



Editorial

Difficult Challenges Coming For Lighting

The automotive industry is moving money toward the development of Mobility, EVs and AVs. That money has to come from somewhere, and so lighting investments are decreasing even as innovations are coming along faster and faster with the arrival of new functions, extension of ADB into lower-priced cars, new system architecture, electronics and software, integration of sensors and other components in the headlamps, and otherwise like that. Meanwhile, styling differentiation is exerting a greater and greater influence. All while disruptive value chain changes are coming, welcome or not, to just about every company seeking to extend their activity.

How are we to react? While we continue innovating, we must communicate more to automakers—to management and project directors all the way through to the dealers—on how best to persuade buyers to go for high-specification lighting. We must reach the buyers themselves via the media. And we must work together on the coming new functions, to avoid waste in the investment stream.

For these efforts to succeed (indeed, for them to happen at all) requires coordination and planning. And that's why technical congresses and workshops are irreplaceably important. They bring opportunities to talk and listen with others, facilitate buyer-supplier match-ups, and facilitate strategic cooperation of exactly the kind we need to proactively do in these challenging times.

Two such events are on the horizon: the DVN Workshop in Japan on 26–27 May, and the VISION congress in Paris on 7–8 October during the Mondial auto show. You'll surely want to attend; save the date and don't miss them!

See you there,



DVN President

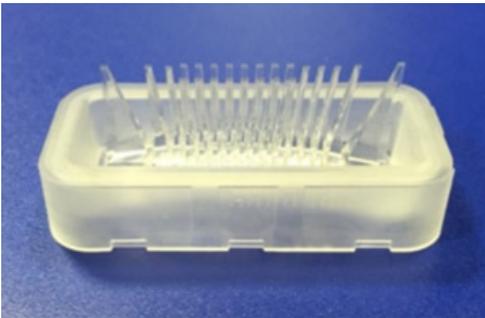
In Depth Lighting Technology

Optoflux: 5 Million Primary Optics for ADB

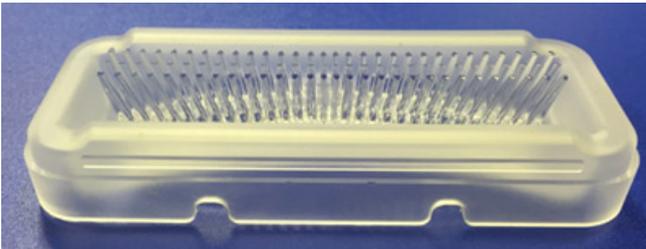
In 2016, the Mercedes-Benz E-Class came with amazing new headlamps, each containing 84 LED chips in three rows to produce low beam, high beam, and high-resolution ADB.

New development directions with 4 to 10 kilopixels are steadily building toward megapixel resolution, and this technology is for the foreseeable future state-of-the-art in production ADB resolution.

For the primary optics, this setup results in a very hot environment and a high radiation load. This calls for new materials, since standard thermoplastic resins cannot withstand these high temperatures, while glass optics cannot be produced efficiently with the very fragile and thin optical light guides needed to achieve compact optics and headlamp packaging.



