

I. Information

Proposal to IEC

Introductory note (not part of the proposal)

This proposal is to insert requirements to non-replaceable filament lamps. Reference is made from UNECE Regulations for signalling devices; requirements in UNECE are mandatory. The reason for this proposal is the danger of the use of low quality filament lamps:

- (a) Filament lamps can have a relative short lifetime;
- (b) Requirements concerning the light source quality are missing, like for lumen and colour maintenance, colour endurance, and resistance against vibration and shock.

Therefore, disadvantages may be noted for road safety and consumers, which could be avoided by replaceable solutions or by introducing appropriate requirements to non-replaceable solutions.

At this occasion, the colour definitions in IEC 60809 have been noted down as in UN/ ECE Regulation 48; there is no change of substance.

Modifications are indicated in red.

IEC60809

Contents, insert a new sub clause:

2.11. Non-replaceable filament lamps

New sub clause 1.3.21, insert:

1.3.21

non-replaceable filament lamp

filament lamp which cannot be removed from the device or luminaire

NOTE Non-replaceable filament lamps are usually intended as components for integration into the luminaire or device by manufacturers. They are designed and intended to be indivisible parts of a lighting or light signalling device, or of parts or modules or units of such devices.

New sub clause 1.3.22, insert:

1.3.22

life B10

constant of the Weibull distribution indicating the time during which 10 % of a number of the tested lamps of the same type have reached the end of their individual lives

New sub clause 1.3.23, insert:

1.3.23

lumen maintenance

ratio of the luminous flux of a lamp at a given time in its life to its initial luminous flux, the lamp being operated under specific conditions

Example 1 L70 is the time in h to 70% lumen maintenance

Example 2 L50 is the time in h to 50% lumen maintenance

New sub clause 1.3.24, insert:

1.3.24

initial luminous flux

luminous flux of a lamp measured after the ageing specified in Annex C for filament lamps or in Annex D of IEC 60810 for discharge lamps or in Annex I of IEC 60810 for LED light sources

Sub clause 2.2, replace by:

2.2 Lamp marking

The following information shall be legibly and durably marked on all filament lamps, **except from non-replaceable filament lamps**:

the trade name or mark of the manufacturer or responsible vendor;

the nominal voltage;

the international designation of the relevant category;

the nominal wattage (in the sequence: high wattage filament/low wattage filament for dual filament lamps); this need not be indicated separately if it is part of the international designation of the relevant filament lamp category.

Additionally, halogen filament lamps meeting the requirements of 2.9 shall be marked with a "U".

NOTE Halogen filament lamps are filament lamps whose category designation starts with the letter "H". **However, halogen filament lamps may have a category designation starting with another letter than "H" if complying with the requirements in sub-clause 2.9.**

Inscriptions other than the above may be affixed.

NOTE An example of such an inscription is the approval mark conferred by an administrative authority.

Compliance shall be checked by the following:

presence and legibility - by visual inspection;

durability - by applying the following test on unused lamps:

The area of the marking on the lamp shall be rubbed by hand with a smooth cloth, dampened with water, for a period of 15 s.

After this test the marking shall still be legible.

If the marking is on the bulb, it shall not adversely affect the luminous characteristics.

Sub clause 2.4.1, replace by:

2.4.1 Colour of light

The colour of the light emitted by the filament lamp shall be white, unless otherwise prescribed on the relevant filament lamp data sheet. For some categories other colour(s) of light are allowed.

The colorimetric characteristics of the light emitted, expressed in CIE chromaticity co-ordinates, shall lie within the following limits:

– finished filament lamps emitting white light:

W12	green boundary:	$y = 0.150 + 0.640 x$
W23	yellowish green boundary:	$y = 0.440$
W34	yellow boundary:	$x = 0.500$
W45	reddish purple boundary:	$y = 0.382$
W56	purple boundary:	$y = 0.050 + 0.750 x$
W61	blue boundary:	$x = 0.310$

with intersection points:

	x	y
W1:	0.310	0.348
W2:	0.453	0.440
W3:	0.500	0.440
W4:	0.500	0.382
W5:	0.443	0.382
W6:	0.310	0.283

– finished filament lamps emitting selective-yellow light:

SY12	green boundary:	$y = 1.290 x - 0.100$
SY23	the spectral locus	
SY34	red boundary:	$y = 0.138 + 0.580 x$
SY45	yellowish white boundary:	$y = 0.440$
SY51	white boundary:	$y = 0.940 - x$

with intersection points:

	x	y
SY1:	0.454	0.486
SY2:	0.480	0.519
SY3:	0.545	0.454
SY4:	0.521	0.440
SY5:	0.500	0.440

– finished filament lamps emitting amber light:

