TFSR-06-05rev1

UNECE approach for „filament-replacement” LED light sources in R37*

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*instead of LED retrofits in R128

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The approach (legal and technical equivalence)

(based on the previous discussions on technology neutral and performance based requirements and guidance given in the TFSR and at GRE)

- No further work on LED “retrofits” into R128

- Open R37 to allow „filament-replacement light sources”* in LED technology (LEDfr)
  - Use the photometric equivalence criteria from LED substitutes
  - Address open issues not fully addressed by LED substitutes (electrical, thermal)
  - Example: a PY21W of incandescent technology or a PY21W of LED technology, both approved to R37, will get the same “legal status”

*the final terminology to be defined

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The new document scope

R37
Light Sources (“filament-like”)
• incandescent technology
• LED technology (LEDfr)

R99
HID light sources

R128
LED light sources
LED substitutes

R.E.5 Category sheets
Filament light sources
HID light sources
LED light sources, including:
• LED substitutes
• Filament-replacement light sources in LED technology (LEDfr)

Filament-replacement LED light sources in R37

- Photometric equivalent to incandescent counterpart
  - Using equivalence-criteria from LED substitutes, incl. 3000K limit for white signaling light sources
- Addressing electrical interface for failure detection
  - Majority of functions / cars on the road have no failure detection (DI excluded)
  - Optional „external electronics“ to support correct failure detection
- Addressing high temperature operation and PWM operation / dimming
- Additional user information and marking

Additional slides provided by Ad De Visser as a „first study“ on the next pages

R37

Title of the Regulation

Uniform provisions concerning the approval of filament ~~lamps~~ light sources and of filament-replacement LED light sources for use in approved lamps of power-driven vehicles and of their trailers

R37

1. Scope

1.1. This Regulation applies to filament light sources shown in Annex 1 and intended for use in approved lamps of power-driven vehicles and of their trailers.

1.2. This Regulation applies to filament-replacement LED light sources (LEDfr) shown in Annex 1,

(a) having a counterpart filament light source with the same category designation shown in annex 1,

(b) intended for use in approved lamps of power-driven vehicles and of their trailers,

(c) keeping the characteristics of the lamps approved for their counterpart filament light sources.

R37

2. Administrative provisions

2.1. Definitions

2.1.1. Definition of "category"

The term "category" is used in this Regulation to describe different basic design of standardised filament light sources and basic different design of their counterpart LEDfr light sources. Each category has a specific designation, as for example: "H4", "P21W", "T4W", "PY21W"or "RR10W". The designation of the LEDfr light source category, if any, is the same as of its counterpart filament light source category.

R37

3. Technical requirements

3.1. Filament light sources

3. 1.1. Definitions

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3.2. LEDfr light sources

LEDfr light sources shall:

3.2.1. In addition to the technical requirements of this Regulation, conform to the technical requirements for LED light sources of the latest version of Regulation No. 128; this includes the additional requirements to LED substitute light sources, except for the requirements to the cap;

3.2.2. Be equipped with a cap of the same cap designation as its counterpart filament light source as defined in the relevant data sheet of Annex 1 ;

3.2.3. Allow the proper functioning of monitoring and failure detection systems used for their counterpart filament light sources;

3.2.4. Switch off above the maximum allowed operating temperature as indicated in the relevant datasheet of Annex 1;

3.2.5. [….. PWM dimming for dual mode ….]

R37

Annex 1

Sheets* for filament light sources and their LEDfr light sources

The sheets of the relevant filament light source category and the group in which this category is listed with restrictions on the use of this category, and the sheets of its LEDfr light source category, if any, listed in group 5 of LED light source categories, shall apply as incorporated in Resolution ~~[R.E.4]~~ R.E.5 or its subsequent revisions, applicable at the time of application for type approval of the filament or LEDfr light source.

R.E.5

2.1.1.3.1. “LED substitute light source” means a LED light source of a category which has a counterpart light source category producing light by another light generating technology.”

2.1.1.3.2. EITHER:

“Filament-replacement LED light source” (LEDfr) means a LED light source of a category which has a counterpart light source category producing light by another light generating technology and which is intended for use in lamps only approved for that counterpart light source category

OR:

“Filament-replacement LED light source” (LEDfr) means a LED light source being a replacement light source for its counterpart filament light source.

OR:

“Filament-replacement LED light source” (LEDfr) means a LED light source intended for use in lamps only approved for its counterpart light source category

OR (rewrite definitions):

A filament-replacement light source has two options:

1. LED Substitute light sources

2. LED Retrofit light source

R.E.5

3.3. LED light sources

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Group 5		
LEDfrlight source categories* only for use in lamps approved with filament light source(s) of its counterpart light source category		
Category	Counterpart filament light source category	Sheet number(s)
PY21W	PY21W	PY21W/LED/1 to 4

* Not for use in conformity of production control of lamps.

R.E.5 - example

Categories PY21W and PY21W/LED **Sheet PY21W/LED/2**

Insert a maximum operating temperature (can be derived from the value in footnote 4)

Move footnote 5 to sheet number 4:

Categories PY21W and PY21W/LED **Sheet PY21W/LED/4**

Monitoring and failure behavior

In the case of electrical or electronic controls outside the LED light source to support monitoring and failure detection, the measurement of the electrical current of the LED light source shall be made including these controls.

PY21W and PY21W/LED

In case of a failure of any of the light emitting elements, the LED light source shall either still comply to the requirements concerning luminous flux and luminous intensity distribution or stop emitting light whereby in the latter case the electrical current draw, when operated between 12 V and 14 V, shall be less than 50 mA.

PY21W

At ambient temperatures exceeding the value specified in the table on sheet PY21W/LED/2, the LED light source shall switch off.

R128

1. Scope

This Regulation applies to LED light sources shown in Annex 1 and intended for use in approved lamps of power-driven vehicles and of their trailers, excluding filament-replacement LED light sources (LEDfr light sources).

Annex 1

Sheets[1] for LED light sources

The sheets of the relevant LED light source category and the group in which this category is listed with restrictions on the use of this category, excluding the sheets of LEDfr categories listed in group 5 of LED light source categories, shall apply as incorporated in Resolution R.E.5 or its subsequent revisions, applicable at the time of application for type approval of the LED light source.

END