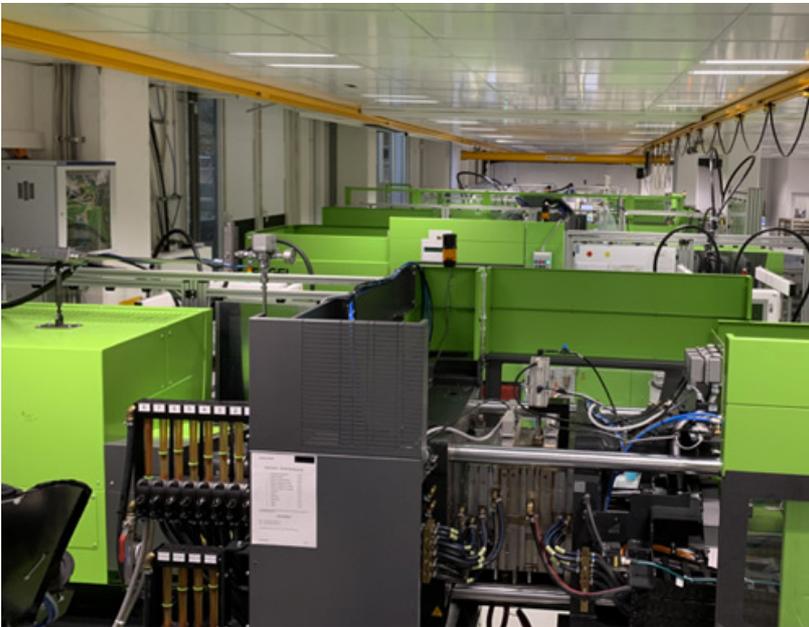
Primary optics with 24 light guides



Primary optics with 90 lightguides

To address this need, Optoflux have developed a method to manufacture primary optics in LSR (Liquid Silicone Rubber), which provides very good transparency at operating temperature up to 150 °C. It's UV-stable, and can be manufactured with high precision.

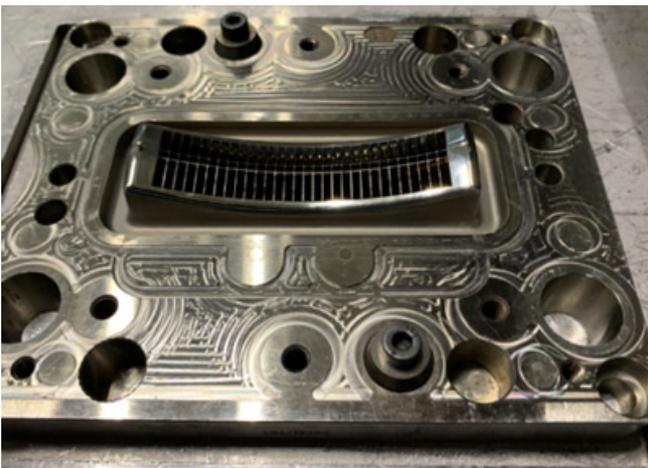
The main challenges for this application were to minimise the light loss of each LED—a tough challenge for accuracy of the incoupling area, the transparency of the material, and the surface finish; and to prevent crosstalk between adjacent LEDs, all while attaining and maintaining robust tolerance to high radiation loads. More, to avoid gaps between the beam components provided by different LEDs, the shape of the lightguide has significant undercuts which pose a challenge for demoulding during serial production. So Optoflux chose to pursue development with LSR.



Silicone optics production lines

Tests had to be conducted with different materials until a stable moulding process compatible with serial production was achieved. One of the big challenges for optical silicone is the tendency to deposit films on the mold, resulting in optical degradation. So emphasis had to be put on a sophisticated cleaning program using different chemical agents and process steps, and to avoid mechanical cleaning steps of the optical inserts as much as possible. Results were fruitful; today a constant optical performance over the complete production cycle can be provided. Nevertheless, further work on the silicone resin and process is ongoing, to extend cleaning intervals and tooling insert service life.

The quality of the injection tools and inserts have a crucial impact on the performance of the optics. Due to the very low viscosity of the LSR, every gap larger than 4 μm will result in flash (unintended protrusions of material) with a bad effect on the optics. To avoid such gaps, the optical inserts for the light guide cannot be made of multiple parts, but must be eroded and polished in one piece. For the surface finish of nozzles, manual polishing is unavoidable. However, very much experience is required to polish up to 100 nozzles with diameter less than 1 mm and depth of about 20 mm without rounding the edges of the light guides. To evaluate the achieved surface quality, both surface roughness measurements and optical transmission measurements are performed for a final approval of the inserts. Of course, in the tooling and manufacturing processes alike utmost care must be taken in handling the inserts, since repair is very difficult and expensive (if it's possible at all).



Optical insert for primary optics

LSR injection molding differs significantly from conventional molding with thermoplastic resins. The solidification of LSR is a result of a thermally initiated polymerisation. Immediately before the injection process, the two components of the LSR are mixed, and the liquid is then injected in the hot mold, the heat of which activates and accelerates the polymerisation.

