

GTB Working Group

Light Sources

Status October 2013



Content

1. Road map

Update of presentation to GRE #65, March 2011

2. Light source work items in the pipeline

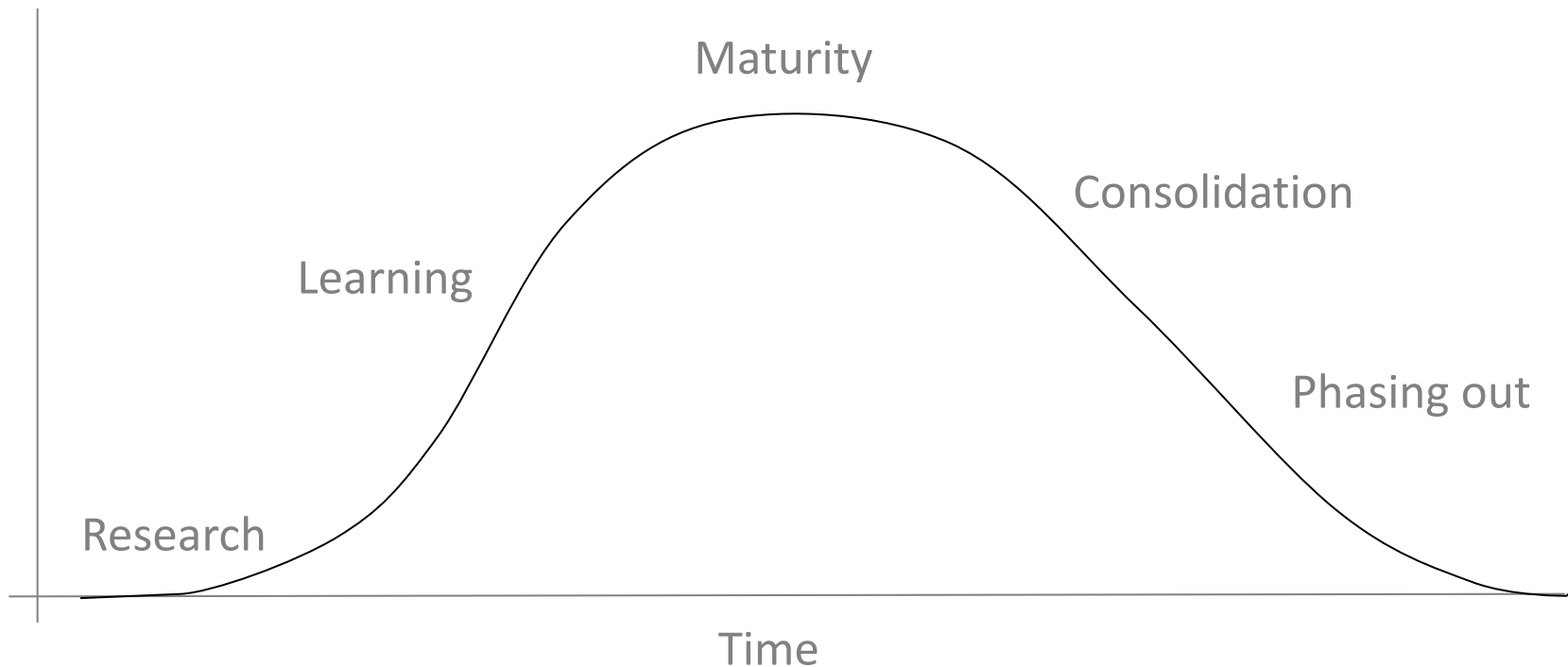
3. GTB WG LS "*Feasibility of LED retrofit*" study

Legal framework draft:

"How to implement in the UN Regulations"

