Informal document GRE-80-30
(80th GRE, 23-26 October 2018,
agenda item 5)

FIA MOBILITY & TOURISM

Gerd Preuss,
FIA Representative at
UNECE, WP 29

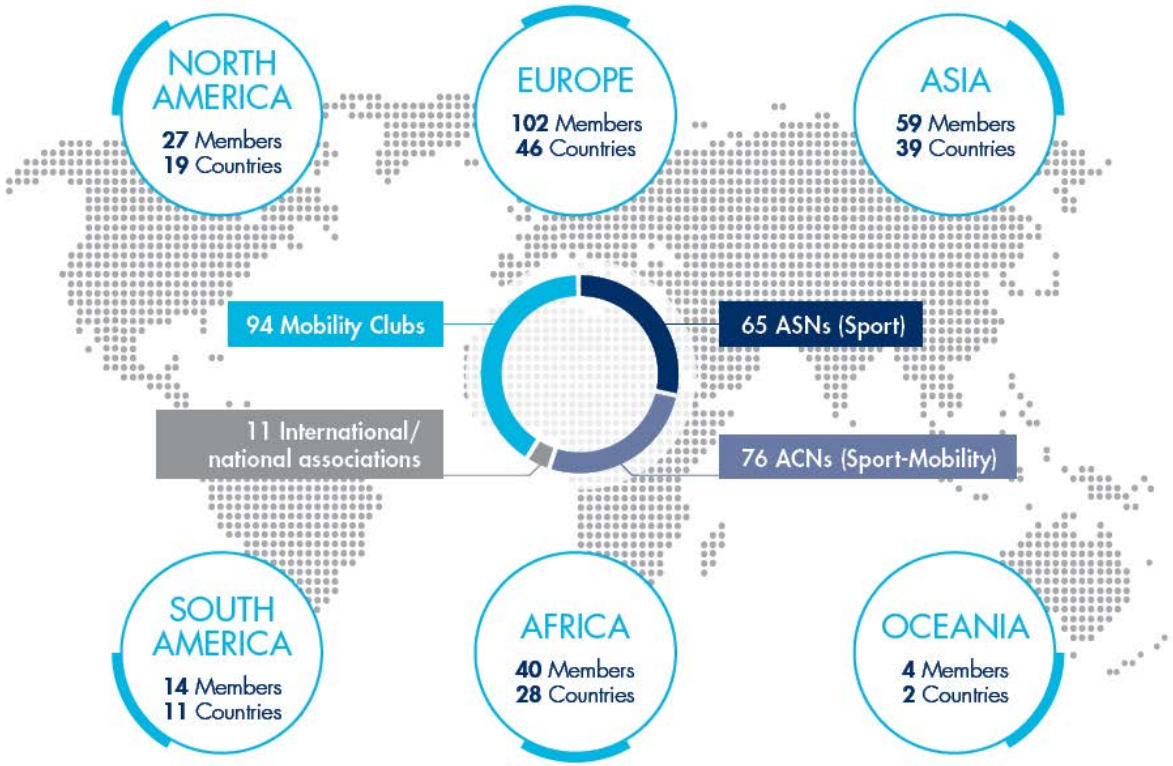
A WORLD IN MOTION

ECE-TRANS-WP29
2018-10-24
LED Replacement Light Sources

FEDERATION
INTERNATIONALE
DE L'AUTOMOBILE

FIA.COM

246 member organisations representing over 80 million people from 145 countries



IN MOTION

FIA Region I Policy priorities

Connecting Vehicles

Ensuring smooth development of future car connectivity, while providing motorists with informed free choice

Safeguarding mobility

Supporting efficient and affordable mobility for all

Protecting the environment

Offering intelligent mobility solutions that mitigate the impact of transportation on the environment

Increasing road safety

Promoting 5-star drivers in 5-star cars on 5-star roads
Light Sources are means to increase road safety

LED Replacement Light Sources

- FIA supports a Regulation on Technical Requirements for LED Replacements

- Technical Arguments for LED:

  Higher Safety with LED

  Disadvantages of Incandescent Lamps

  Advantages of LED lamps

- Consumer Views

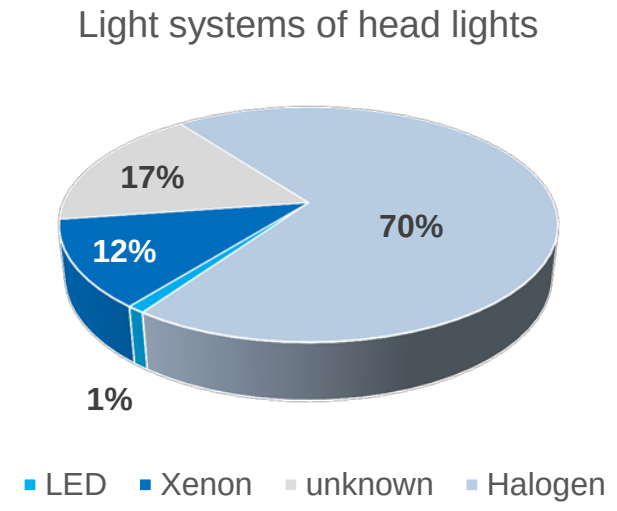
LED Replacement Light Sources

- FIA supports a proposal submitted by the Task Force on Substitutes and Retrofits (TF SR) which introduces requirements for the use of light emitting diode (LED) substitute light sources in the new LSD UN Regulation

LED Replacement Light Sources

Technical Arguments: Higher Safety with LED

- 15,5 % of all vehicles have one or more lamp defects
- 13,1 % of all vehicles equipped with lamp diagnostic systems have also one or more lamp defects
- 70 % to 87 % of all car head lights in Germany are equipped with incandescent lamps
- The risk of fatal accidents is three times higher during night than by daylight (Source: DESTATIS)

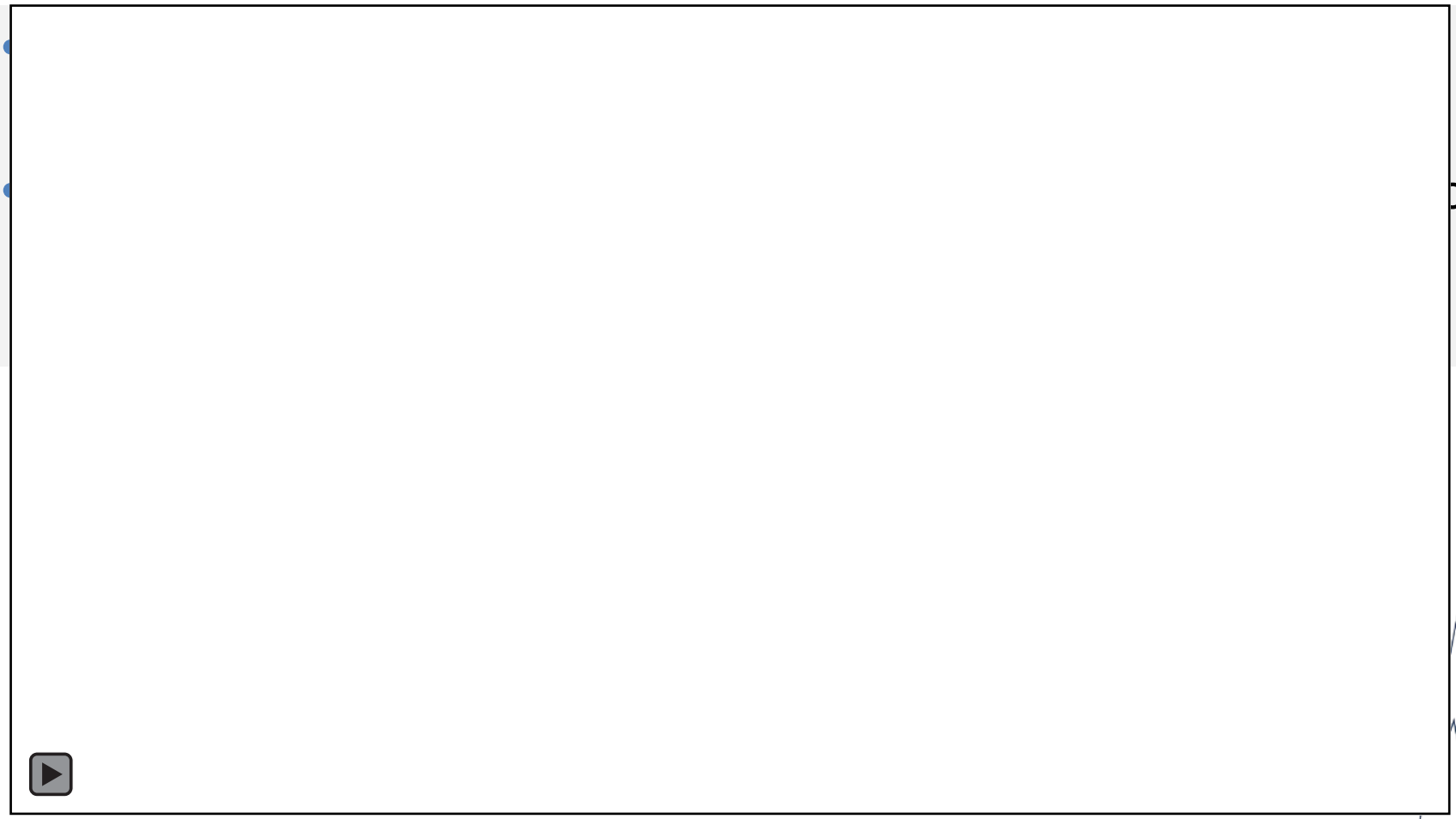


ADAC lighting check 2017 on 5.819 vehicles in Germany (October 2017)