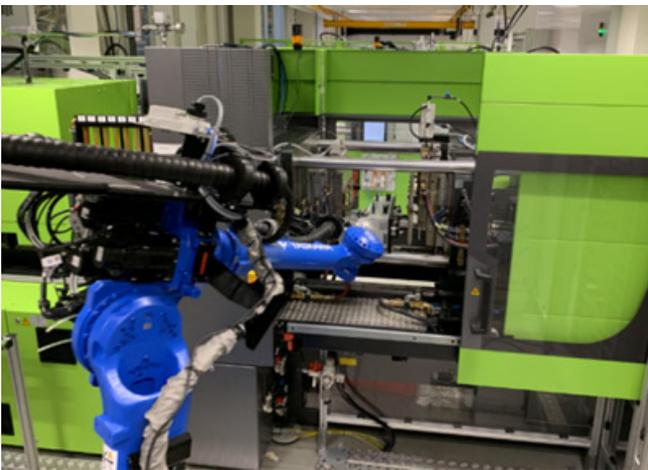
After 1-2 minutes of reaction time, depending on the type of LSR, the polymerisation is complete and the part can be ejected. Due to the soft structure, the parts cannot be grasped by a simple gripper, but must be picked across a larger area to remove them reliably from the tool. A camera-controlled 100% check of the ejection is conducted, to avoid the risk of eventually leaving torn silicone fragments in the mould due to defects or improperly-ejected parts. The length of all nozzles is measured, so that missing or torn-off nozzles are detected and the molding process is stopped, to avoid damage on the inserts.

Several camera-based 100% inspection tests are done afterwards, to detect flashes or surface defects.



100% testing of optical and mechanical parameters

For a stable and trouble-free production, the control and stability of the material and process parameters is crucial. Deviations result in faster degradation of the inserts, so shorter cleaning cycles are needed, resulting in lower output, higher maintenance efforts.



Fully automated LSR molding line.

After acceptance of the part by the inspection system, the next step is a tempering process to remove incompletely-polymerised volatile silicone monomers. This causes a shrinkage of 1–3%, leaving the optical parts at their final size. For the part design it is important to make sure the correct shrink factor is evaluated before manufacturing the optical inserts. The tempering process parameters (duration, temperature) depend on the type of LSR material and are in the order of 4 to 20h at about 140°C – 180°C.

In summary, after several years of development and optimisation, a serial process for manufacturing silicone optical components has been developed and successfully implemented. The optical performance of the produced parts is outstanding, fulfilling all optical and environmental requirements. Optoflux launched serial production in 2014, and since then they've produced more than 5 million primary optics for matrix beams. Ongoing tasks will be the development of more cost-effective production methods to increase output and reduce production cost.

Lighting News

Focus! Osram Continental's Projection Work



Digitalisation, electrification, user experience, and new mobility concepts—these megatrends are shaping the future of automotive lighting. Osram Continental are therefore focusing on projection in 2020.

With expertise in vehicle lighting, optoelectronics, and software, Osram Continental are using innovative projection solutions to extend the possibilities of classic headlamp technology: projectors turn vehicles and their surroundings into a canvas for automakers and mobility providers to facilitate advanced functionality, more emotion, and better safety.

At the Intelligent Automotive Lighting Conference, Osram Continental's Head of Advanced Development Dr. Michael Rosenauer said his company focus primarily on intelligent lighting that automatically adapts to the situation on the road, and on light for communication between the driver, vehicle and environment: "Exterior projections will ensure better visibility of turn signals and brake lights, among other things, and will display relevant driving information on the road. Interior projections will be used to improve the comfort, convenience and well-being of the occupants".

Osram Continental's product portfolio includes static, semi-dynamic and dynamic projection solutions for diverse application scenarios and individual requirements. The products benefit from the software acumen of the Osram Continental development team and enable intelligent control.