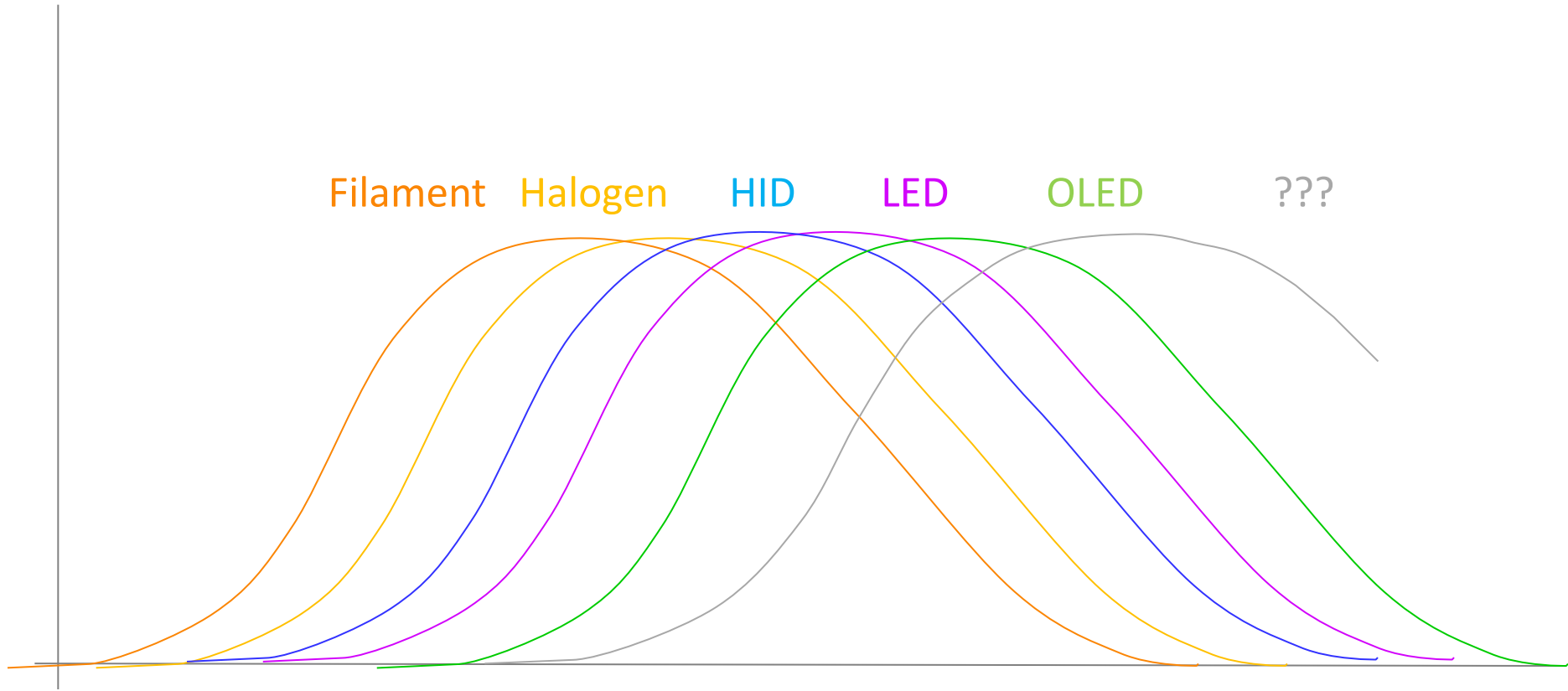
1. Road map

Outlook - theoretical

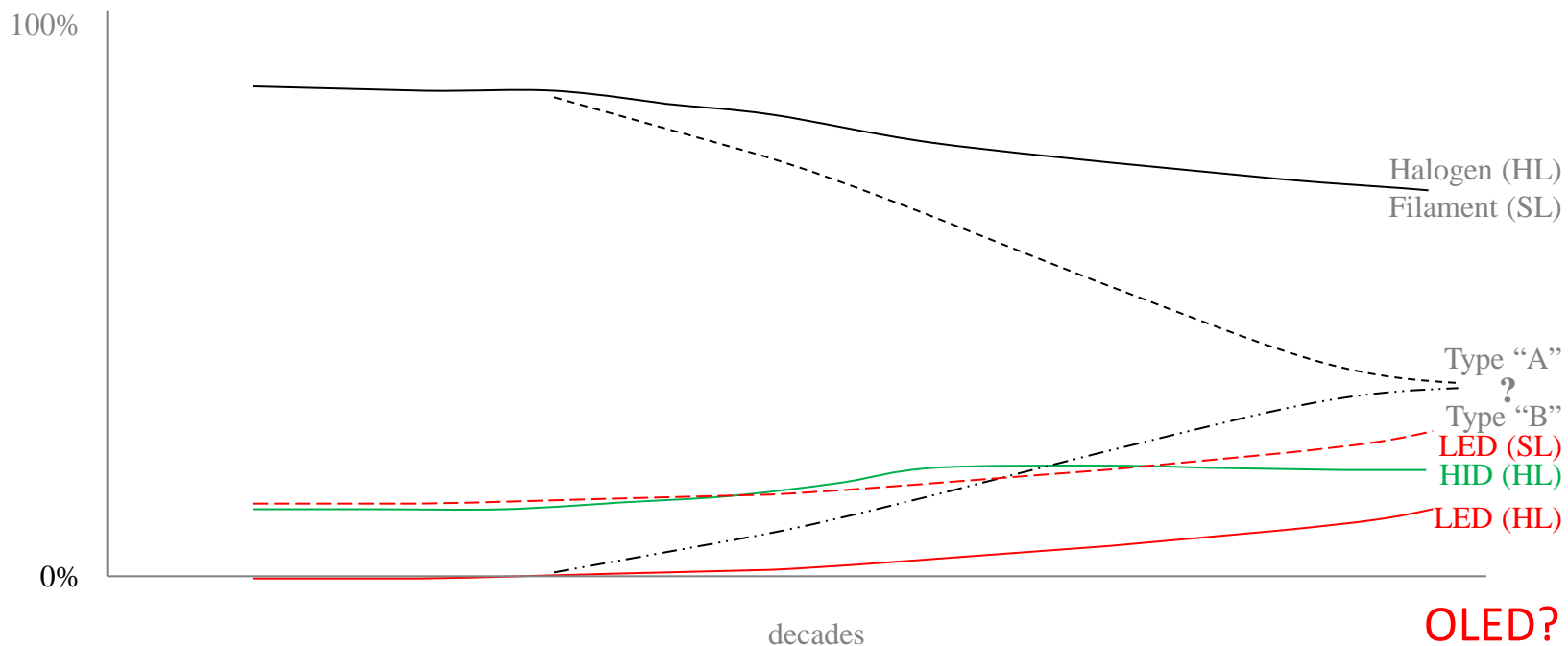