LED Replacement Light Sources

Technical Arguments: Higher Safety with LED

Test: LED Replacements switch on faster than incandescent lamps



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MOTION

LED Replacement Light Sources

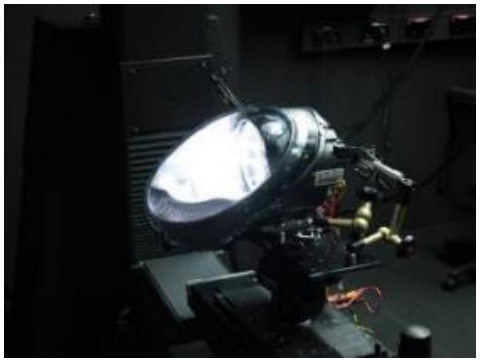
Technical Arguments: Higher Safety with LED

Replacements in Low Beam Head Lights

- More brightness
- Better contrast
- Higher range

LED Replacements fulfill already many requirements in light distri-bution of UNECE regulations for incandescent filament lamps

BMW MINI with
Philips H4 Halogen

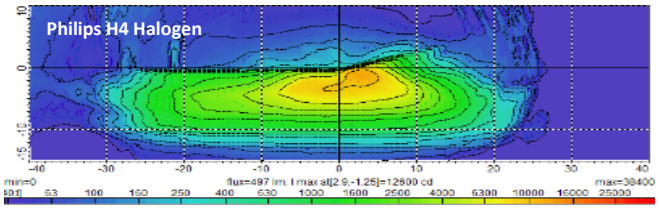


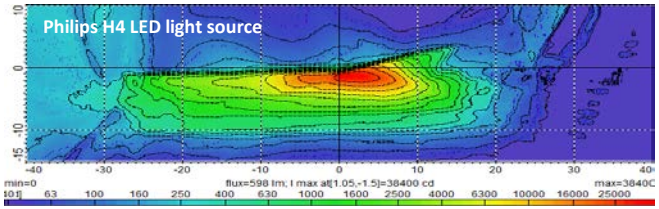
BMW MINI with
Nighteye H4 LED light source

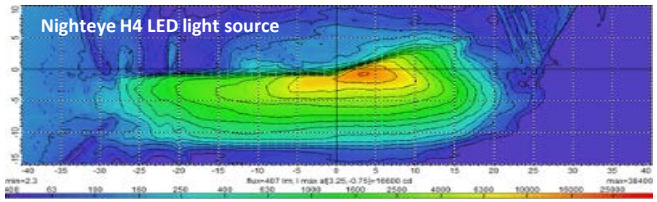
LED Replacement Light Sources in

Technical Arguments: Higher Safety with LED

Tested with Free-form Reflector: BMW MINI (H4)
Light Distribution Low Beam – Driver´s View



