

## Editorial

# New UN Reg 48 Amendments In Effect!



During the WP29 meeting this past March, a new 09 series of amendments to UN Regulation № 48 was approved, and set to enter into force on 22 September. As this issue of your DVN newsletter goes live, that was two days ago; those amendments are now in force, so vehicles meeting them can now be homologated. The 09 amendments will become mandatory for new vehicle types in September 2027, and for all types in September 2030, except that for vehicle types N2, N3, O3, and O4—those have a one-year deferral to 2028 and 2031, respectively.

The main updates are mandatory static automatic headlamp levelling to reduce glare due to vehicle cargo and passenger loading, and a new "answer back" signal function with 3-second limit on welcome lighting scenarios.

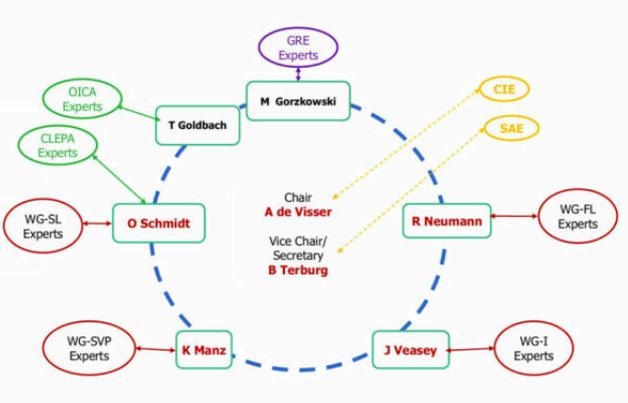
This updated regulation including automatic levelling was in discussion for many years at GRE meetings, including by some very famous names in the lighting community; a lot of readers will remember the Klettwitz testing ([Doc 1](#), [Doc 2](#)).

**Klettwitz Levelling Test Overview Of Results**

B. Zydek, Prof. T.Q. Khanh



TECHNISCHE UNIVERSITÄT DARMSTADT  
FACHGEBIET LICHTTECHNIK



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graph TD; GRE[GRE Experts] --- M[M Gorzkowski]; M --- T[T Goldbach]; M --- R[R Neumann]; T --- O[OICA Experts]; T --- C[CLEPA Experts]; T --- O[O Schmidt]; O --- W1[WG-SL Experts]; O --- W2[WG-SVP Experts]; R --- J[J Veasey]; R --- W3[WG-FL Experts]; J --- K[K Manz]; J --- W4[WG-I Experts]; A[Chair A de Visser] --- B[Secretary B Terburg];
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Do not miss also the final report of DVN Pune September 4-5 [here](#)

Sincerely yours,

**Paul-Henri Matha**  
DVN Chief Operating Officer and Lighting General Editor

# In Depth Lighting Technology

## ORAFOL: A Hidden Champion



W. Huhn (DVN, Left) · J. Ewald (ORAFOL, Right)

DVN was invited by Jürgen Ewald to visit the company ORAFOL Europe GmbH in Oranienburg. Jürgen Ewald is an old friend back from my university time in Darmstadt. He took his time to guide me around the company for a half a day and he presented many surprises.

To be honest, only insiders know about ORAFOL and the brands ORALITE and ORACAL, but everyone sees and uses these products every day. ORAFOL is one of the few leading manufacturers of self-adhesive tapes, graphical and retroreflective sheeting. This means that most of the world's retroreflective traffic signs, other road safety equipment, license plate sheeting, reflective markings for emergency vehicles and contour marking for trucks and trailers are made by ORAFOL. Car wrapping films, window- and floor-graphic products as well the huge range of self-adhesive sheeting for digitally printed advertisements up to the sheeting application for aircraft livery designs and many other of adhesive tape products are produced in Oranienburg, near Berlin, Germany, or in one of its international subsidiaries.

That alone sounds exciting, but what is exciting is the story behind it. Today's ORAFOL was founded in 1808 as Wibelitz Farbenwerkstatt, and moved to Oranienburg in 1919. In 1957, during the GDR era, it was renamed Hannalin KG and later, in 1972, became the state-owned company VEB Spezialfarben Oranienburg. In 1960 the first retroreflective sheeting named Mikrolux was produced, in 1976 the production of the first self-adhesive graphic product named ORACAL was started.

With the "Wende", the reunification of East and West Germany, an important part of history took place. Other global players had been interested to buy the company for a low price, but Dr. Holger Loclair, during this time operations manager, had the spirit and the vision to continue the business and to transfer the company to a privatized family owned business.