Not on scale

Technology curves - theoretical

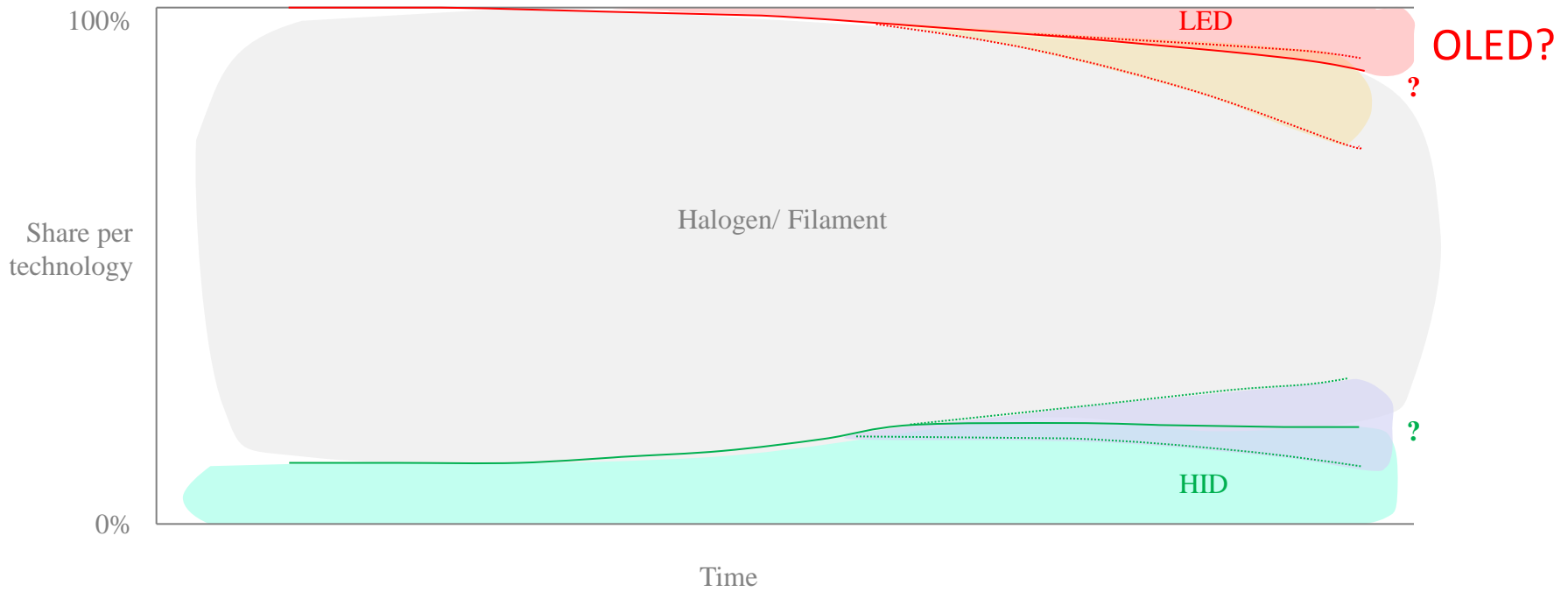


Technology curves ?