IQPC Conference about Intelligent Automotive Lighting



Last week on February 18 & 19, IQPC held a conference about the topic of "Intelligent Automotive Lighting " at the Radisson Blu Hotel in Cologne. The theme of the conference was "Getting ready for autonomous driving: How to ensure safety and promote comfort via light ". An audience of about 50 people listened to the dedicated presentations and the lively panel discussions including Q&A. Unfortunately, the planned speakers from China could not attend due to the situation around the Corona virus.

The conference was chaired by Ana Bizal from Hella Innenleuchten Systeme GmbH. The topics of the different sessions comprised Light as Communication Tool , Lighting & Design, Highly Automated Driving, Ambient Lighting, Lighting

Technologies and Sensors in Lighting & Automated Driving. The presentations were given by 12 speakers representing a mix of opinions from OEMs, Tier 1s and Tier2s as well as lighting related institutes and consultancy companies.

The lunch and coffee breaks as well as the dinner "Get together" on the first day in a typical Cologne style "Brauhaus" gave ample time for communication with the speakers and networking among the participants.

Fire Damages Varroc Lighting Plant



A Varroc Lighting factory on the outskirts of Pune City, India caught fire early last Tuesday. The plant manufactures lighting products for four wheelers in India and contributes about 2% to the consolidated revenue of Varroc Engineering. There is said to be no significant impact on the company's operations, though Varroc Engineering stock dipped 2.43% in apparent response to the event.

Losses and damages are not yet known, but no human casualties were reported. In a statement, Varroc Engineering said the fire started outside the manufacturing block, then spread to the packaging area. Varroc are in the process of finding the cause of the fire and the losses and damages it caused.

Valeo's Go-Go-Go '19 Results



Valeo have released their 2019-year results with an outperformance of 8 percentage points in the second half and 6 percentage points for the whole of the year. 2019 sales came to €19.48 billion, in line with the forecast.

2020 outlook

Valeo expects automotive production to be down by 2% in 2020. Excluding the possible impact of the coronavirus in China, the

Group have set objectives for 2020:

- outperformance of more than 5 percentage points
- strict control over costs and capital expenditure
- further increase in EBITDA
- improvement in operating margin excluding share in net earnings of equity-accounted companies.

Chairman and CEO Jacques Aschenbroich says "The technological platforms we have developed in the past few years, mainly in the electrification and ADAS segments, have driven our sharp outperformance versus the automotive market (8 percentage points in second-half 2019) and also allowed us to reduce, from the second half of 2019, our R&D expenses and our capital expenditure. In a market set to remain uncertain in 2020, we will once again deliver a substantial outperformance, generate significant free cash flow and improve our operating margin, thanks to our strict control over costs and capital expenditure".

Aschenbroich also commented specifically on the virus situation: "Concerning the Covid-19 outbreak in China, we have taken every step to protect our employees. It is too early to assess the impact on the automotive industry and on Valeo specifically. Our plants located outside Hubei province, which account for 90% of our nominal sales in China, have resumed production, with supply chains gradually getting back in order".

Osram's Efficiency Push



Osram say increased efficiency and targeted measures warrant an increase in their savings goal from €220m to €300m by 2022. The cumulative impact of several individually-led programs across Osram's business units has resulted in beating expectations with regards to savings. Together, they have already succeeded in achieving improvements in the operating result in the first quarter

of the current fiscal year.

2019 was a challenging fiscal year for Osram with the weak automotive market resulting from worldwide uncertainty. However, Osram had a good start for fiscal 2020 and are pushing to continue their transformation to focus on high-tech photonics.

Driver Assistance News

Jenoptik: Long-Term Contract in the Automotive Industry



Jenoptik has been chosen to supply a laser-optical subsystem for the PM2.5 particle sensor, developed by HELLA. This particle sensor will now make it possible to reliably and precisely measure minute concentrations of particulate matter inside vehicles and in their immediate environment. The sensor's high measuring accuracy was achieved thanks to Jenoptik's custom precision polymer optics and the high-accuracy 5-axis adjustment of the optoelectronic system.