In 1995, the foundation stone for the new ORAFOL factory was laid. From this time Dr. Loclair started the expansion of ORAFOL all over the world with courageous and visionary decisions. He started with a presence in the USA in 2003, and a first production plant was established there in 2005. With acquisitions in USA and Australia the graphical business area increased globally. But the big deal was done in 2011, when ORAFOL acquired the Reflexite cooperation with established global subsidiaries and implemented the manufacturing of the prismatic sheeting technology in the product portfolio. From 2017, subsidiaries in Dubai and India had been founded by ORAFOL's own activities and had been followed up by additional acquisitions in USA, Canada and Mexico.

Some numbers from 2023: 2900 employees worldwide (1300 in Oranienburg), €870m turnover, in total a €300m investment in 2022 and 2023, €4m investment in renewable energy, 300,000 m<sup>2</sup> factory area, named as one of the top 50 innovative companies in Germany and several other awards winning such as "Best Managed Company". Determination, perseverance and assertiveness are the factors that have led Dr. Loclair to his continuous success.



Orafol Oranienburg factory and headquarters

The factory tour goes through the production hall for the converting processes. It starts with a first impressive view on huge tanks containing thousands of litres of glue. The main production machine type is called "RECO", which means "REverse COating" and which is the main principle of the manufacturing process for the sheeting products. Several production steps from intermediate products to the final product are manufactured on these lines. Later, the other processes for refining and converting of the reflective sheeting had been seen, such as the different printing technologies, which are screen printing of the colours for the traffic sign face sheeting, printing by laser-technology of logos or identifying watermarks or gravure printing technology for the manufacturing of multi coloured license plate sheeting. For example, using digital printing machines can print colourful logos on the contour marking tapes, for individualization the marking of the trucks and trailers. Currently three additional coating lines will be installed and will increase the number of them in total up to 32 in the Oranienburg plant.



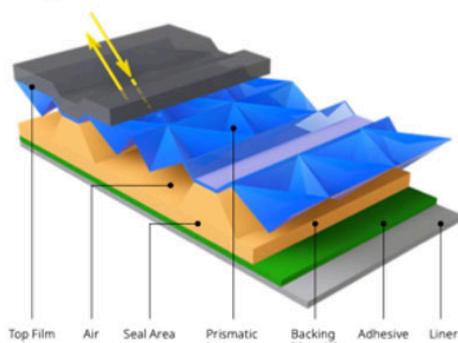
After printing and drying, several plotter-lines cut out the printed sign face sheeting, no matter which kind of shape. They will be packed carefully for shipping to the customers. Laser markings on the glass-bead sheeting showing several information, which are required by the authorities and test-houses for traceability reason and market surveillance based on various standards. Packaging is also important.

Specially designed cardboard boxes are used for worldwide shipping to prevent damage. For development purposes and for production control, ORAFOL uses a retroreflective measuring system and a colour measuring system for from LMT Lichtmesstechnik Berlin GmbH, which are only a few kilometres away.

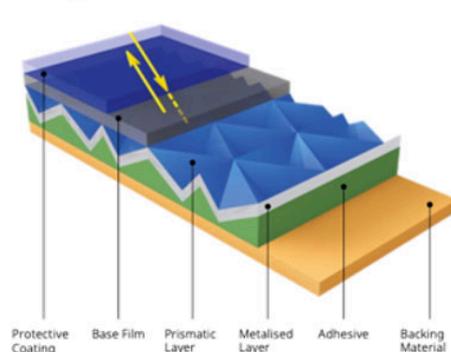
ORAFOL is a very successful company with modern, state of the art production equipment, highly automated and with full digital process control. Quick decisions and a slim organization structure allows implementing new investments, which lead to the continuous grow of the company. The ambitious and committed management team and the vision of the owner and CEO Dr. Holger Loclair are the core of ORAFOL's global success. The visit was, as I said, a great surprise.

## Principles of Retroreflection

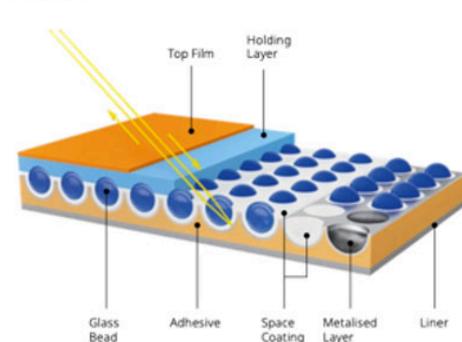
**Prismatic Air-backed Construction**  
Design C