Not on scale

Outlook ?



Not on scale

--- 2010 ---

--- 2000 ---

--- 1990 ---

--- 1980 ---

--- 1970 ---

--- 1960 ---

--- 1950 ---

--- 1920 ---

--- 1900 ---



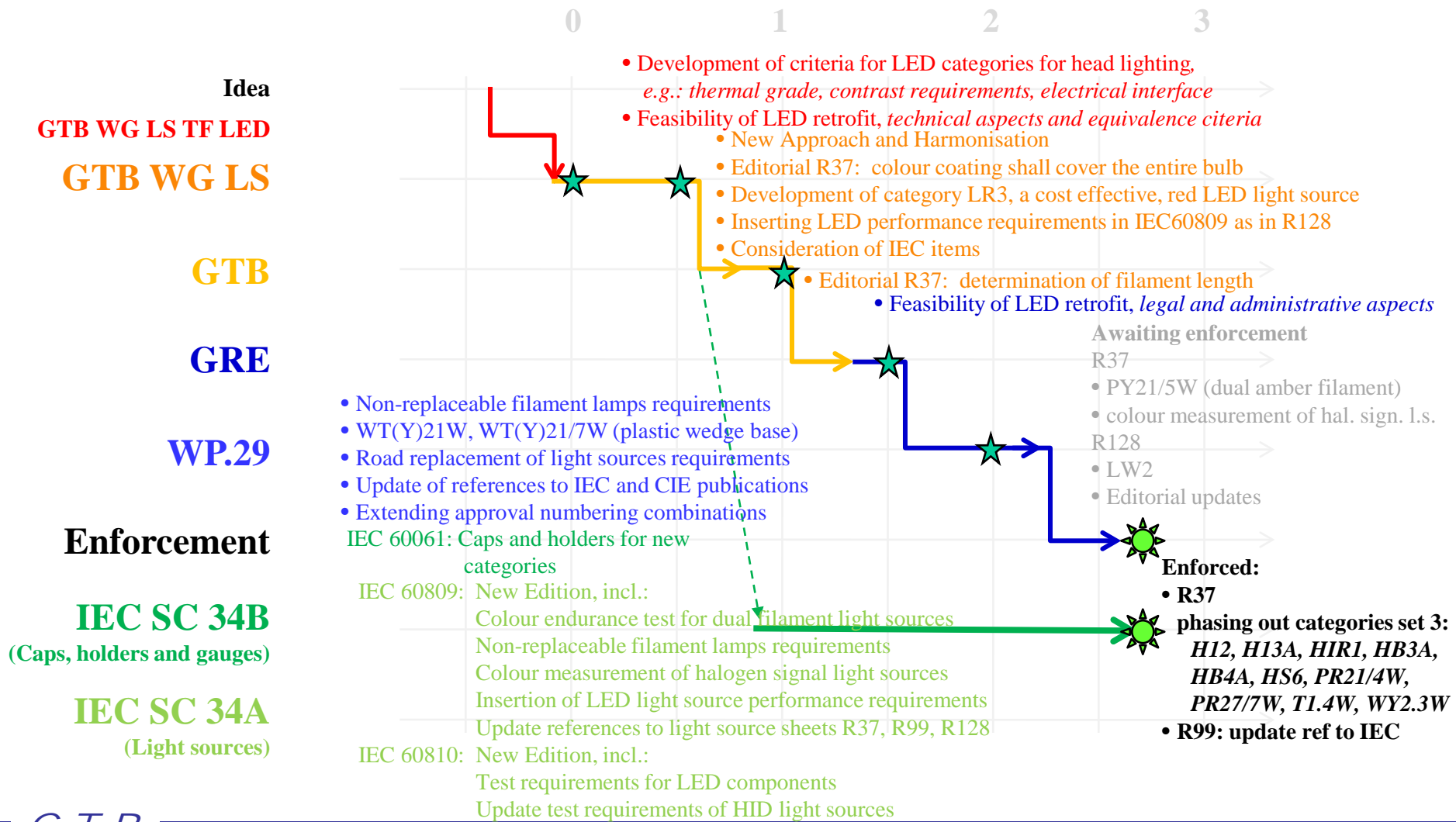
GTB
The International Automotive Lighting
and Light Signalling Expert Group
Groupe de Travail "Bruxelles 1952"

Automotive Tree of Light

Tree adapted from <http://www.dragonartz.net/>

2. Light source work items the pipeline

Light source work items the pipeline



GRE-69-41

3. GTB WG LS "*Feasibility of LED retrofit*" study

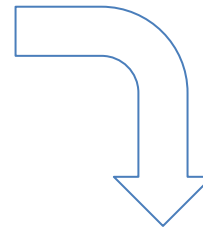
"Feasibility of LED retrofit"

WGLS work item

To investigate feasibility of new LED categories according to R128, as replacement parts for filament light source categories according to R37.