A12	green boundary:	$y = x - 0.120$
A23	the spectral locus	
A34	red boundary:	$y = 0.390$
A41	white boundary:	$y = 0.790 - 0.670 x$

with intersection points:

	x	y
A1:	0.545	0.425
A2:	0.560	0.440
A3:	0.609	0.390
A4:	0.597	0.390

– finished filament lamps emitting red light:

R12	yellow boundary:	$y = 0.335$
R23	the spectral locus	
R34	the purple line:	(its linear extension across the purple range of colours between the red and the blue extremities of the spectral locus).
R41	purple boundary:	$y = 0.980 - x$

with intersection points:

	x	y
R1:	0.645	0.335
R2:	0.665	0.335
R3:	0.735	0.265
R4:	0.721	0.259

The colour of the light emitted shall be measured by the method specified in Annex B.

Each measured value shall lie within the required tolerance area. Moreover, in the case of filament lamps emitting white light, the measured values shall not deviate more than 0,020 units in the x and/or y direction from a point of choice on the Planckian locus.

For conformity of production purposes amber and red colour only, at least 80 % of the measuring results shall lie within the required tolerance area.

Sub clause 2.5, replace by:**2.5 Lamp dimensions**

The filament lamp dimensions shall comply with the limiting values given in the lamp drawing or on the relevant filament lamp data sheet.

The definition of and the measuring condition for the filament shape, length and position, shall be in accordance with the appropriate requirements of annexes A, D, E and F respectively; **this does not apply to non-replaceable filament lamps.**

Sub clause 2.6, replace by:

2.6. Caps and bases

Filament lamps shall have standard caps or bases as specified on the relevant filament lamp data sheet and shall comply with the relevant cap data sheet of IEC60061-1. **This requirement does not apply to non-replaceable filament lamps; in this case, filament lamps shall be equipped with bases that allow firm and secure fixation to the lighting or light signalling devices, or to parts/modules/units of such devices, for which these filament lamps are designed and intended for.**

Sub clause 2.9, insert as last line:

.....

In the case of non-replaceable filament lamps, compliance to UV radiation requirements may be exempted if this is specified in the relevant lamp data sheet.

New sub clause 2.11, insert:

2.11. Non-replaceable filament lamps

For non-replaceable filament lamps (either as part of a lighting or light signalling device (luminaire), or as part of parts/modules/units of such devices), the applicant shall demonstrate, with a test report or other means, compliance with requirements to:

- (a) lifetime, and**
- (b) colour and colour endurance, and**
- (c) lumen and colour maintenance, and**
- (d) vibration and shock resistance.**

A brief technical description (data sheet) of the non-replaceable filament lamp shall be submitted by the manufacturer or responsible vendor, stating in particular:

the test voltage;

the device (luminaire) the filament lamp is used for;

whether "standard" or "heavy duty" test conditions apply for testing vibration and shock resistance.

For conformity of production of non-replaceable filament lamp(s), compliance shall be checked with the requirements to lifetime in sub-clause 2.11.2 and for colour coated filament lamps also with requirements to colour endurance as specified in sub-clause in 2.11.3.

2.11.1 Fixation

For testing purposes, non-replaceable filament lamps shall be used that are fixed firmly and secure to appropriate means necessary to conduct the test, or as specified by the respective test, and does not need to be installed in the devices for which these filament lamps have been designed and intended for; filament lamps may be fixed to the parts/modules/units of devices for which they have been designed and intended for.

2.11.2. Lifetime

The life B10 of non-replaceable filament lamps shall not be less than the value given in the following table*, and not less than 50% of that value, in the case of non-replaceable filament lamps that are an indivisible part of parts/modules/units of lighting or light signalling devices:

Devices (Luminaires) in which non-replaceable filament lamp(s) are used	Life B10	Corresponding UN Regulations (for information only)
Rear registration plate lamps	2200**	No. 4
Direction indicator lamps	500	No. 6, 50
Front and rear position lamps	2200**	No. 7, 50
Stop-lamps	1000	No. 7, 50
End-outline marker lamps	2200	No. 7
Reversing lamps	100	No. 23
Rear fog lamps	100	No. 38
Parking lamps	2200	No. 77
Daytime running lamps	4000	No. 87
Side marker lamps	2200**	No. 91
Cornering lamps	200	No. 119

* typical "on"- times for different functions per 200000 km drive distance with an average speed of 33,6 km/h, based on the New European Driving Cycle (NEDC)

** in case these light sources are intended for vehicles where these functions are also switched ON together with the DRL function, then the value of 6200 shall be used

Compliance is checked by life tests as prescribed in Annex A of IEC 60810.

In the case of dual non-replaceable filament lamps the applicable filament shall be considered that is used for the specified device.

