is obvious that none of the provisions of the guidelines are met in the present case. It is also obvious that the aid does not aim at compensating for PSO obligations within the meaning of Article 86(2) of the EC Treaty and is therefore incompatible with the common market.

7.3.2. *Compatibility of aid granted to Olympic Airways Services through forbearance of debts and special creditor protection*

(185) Having concluded that Olympic Airways Services has also received illegal state aid, the Commission must examine the measure in the light of Article 87(2) and (3) of the Treaty which provide for exemptions to the general rule of incompatibility set out in Article 87(1).

(186) The exemptions in Article 87(2) of the Treaty cannot apply in the present case because the aid measure does not have a social character and is not granted to individual consumers, nor does it make good the damage caused by natural disasters or exceptional occurrences nor are they granted to the economy of certain areas of the Federal Republic of Germany affected by its division.

(187) Further exemptions to the general prohibition on State aid are set out in Article 87(3). The exemptions in Articles 87(3)(b) and 87(3)(d) do not apply in this case because the does not promote the execution of an important project of common European interest or remedy a serious disturbance in the economy of a Member State nor does it promote culture and heritage conservation.

(188) Article 87(3)(a) of the EC Treaty contain derogation in respect of aid intended to promote the economic development of areas where the standard of living is abnormally low or where there is serious underemployment. Nevertheless the aid does not meet the criteria of the applicable 'Guidelines on National Regional Aid'.

(189) With regard to the derogation provided by Article 87(3)(c) of the Treaty in respect of aid to facilitate the development of certain economic activities where such aid does not adversely affect trading conditions to an extent contrary to the common interest, the Commission will have to examine whether this proviso can apply to the current situation. In carrying out this examination the Commission has to have regard to the applicable guidelines relating to the aviation sector ([46]).

(190) In this context, it is obvious that none of the provisions of the guidelines are met in the present case. It is also obvious that the aid does not aim at compensating for PSO obligations within the meaning of Article 86(2) of the EC Treaty and is therefore incompatible with the common market.

(191) Accordingly the Commission concludes that Greece has granted incompatible State aid to Olympic Airways Services through its tolerance of late and non-payment of tax and social security and by means of the special creditor protection it has afforded this company,

HAS ADOPTED THIS DECISION:

Article 1

1. The continued forbearance of the Greek State towards Olympic Airways Services in relation to its tax and social security debts to the State which are estimated to stand at least at EUR 590,4 million constitutes illegal state aid to Olympic Airways Services which is incompatible with the Treaty.

2. The continued forbearance of the Greek State toward Olympic Airlines in respect of aircraft leases estimated in the sum of EUR 137,2 million, debts owed to Olympic Airways Services and Olympic Aviation estimated at totalling EUR 86,3 million, debts owed to the Hellenic Civil Aviation Authority of EUR 4,5 million and Spatosimo tax of at least EUR 38,1 million constitutes illegal state aid to Olympic Airlines which is incompatible with the Treaty.

3. The special creditor protection granted through Greek legislation to Olympic Airways Services and Olympic Airlines constitutes illegal state aid to both companies which is incompatible with the Treaty.

Article 2

1. Greece shall recover the aid referred to in Article 1 from the beneficiary.

2. The sums to be recovered shall bear interest from the date on which they were put at the disposal of the beneficiary until their actual recovery.

3. The interest shall be calculated on a compound basis in accordance with Chapter V of Commission Regulation (EC) No 794/2004 ([47]) as amended by Regulation (EC) No 271/2008 ([48]).

4. Greece shall cancel all outstanding payments of the aid referred to in Article 1 with effect from the date of adoption of this decision.

([46]) See footnote 45.

([47]) OJ L 140, 30.4.2004, p. 1.

([48]) OJ L 82, 25.3.2008, p. 1.

Article 3

1. Recovery of the aid referred to in Article 1 shall be immediate and effective.

2. Greece shall ensure that this decision is implemented within four months following the date of notification of this Decision.

Article 4

1. Within two months following notification of this Decision, Greece shall submit the following information to the Commission:

(a) the total amount (principal and recovery interests) to be recovered from the beneficiary;

(b) a detailed description of the measures already taken and planned to comply with this Decision;

(c) documents demonstrating that the beneficiary has been ordered to repay the aid.

2. Greece shall keep the Commission informed of the progress of the national measures taken to implement this Decision until recovery of the aid referred to in Article 1 has been completed. It shall immediately submit, on simple request by the Commission, information on the measures already taken and planned to comply with this Decision. It shall also provide detailed information concerning the amounts of aid and recovery interest already recovered from the beneficiary.

Article 5

Greece shall immediately suspend all further payments of aid to Olympic Airways Services and Olympic Airlines.

Article 6

This Decision is addressed to the Hellenic Republic.

Done at Brussels, 17 September 2008.

For the Commission

Antonio TAJANI

Vice-President

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