Study should include:

- Development of equivalence criteria
- Investigation on how to implement retrofit provisions in the relevant UN regulations*



*CE-4871

R128

1. This is about LED retrofit l.s. as legal and equivalent replacement parts for R37 l.s.
 - Therefore LED retrofit l.s. should be approved but to R128.
2. Equivalence criteria are being developed in the TF LED of WG LS
 - Will be used for defining LED retrofit category sheets for R128
 - Will not be implemented into R128
 - Similar as the criteria tool for filament lamps for head lighting
 - May be inserted in the "reference documents" section of the GRE
 - Available to all participants to GRE
3. The category designation will be the same as of the corresponding filament lamp
 - To clarify that LED retrofit categories are equivalent retrofits
 - To avoid confusion: R37 category is marked on the lenses of signal lamps
 - Additional marking "R" (incl. "") to indicate as retrofit
 - Disconnected from other markings and category designation
 - A similar marking is the U marking for UV requirements

R128

4. Every replaceable approved I.s. is basically also a retrofit product/ replacement part
 - LED retrofit categories replace filament lamps (another technology)
 - This is additional reason for “R”-marking in R128
5. Standard “R”-marked LED light sources
 - Not available for type approval of new lamps nor for COP purposes of lamps
 - The intention is retrofit
 - Wattage lower than R37 I.s.
(max. wattage R128 light source up to max wattage of R37 light source)
6. Introduce groups of categories in R128 such as in R37
7. New group for “R”-marked lamps
 - Group 4 “Light sources not available for approval of new lamps”
 - Insert new paragraph “9. retrofit provisions”

Regulation No. 128

ADMINISTRATIVE PROVISIONS (AMEND)

- "2.3.3. LED light sources of categories listed in the table for group 4 in annex 1 shall be marked with an "R" including the inverted commas, and shall be disconnected from other markings.**
- 2.3.4.** Inscriptions other than those covered by paragraphs 2.3.1. and 2.4.4. may be affixed, on the condition that they do not adversely affect the luminous characteristics."

TRANSITIONAL PROVISIONS (NEW)

- "8. RESERVED"**

Regulation No. 128

RETROFIT PROVISIONS (NEW)

“9. Retrofit provisions

9.1. No “R “marked LED light sources shall be used in lamps for type approval purposes.

9.2. No “R “marked LED light sources shall be used for conformity of production control purposes of lamps.

9.3. For lamps installed on vehicles in use, “R “marked LED light sources are deemed to be replacement parts to light sources with the same category designation but approved according Regulation[s] No. 37 [or 99].”

Regulation No. 128

LED LIGHT SOURCE CATEGORY LISTINGS (NEW)

Annex 1

The List of categories of LED light sources and their sheet numbers, amend to read:

“List of categories of LED light sources, **grouped** and their sheet numbers”

Group 1	
Without general restrictions:	
Category	Sheet number(s)
“RESERVED”	

Group 2	
Only for use in signalling lamps, cornering lamps, reversing lamps and rear registration plate lamps:	
Category	Sheet number(s)
LR1	LR1/1 to 5
LW2	LW2/1 to 5

Group 3	
RESERVED	

Regulation No. 128

<i>Group 4</i>		
<i>For replacement purposes only, as specified by retrofit provisions in paragraph 9:</i>		
<i>Sheet number(s)</i>		
<i>Category</i>		
Pk	*4	tt

LED LIGHT SOURCE CATEGORY SHEETS

Comments:

The maximum value of the objective wattage of an LED category having the same designation as a particular category in R37, might be equal to the maximum value of the objective wattage of the R37 category.

Testing of group 4 light sources not yet included in this text.