2.11.3. Colour and colour endurance

Non-replaceable filament lamps shall comply with the colour endurance requirements as specified in par. 2.4 of this publication.

2.11.4. Lumen and colour maintenance

The lumen maintenance shall not be less than 70% at life B10.

In the case of amber and red coloured non-replaceable filament lamps, the colour of the light emitted by these filament lamps shall be measured at the moment of lumen maintenance and be within the colour boundaries as defined in sub-clause

2.4.1. These measurements shall be made at test voltage as indicated in the relevant datasheet and at an ambient temperature of $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$ using a suitable integrating photometer.

In the case of dual non-replaceable filament lamps the applicable filament shall be considered that is used for the specified device.

Testing may be combined with the lifetime test.

2.11.5. Vibration and shock resistance

To assess the performance influenced by vibration or shock, the test methods and schedules detailed in Annex B of IEC 60810 shall be used.

The non-replaceable filament lamps are deemed to have satisfactorily completed the wideband or narrowband random vibration test as described in Annex B of IEC 60810, if they continue to function during and after the test.

The number of non-replaceable filament lamps failing one of the tests shall not be more than 2.

CLAUSE 4, REPLACE BY:

4. SAMPLING AND CONDITIONS OF COMPLIANCE

Requirements for sampling and conditions of compliance, **except from for non-replaceable filament lamps**, are specified in the relevant regulation for example ECE Regulations No. 37 and No. 99.

4.1. Non-replaceable filament lamps

Alternatively to testing compliance, (previous) measurements or test reports of test samples may be used, under the condition that:

- this acceptable to the Authority responsible for approval; and that
- the essential parameters of these test samples are identical in relation to the test under consideration;
- simulations may be used additionally, in case essential parameters of these test samples are not identical but similar in relation to the test under consideration.

4.1.1. Type approval

For testing purposes, 20 type test samples shall be used for performing the testing of non-replaceable filament lamps.

Compliance is achieved if all requirements as specified in sub clause 2.11 are met.

4.1.2. Conformity of production

For test purposes, 20 test samples per year of normal production shall be used. Alternatively for testing of colour coated non-replaceable filament lamps with colour endurance requirement, a representative distribution over different lamps may be used provided that these are using the same colour coating technology and finishing, and that this representative distribution comprises lamps of the smallest and the largest diameter of the outer bulb, each at the highest rated wattage.

Compliance is achieved if requirements concerning lifetime as specified in sub clause 2.11.2 and, in the case colour coated non-replaceable filament lamps, colour endurance, as specified in sub clause 2.11.3 are met.

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Sub clause A.2, replace by:

A.2 Test voltage

Measurements shall be carried out at the test voltage specified in Clause 5 of this standard which shall be a stable d.c. or a.c. voltage with a frequency between 40 Hz and 60 Hz.

In the case of non-replaceable filament lamps (defined in IEC 60809), the filament lamp shall be operated at the test voltage specified in the relevant data sheet. In case an electronic regulator is used, such as pulse width modulation (PWM), this non-replaceable filament lamp should be operated in such a way that it does not negatively affect the lifetime of the filament lamp.

NOTE The test voltage is deemed to be stable when the momentary fluctuations do not exceed 1 % and the deviation of the average over the test period does not exceed 0,5 % of the specified value.

Sub clause A.3, replace by:

A.3 Operating position and operating conditions

Filament lamps shall be operated on a vibration-free test rack with both lamp axis and filament(s) horizontal. In the special case of double-filament lamps which include a shield, this shall be under the dipped or lower-beam filament (H-H line horizontal). In the case of filament lamps with an axial filament, the longer filament support shall be positioned above the filament.

The lamps shall be tested under normal ambient temperature conditions; assumption is $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$.

Sub clause A.5, replace by:

A.5 Lumen and colour maintenance

Tests may be interrupted for determination of the lumen and colour maintenance.

Sub clause B.2.4, replace by:

B.2.4 Conditioning

Filament lamps shall be aged for 30 min at test voltage as given in the relevant data sheets of IEC 60809 or in the relevant data sheets of non-replaceable filament lamps. No ageing period is required for discharge lamps, but lamps which fail before starting a vibration test shall be omitted from the test results.

Sub clause B.3, replace by:

B.3 Test conditions

The test voltage for filament lamps shall be in accordance with IEC 60809 **or with the specification in the relevant data sheets of non-replaceable filament lamps**. For discharge lamps, the conditions of Clause D.2 of this standard apply.

The specific vibration test conditions are given as follows:

Narrowband random vibration test	Standard test conditions	Table B.1
	Heavy-duty test conditions	Table B.2
Wideband random vibration test	Standard test conditions	Table B.3