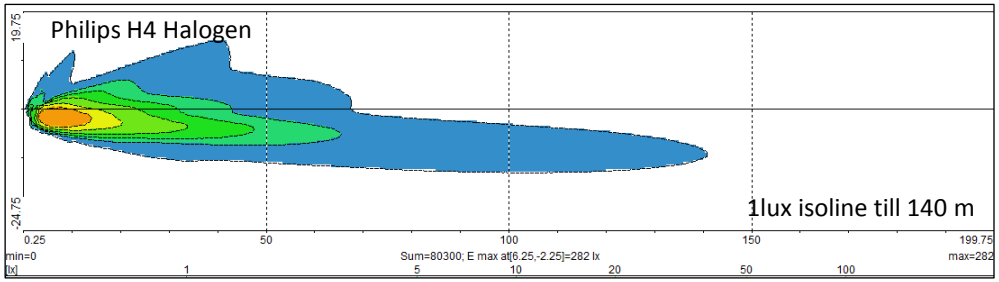


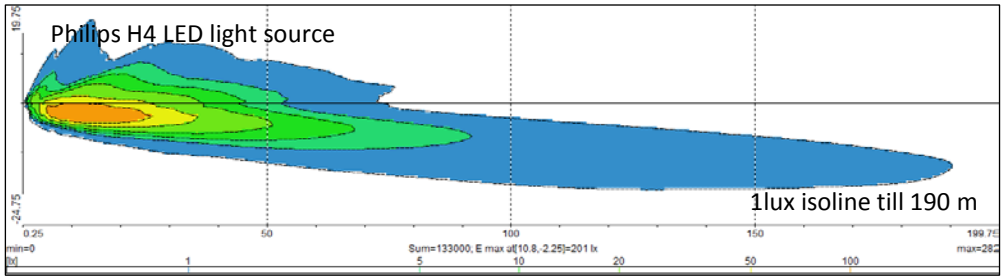


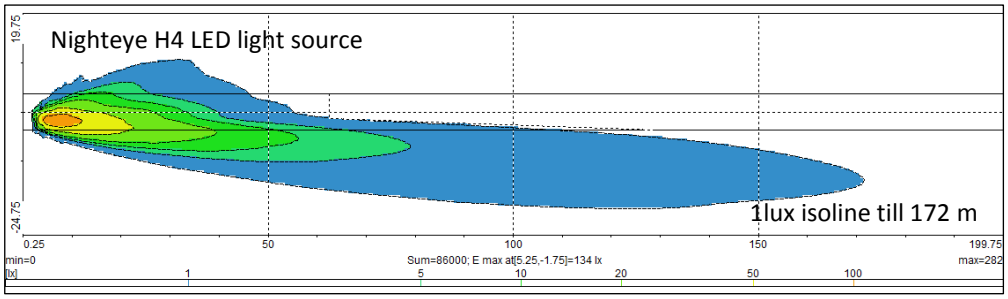
LED Replacement Light Sources

Technical Arguments: Higher Safety with LED

Test: Free-form Reflector in BMW MINI (H4) with Bird's Eye View and Low Beam Range







Technical Arguments: Higher Safety with LED

Free-form Reflector: BMW MINI (H4)
Table UN ECE Reg. 112 Low Beam

Functions	Min [cd]	Max [cd]	Philips H4 Halogen [cd]	N.i.O	Philips H4 LED light source [cd]	N.i.O	Nighteye H4 LED light source [cd]	N.i.O
Range:								
75R	10100	-	8605	*	16959		9274	*
50R	10100	-	10841		29970		13925	
50V	5100	-	6022		21536		4836	*
25L	1700	-	2631		6793		3274	
25R	1700	-	3324		7241		7788	
Zone IV	2500	-	12520		39143		16468	
Glare Values:								
B 50L	-	350	251		163		190	
BR	-	1750	199		205		316	
75L	-	10600	2434		5670		890	
50L	-	13200	4733		11932		2894	
Zone III	-	625	548		681	*	3760	*
Zone I	-	2*E(50R)	11978		35887		12455	
Visibleness Values:								
1 (8L - 4O)	65	-	77		67		106	
2 (H - 4O)	65	-	116		93		133	
3 (8R - 4O)	65	-	136		64	*	232	
4 (4L - 2U)	125	-	166		92	*	140	
5 (H - 2U)	125	-	205		120	*	164	
6 (4R - 2U)	125	-	201		153		273	
7 (8L - V)	65	-	290		325		339	
8 (4L - V)	125	-	309		490		238	

LED Replacement Light Sources

Technical Arguments:
Higher Safety with LED

- Lower failure rates
- Better view at night
- Easier detection of pedestrians
- Higher protection for motorcycles
- Faster signalling of braking procedures
- Retrofitting for present vehicle fleet
- Better equipment for older vehicles
- Shock proof lamps for trailors

Osram H7 LED Retrofit lamp
in Hyundai i30 head light

Philips LED Replacement Light Sources in
VW Golf VI Variant rear light with clear cover

LED Replacement Light Sources

Technical Arguments:
Disadvantages of incandescent lamps

Incandescent filament lamps are sensitive to

- Voltage Fluctuation
- Vibration
- Shock Force
- Life time requirements

This leads to defects of lamps and less safety if not replaced in time

H7 Halogen incandescent filament lamp

LED Replacement Light Sources

Technical Arguments:
Advantages of LED lamps

LED lamps are robust in terms of

- Voltage fluctuations
- Vibrations
- Shock forces
- Life time requirements

Further advantages of LED lamps are

- Lower power consumption
- Less heat emission

NightEye H4 LED Retrofit lamp

All reports are available at (in german only):

https://www.adac.de/infotestrat/technik-und-zubehoer/licht/lichttechniken/

LED Replacement Light Sources

Consumers View

- LED Replacemts are already available on the market and in some markets outside Europe, they are already „allowed“
- Consumers have no understanding for prohibition of LED Replacements in vehicle use in Europe
- Consumers in Europe cannot make a distinction betwenn good and bad performing LED replacement light sources, due to missing regulative technical requirements
- A Regulation for LED Replacements developed by GRE, will give industry safety guidelines with benefits for both: the consumer and the vehicle safety

ECE 22.05

R22 Example (Helmets)