Device regulations

1. No amendment necessary.

- “R”-marked light sources are intended for the **aftermarket**
- “Regular” R128 categories are for OEM
- The reference to **use restrictions in Regulation No. 128** approved by WP.29
*WP.29/2012/63, WP.29/2012/64, WP.29/2012/65, WP.29/2012/68, WP.29/2012/71,
WP.29/2012/75, WP.29/2012/77, WP.29/2012/78, WP.29/2012/79*
- “R”-marked light sources are not for type approval of lamps nor for COP

R48

1. For type approval acc. to **R48 amendment is not needed**

BUT

2. There is no requirement that **approved lamps installed on vehicles shall use light sources for which these lamps have been approved**

- Possible negative consequences: GRE-69-41, WP.29-156-08



3. **Such requirement should be introduced**

- The only **exemption**: "R"- marked LED light sources
- Regulation No. 48 is often used for **reference purposes from national law** for permanent requirements; GRE-69-41, WP.29-156-08



Regulation No. 48

~~{04 series of amendments, proposal for Supplement xx}~~

~~{05 series of amendments, proposal for Supplement yy}~~

06 series of amendments, proposal for Supplement zz

RETROFIT PROVISIONS (NEW)

"13. Retrofit provisions

Lamps installed on vehicles [(in use)] and approved for use with light source(s) according to Regulations No. 37, 99 or 128 shall be equipped with light sources of the categories for which the lamp was approved.

However, lamps installed on vehicles [(in use)] and approved for use with light source(s) according to Regulations No. 37 or 99 may also be equipped with "R" marked LED light sources with the same category designation as of these filament or gas discharge light source(s), but according to Regulation No. 128."

R37

1. For type approval according to R37 amendment is not needed.

BUT

2. For clarity it may be better to specify in R37
 1. Light source categories of the same designation appear in R128
 2. To explain such categories are legal replacement parts, too.

Regulation No. 37

RETROFIT PROVISIONS (NEW)

"9. Retrofit provisions

- 9.1. For lamps installed on vehicles in use, "R marked" LED light sources approved according to Regulation No. 128 are deemed to be replacement parts to light sources with the same category designation but approved according this Regulation.**

"

We would appreciate your valuable input and guidance.

THANK YOU

BACK UP LED RETROFIT

Taken from: GRE-69-41 and WP29-156-08e

"Feasibility of LED retrofit"

With reference to

"Replacement light sources and compliance"

GRE-66-19; WP.29-156-08

on one hand:

there are worries about

- non-approved light sources,
- including non-approved LED retrofits

"Feasibility of LED retrofit"

on the other hand:

- The public is stimulated to apply energy saving products in *general* lighting
- But is not aware that *automotive* LED retrofits are non-approved light sources

Today, there are **no legal energy saving replacement light sources for vehicles available**

"Feasibility of LED retrofit"

New work item

To investigate **feasibility of new LED categories** according to R128, **as replacement parts for filament light source categories** according to R37.*

Study should include:

- Development of equivalence criteria
- Investigation on how to implement retrofit provisions in the relevant UN regulations

*GTB document CE-4792

Conditions for equivalent performance

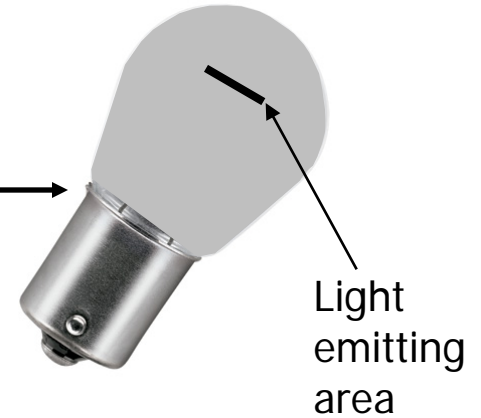
R37 light source



“Identical”
performance based and prescriptive criteria

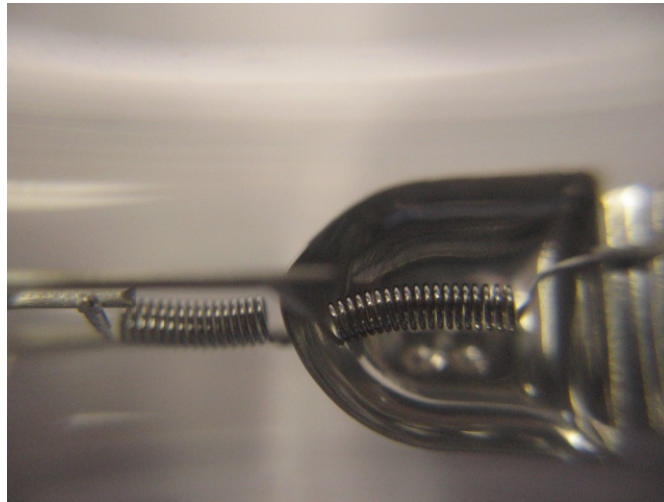
- Luminous flux
- Light emission characteristics
- Colour of the light emitted
- Geometry of light emitting area
- Maximum outline
- Wattage (\leq)
- IEC cap/ holder system