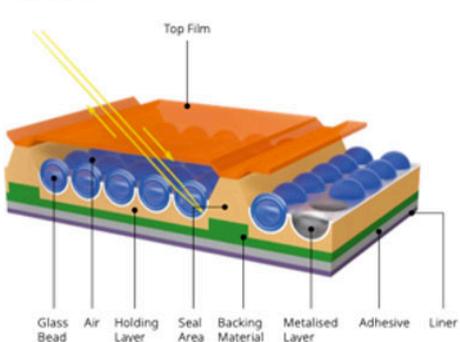
**Prismatic Metalised Construction**  
Design C



**Embedded Glass Bead Construction**  
Design A



**Encapsulated Glass Bead Construction**  
Design B



# Lighting News

## Lighting Homage on DS SM Tribute

LIGHTING NEWS



DS have just revealed, at the Chantilly Arts & Elegance Richard Mille event in France, the new DS SM tribute concept for the French premium brand's 10<sup>th</sup> anniversary.

For a French boy, born in the 1970s, the SM is a legend with its innovative design and its Maserati V6 engine.

For a lighting engineer, it was its famous bending lamp, turned by cables, from Cibié—DVN founder Hector Fratty and Jean Paul Ravier were very likely involved with its development.



For the 10<sup>th</sup> anniversary, DS and Thierry Metroz's team presented a new DS SM Tribute with really innovative lamp design including super slim modules for low beam and high beam, a lit grille and logo, and a slim rear lamp including a red side marker light (allowed outside USA if combined with another rear lighting function). With new

technology available on the market (MLA, lasers, thickwall optics, and so much more), lamp designs like this can break out of the dream world and come true.



# Renault Estafette Concept @ IAA Hannover

## LIGHTING NEWS



65 years after the Estafette roamed the roads, Renault are launching a new version.



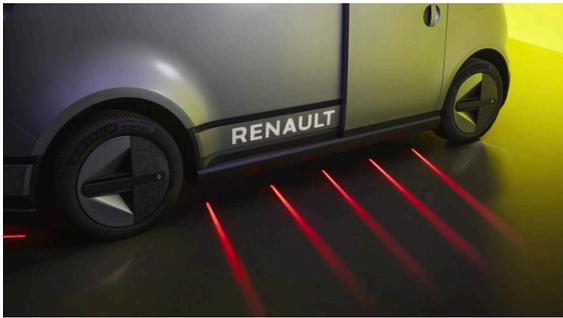
The new Estafette concept is designed for cities. It is a compact yet spacious electric van combining the Kangoo L2's length, the Clio's agility, and the Trafic L1H2's load capacity.

It was designed around professional drivers, engineered based on their feedback, and is configured and equipped to meet their needs while streamlining operations and improving safety.

It is fully connected and leverages the SDV (software-defined vehicle) architecture in the FlexEVan platform developed by Ampere. SDV electronic architectures play an essential role in increasing performance and cost-efficiency in new-generation vehicles. They also integrate advanced features including real-time updates and predictive maintenance. Overall, they help to reduce cost in use by about 30 per cent.



It is interesting to see how lighting and signalling components are highlighted in Renault's marketing communication. LEDs are clearly a strong, central trend in LCVs; this one has a lit logo and grilleboard with an ISD ('interactive social display'); lights with a slim, homogeneous design, and signalling projections.



# Lights on the SAIC-VW Tharu XR

## LIGHTING NEWS



SAIC Volkswagen's new Tuyue Xinrui Tharu XR was on display at the Chengdu Auto Show, with a price range around C¥80,000 to 100,000.



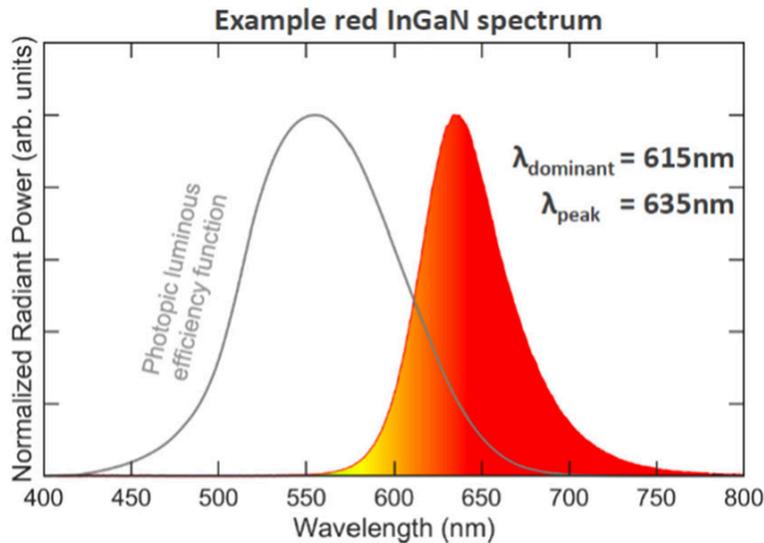
Positioned between the Tuyue and Tukai, it is an entry-level compact SUV. Hasco Vision make the front and rear lamps, and they provided some details about the lighting technology: a continuous DRL similar to the ID. family, and winglike transverse LED taillights.