The project contract, concluded between Jenoptik and HELLA, stipulates that series production will begin in 2020. The contract is expected to run for a total of nine years. The first customer for the sensors is a European premium manufacturer that primarily intends to integrate the sensor into its Asian vehicle fleet. The PM2.5 class sensors can measure particle sizes below 2.5 micrometers in diameter.

One sensor monitors and optimizes air quality inside the vehicle by automatically controlling the air supply and through the efficient use of air filters. The second sensor measures the fine dust concentration in vehicle's immediate environment. It can be used for air quality information purposes and to automatically control air circulation.

At the heart of the particle sensors is a laser diode and polymer optics developed and manufactured by Jenoptik, which combine to form a full laser optic system using high-precision five-axis adjustment. Only this way is it possible to guarantee the high measuring accuracy of the particle sensor, which detects particles down to a lower limit of even 0.3 micrometers in diameter. The high measuring accuracy is significant because fine dust particles of this size penetrate deep into the lungs, where they accumulate and cause a risk to health.

"In Jenoptik, we have found an experienced partner whose core competencies include developing, manufacturing and assembling precision optical systems. They are also masters in the field of automated series production, providing automotive quality with reliability and flexibility," explains Marco Döbrich, head of the Sensors business field at HELLA's site in Bremen, Germany

Jenoptik is a globally operating technology group and is active in the photonics-related divisions of Light & Optics. Its key target markets primarily includes the semiconductor equipment industry, the medical technology, automotive and mechanical engineering, traffic, aviation as well as the security and defense technology industries. Jenoptik has about 4,000 employees worldwide.

Hella's Newest 77-GHz Radar Launches



Hella will be bringing their latest 77-GHz radar technology into series production this Spring, having already acquired several major orders. Initially, an Asian manufacturer of trucks and buses will be supplied. In this context, the market launch will take place within the framework of the strategic coöperation with ZF; then Hella will start series production for other international car manufacturers, thus further expanding its strong market position in the field of radar sensor technology. The radar sensors will initially be manufactured at the electronics plant in Hamm, Germany, and then also in China and the USA.

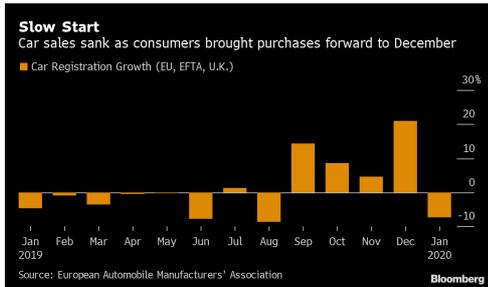
"Radar sensor technology is a key technology for the realisation of assisted and automated driving functions", says Frank Petznick, who, as a member of Hella's Electronics Executive Board, is responsible for the global Automated Driving Product Centre. "Our 77-GHz radar sensors make a significant contribution in this context." Hella's latest 77-GHz radar technology is characterised by its high performance and range as well as its compact design. This simplifies its integration into the vehicle body and enables 360-degree perception of

the vehicle environment. The sensors are based on a modular, scalable platform concept that allows customer-specific requirements to be implemented flexibly and efficiently. Thus, NCAP requirements as well as functions for automated driving can be implemented.

At the beginning of this year, Hella also announced a strategic partnership with the US startup Oculii. The aim of the cooperation is to further increase the performance of the 77-GHz radar platform by integrating software developed by Oculii. Results of the development partnership are expected to go into series production in 2023. Hella have been active in the radar business for around 20 years, and were one of the first companies to start series production of 24-GHz radar sensors for rear applications.