R128-retrofit



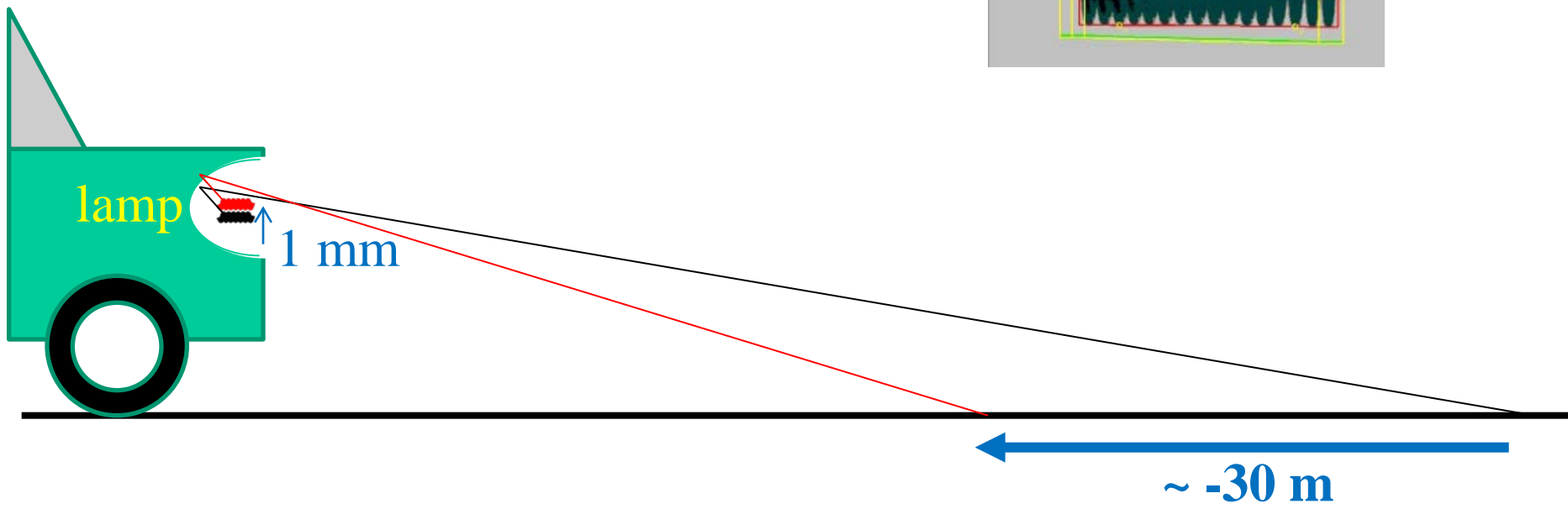
GRE-69-41

"Bad" bulbs



One effect of displacement of the filament:

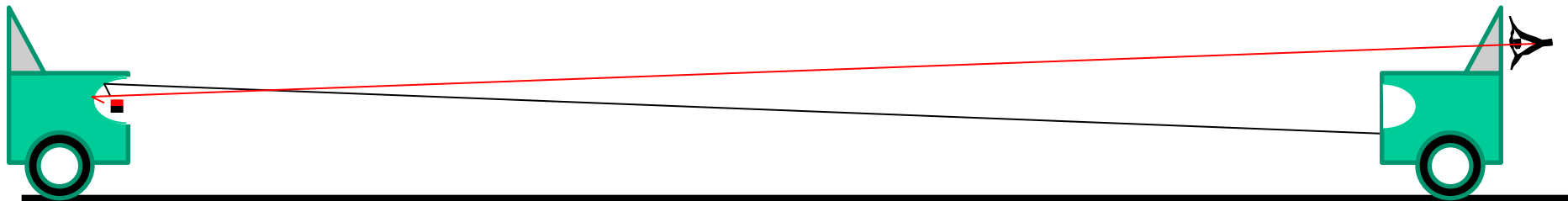
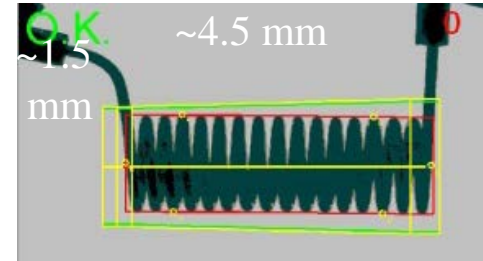
Δ visibility range