The full-width front light strip and the blackout light cavity make the front of the car more eye-catching, and also advertise a level of technology. The logo is inlaid in the middle of the light strip, highlighting the brand identity.

The rear lights also include a full-width light band which echoes the front, and here as well the light cavity has been blackened.

# Lumileds Maintain Red InGaN Lead

## LIGHTING NEWS



Lumileds have extended their record-setting advances in its InGaN Red LED development. The InGaN material system is an attractive alternative to AlInGaP for creating red light sources, because it harmonizes manufacturing with green and blue LEDs, which are also based on InGaN. The large industrial capacity of InGaN gives economies of scale and is preferred for integration with silicon semiconductor manufacturing. InGaN Red is especially promising for microLED applications because of its characteristic to maintain efficiency at micron-scale sizes and low current density.

Lumileds scientists are the first to demonstrate that a rich, deep red light (615-nm dominant wavelength corresponding with 635-nm peak) can be produced with InGaN LEDs, achieving a wall plug efficiency of 7.5 per cent at a current density of  $10\text{A}/\text{cm}^2$ . Lumileds' breakthroughs address the challenges associated with high indium concentrations, including spectral peak shifts and broadening with current density. Rob Armitage is the company's Director of Nitride Epitaxy Development. He says, "The current efficiency for sub-10-micron red microLEDs is an impediment to cost-effective and efficient microLED displays. Our work on Red InGaN validates our roadmap to meeting cost and efficiency thresholds for adoption".

In addition to demonstrating high-efficiency Red InGaN, Lumileds successfully established red, green, and blue light emission from a single InGaN epitaxial stack. Subsequently, Lumileds leveraged this into microLEDs with excellent colour quality and electrical characteristics. The integration of the three primary colours into single microLEDs is a great boost toward achieving low-cost, high-yield microLED display assemblies—and will ultimately enable compact full-colour displays for augmented reality applications.

Dirk Vanderhaeghen, Lumileds' Senior Strategic Marketing Director, says, "This efficiency improvement is mainly of interest for full RGB microLED InGaN displays. For monochrome red displays for rear signaling applications, it's more appropriate to use significantly more efficient Red AlInGaP MicroLED technology. But in future, RGB microLED InGaN displays could be applied in both/various application fields. This technology development is still in an early stage and definitely not yet available".

# Forvia Hella's First RGB Rear Lamp With Animations Launches in China

## LIGHTING NEWS



Forvia Hella have put an RGB LED rear combination lamp with full-colour light animations into series production in China for the first time. It boasts a variety of new light-based functionalities and thus addresses the increasing demand for new opportunities for brand differentiation and personalization. It is used in Geely's new Lynk & Co Z10 sedan, an EV launched in the Chinese market a few weeks ago; the lamp was showcased during ALE last June.

The new lamp can generate a total of 256 different colour variants from the three basic shades of red, green and blue, creating dynamic multi-coloured lighting animations. In addition to welcome/goodbye scenarios, this includes coloured animations after locking the vehicle, during battery charging, or as a burglar alarm. Specially developed 3D optical elements in the light enable a particularly striking light signature and unmistakable aesthetics for the rear of the vehicle.

Forvia Hella's Lighting Managing Director Yves Andres says, "In the Asian automotive market in particular, the importance of individualization and brand differentiation is constantly increasing. In this context, the lighting design plays a central role. RGB LED technology has long been established in vehicle interior lighting. By transferring this technology to exterior lighting, we are creating an entirely new customer experience that allows car manufacturers to differentiate themselves in the market and gives end consumers a technological platform to realize their own lighting design and vehicle appearance. The series production of an RGB rear combination lamp for our customer Geely therefore shows once again that we have a leading position with regard to the major automotive market trends, anticipate local customer requirements and offer customized product solutions".

# Driver Assistance News

## Innovation Day, Part 2: Valeo's New ADAS Tech

### DRIVER ASSISTANCE NEWS



Valeo held their Innovation Day on 11 September at their US headquarters in Troy, Michigan, where they demonstrated new technologies in power, lighting, and ADAS.