General News

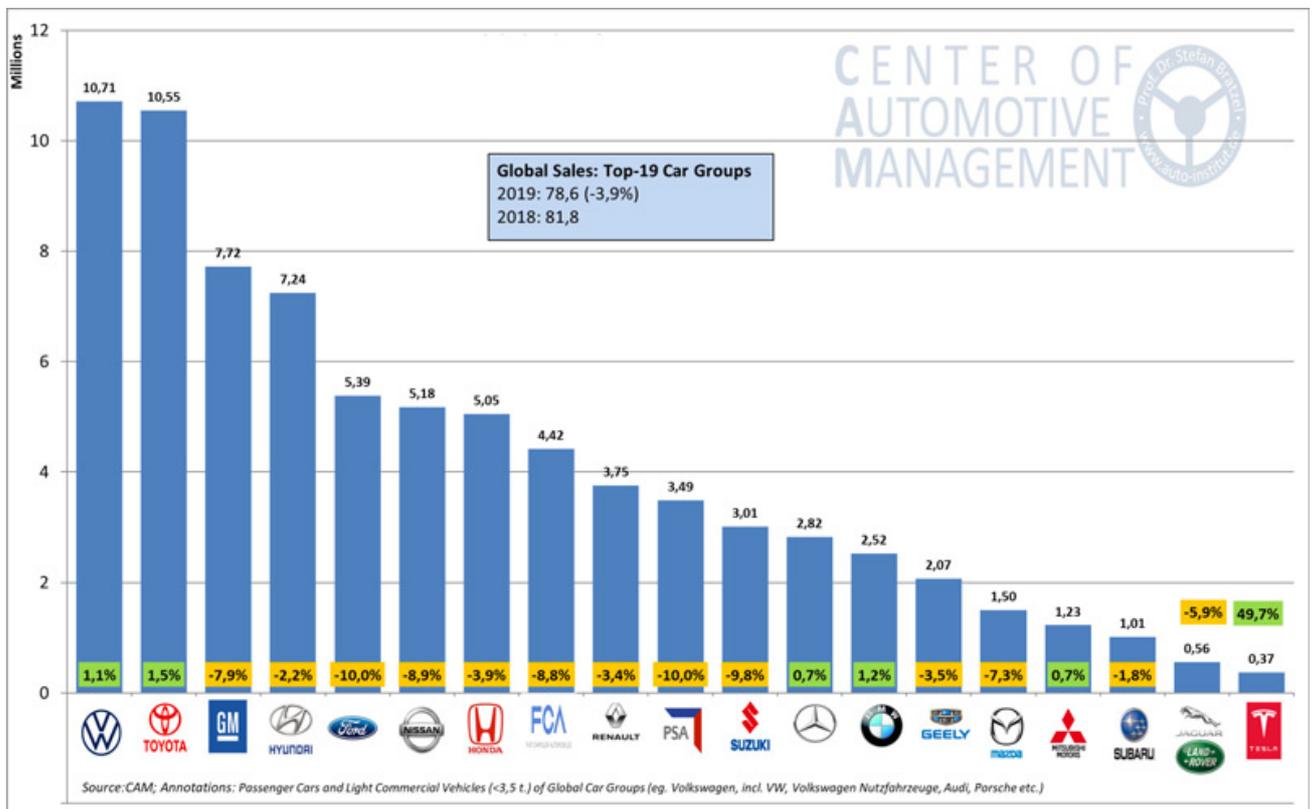
European Sales Dip



European new-car sales fell 7.4% in January, slowed by changes to emissions rules and consumer-incentive programs. Registrations dropped to 1.135 million vehicles in the European Union, Britain, and the European Free Trade Association (EFTA) countries, industry association ACEA said last week. January's decline was the first drop in sales in five months.

Ford's sales fell most among major brands in January, down 19%, followed by Renault Group with registrations down 16% and PSA Group with sales down 14%. Volkswagen Group's sales were flat.

Among VW Group brands, Porsche gained 68%, Seat was up 9% and Audi gained 9%. Toyota's group gained 10% and Hyundai sales fell 4%. Fiat Chrysler Automobiles saw registrations decline by 6%. Daimler's sales fell 10%.



Global sales of car group in 2019

Worldwide, Toyota and the German OEM Volkswagen, Daimler and BMW are among the big global sales winners in 2019. GM, Ford and FCA as well as PSA and Nissan have significantly lost global market share. Volkswagen remains the top-selling group of automobile manufacturers with 10.7m vehicles slightly ahead of Toyota with 10.6 million. General Motors and Hyundai came in third and fourth with 7.7 and 7.2 million units respectively.