Not to scale

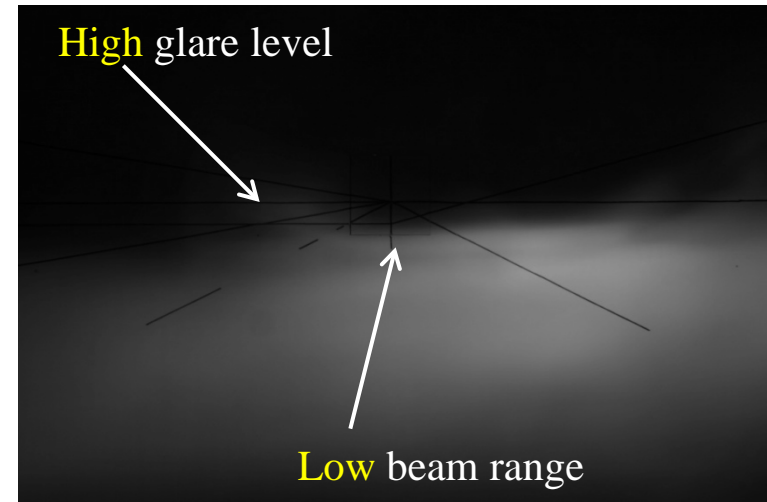
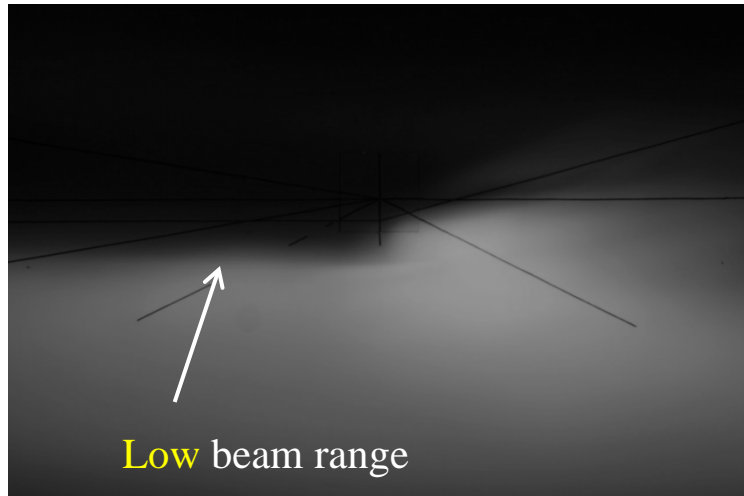
Another effect of displacement of the filament:

Δ glare



Not to scale

"Bad" beam pattern



LED retrofit in signal lighting

example

approved filament lamp

vs.

non-approved LED retrofit



- | | | | |
|---------------------------|-----|-----|--------------------------------|
| ➤ Luminous output: | ok | vs. | not sufficient |
| ➤ Red color: | ok | vs. | ok |
| ➤ Emitter size: | 4mm | vs. | 12mm (too large) |
| ➤ Intensity distribution: | ok | vs. | does not fit to optical system |

LED retrofit in front lighting

example

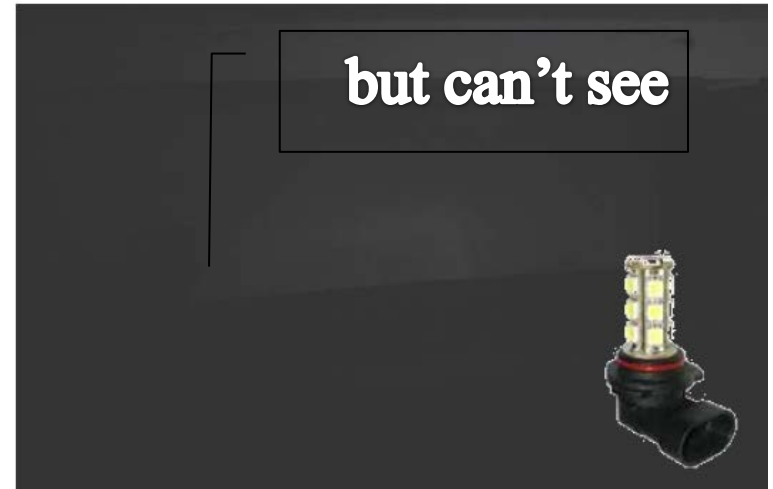
approved halogen light source

vs.

non-approved LED retrofit



looks cool



- | | | | |
|---------------------------|----------|-----|--|
| ➤ Luminous output: | 1100lm | vs. | 67lm |
| ➤ Color of light: | 3200K | vs. | 9300K (outside boundaries for white) |
| ➤ Emitter size: | 4mm | vs. | 20mm |
| ➤ Intensity distribution: | circular | vs. | non-symmetrical |



END