OLEDs are coming to exterior lighting, providing a lit surface rather than individual pixels, giving better resolution and more flexible design possibilities. Audi will likely be the first to launch this on a car. For interior screens, OLEDs also have advantages, for example in thickness and image quality, but are presently only used in high-end applications, so there is still a lot of focus on improving TFT integration with localized (backlight) dimming and improved optical films and coatings.

Driver monitoring systems are increasingly required for autopilot as well as driver impairment monitoring, and Valeo's solution uses an RGB-IR imager. It can be put, for instance, below the rearview mirror and then 'AI' processing (for gaze etc.) done in the central computing system. An in-cabin radar can also be added for occupancy monitoring.

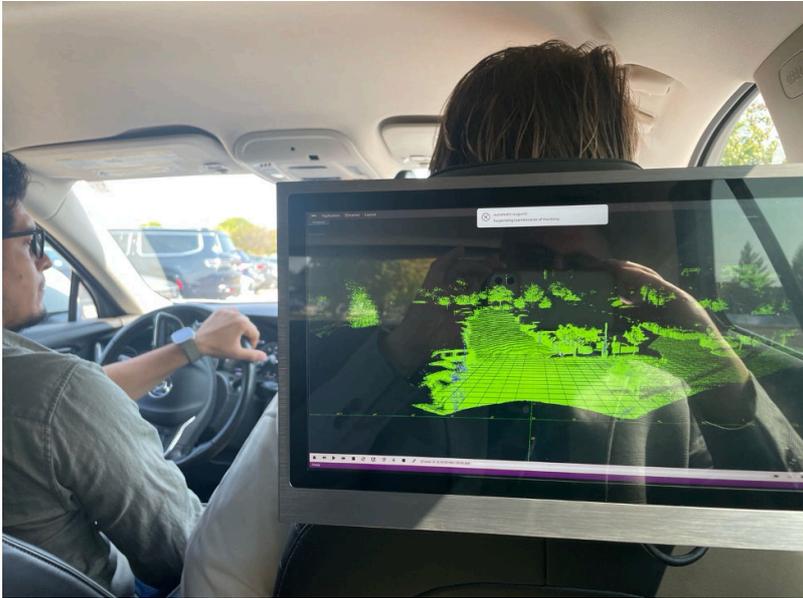
As computing for ADAS gets increasingly centralized, modular and scalable compute solutions may be required. Valeo showed a liquid-cooled baseboard system, configurable with different flash memory modules and auxiliary computing modules, depending on automaker requirements. A modular system like this can mix different silicon providers allowing each to operate in their domain of expertise. It facilitates market-segmentation using the same base hardware and allowing upgrades for higher-end features. And it allows for future hardware evolution after the vehicle is built.

Managing multiple functions and cores requires some sort of virtual machine layer and load balancer, and Valeo have their VOS middleware to provide such capability.



As to lidar, Valeo demonstrated their Scala 3 Smart (1M pps for behind-grille integration) and the Scala 3 Satellite unit (for above-windshield integration; 12M pps). A blooming filter was developed for highly reflective objects like road signs. Lidar still remains a high-end option today, but as costs come down, it provides coverage for corner cases, like road object avoidance and night vision, plus redundancy versus a camera-only system.

The Scala Satellite system uses a separate ECU for point cloud processing and has the capability to do object detection depending on automaker requirements. This also helps keep the power down in the box that sits behind the windshield, for thermal design considerations.





The Surround 360 system provides  $L^2$  assist using a Mobileye (Omnivision) camera-based system with corner radars. The EueQ4 processor does vision processing and a separate processor is used for radar and sensor fusion. The ECU is quite small and can sit with the camera module behind the windshield or packaged remotely. Features include blind spot monitoring, front and rear close-vehicle detect, front and rear cross-traffic, and door opening alert when parked.

The next-generation satellite radar demo shows better resolution and the ability to generate a full 3D point cloud as well as object classification and tracking in a small package. The radar sensor has a built-in wave guide antenna and sends FFT data to the processing unit over 1Gb Ethernet.



The next step beyond that is HD radar—projected to be about  $\frac{1}{4}$  to  $\frac{1}{2}$  the cost of lidar, Mobileye have a classy solution in the pipeline for it. Point clouds with up to 500K pps can be generated and resolutions to around  $1^\circ$ , which is not quite as good as best-in-class lidar but provides an alternative for  $L^3$  and above at a lower price.