

Patent pending lighting technology

JOKER table luminaire by Regent Lighting – perfect light at the workplace thanks to unique light guides made from PLEXIGLAS®

- **Lighting manufacturer Regent Lighting develops innovative table luminaires for bright, but glare-free light for the home office and the open-plan office**
- **The material properties of the transparent PLEXIGLAS® molding compounds from Röhm make unique light design possible**
- **Optics specialist Jungbecker produces light guides made from PMMA with highly precise microstructures**

Bad lighting results in poor work. Office work is very tiring under unfavorable lighting conditions, as anybody who has worked from home for a longer period of time without ergonomic office equipment can attest to. It is almost impossible to concentrate if a table luminaire causes glare, only illuminates half the desk, is in the way or blocks your view of a monitor.

The Swiss lighting manufacturer Regent Lighting developed the JOKER table luminaire with the aim of bringing a professional luminaire to market which provides pleasant lighting for those working from home – in close collaboration with Jungbecker, a company from Olpe which specializes in plastic optics. Their material of choice for the optics is PLEXIGLAS®, the brand polymethyl methacrylate (PMMA) from Röhm.

Unique optics made possible with PLEXIGLAS® molding compound

JOKER stands out from traditional table luminaires with its one of a kind, patent pending, lighting technology. This elegant, rectangular luminaire stands upright and can be moved freely around a desk, evenly lighting the workplace without casting multiple shadows. A micro-structured light guide made from a highly transparent PLEXIGLAS® molding compound is integrated into the very slim body of the luminaire. The unique construction of the optics allows the luminaire to emit a pleasantly soft and glare-free light from the vertical area, lighting the workspace in a highly efficient manner at an unconventional beam angle from the side.

The optical system that creates this effect consists of a v-shaped light guide with lateral coupling collimators which focus the light rays, as well as a planar microstructure. They are optimized and combined in such a way that distributes the light downwards asymmetrically, thereby preventing glare. The work surface of 60 x 60 centimeters is homogeneously illuminated at the desired level of illumination up to 600 lux.

The integrated Tunable White technology makes it possible to control the color temperature steplessly at the push of a button. This not only makes working at home more pleasant but enables everyone to work with the light that they prefer even in a large open-plan office.

Reduced form, high functionality

“We did not want to design the 550th table luminaire with a swivel arm, but come up with something completely different,” says Kornelius Reutter, Project Manager for Design and Innovation at Regent Lighting. “Especially since the technological advancement with LEDs and optics allows for shallow constructions which are favorable to shapes that are in line with the Regent Lighting design philosophy: timeless, clearly designed luminaires with highly

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intelligent lighting technology." With his designs for JOKER, Reutter followed three guiding principles: Light is simple. Light is personalized and serves people. And the luminaire fits in harmoniously with the architecture and the space.

Light area inspired by infinity pools

The designer got his inspiration for the surface light from infinity pools – fascinating swimming pools in which the water appears to be contained without a visible barrier. The implementation was successful: when the luminaire is on, the view is of a free-floating, homogeneous light area. The frame of the light guide made from PLEXIGLAS® is barely visible. It is just as surprising that no light emission is visible from the side.

This innovation is the result of the high demands Regent Lighting places on light design, the development and processing skills of Jungbecker and the optical properties of the PLEXIGLAS® molding compounds from Röhm. "It is crucial that the material absorbs as little light as possible. Highly transparent PLEXIGLAS® is ideally suited here," says Fabian Bürkli, Project Manager for Research & Development at Jungbecker.

"With a light transmittance higher than 92 percent, PLEXIGLAS® is one of the most transparent materials," describes Dr. René Kogler, Head of Product Management for Lighting, Extrusion, Optics at Röhm. "The transparency is only reduced by the physically induced reflection loss of four percent each on the light entry and exit surfaces. This is why our PLEXIGLAS® molding compounds are in high demand as a material for high-performance optics."

Extremely fine microstructures through hot stamping

The optics for JOKER are produced in a special production process. In the first process step, the PLEXIGLAS® molding compound is made into a v-shaped blank with small cones at the thicker end, the optical couplings for the LEDs. In the second step, extremely fine microstructures are stamped into the light guide in a hot-stamping process.

"Our years of experience with the hot stamping technology allow us to precisely control the point and angles at which light is emitted by the component," explains Bürkli. Despite this expertise, the extraordinary complexity of the light guide for JOKER presented an extreme challenge, as the goal was for the asymmetric light distribution to illuminate as much of the work surface as possible without causing glare. "Together with Regent Lighting, we tested the boundaries of what is possible," he states. Reutter emphasizes: "I knew that it was theoretically possible to achieve this degree of precision, but it is fantastic when everything works in reality as well as in planning. And this is also due to PLEXIGLAS®, as it has excellent optical values and can be processed very precisely."



The JOKER table luminaire by Regent Lighting is equipped with a light guide made from a PLEXIGLAS® molding compound which directs the light exactly where it is needed. The homogeneous illumination of a work surface of 60 x 60 centimeters meets the standardized requirements for the illumination of a single workspace.

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“Simply good light” is the principle Regent Lighting followed when designing the extraordinary table luminaire. A special feature is the entirely glare-free vertical light exit surface. The optics made from PLEXIGLAS® are designed to create a homogeneous area of soft light in a space.

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Individual light in the standardized environment of an open-plan office: With JOKER on their desks, employees can adjust the lighting to suit their individual needs. The Tunable White technology allows for a seamless transition between brightness and light color. The luminaire is easy to move and can be freely placed on the table, even immediately next to the monitor.
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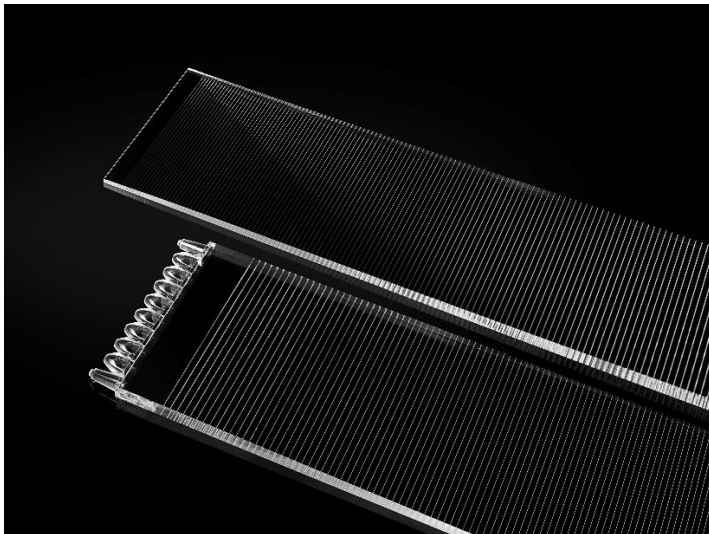


Minimalist design for maximum visual comfort: JOKER consists of a 54-centimeter tall and slim body made from anodized aluminum with an integrated thin light guide made from PLEXIGLAS®. The brand PMMA from Röhm meets high requirements for function and aesthetics.
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For a late shift when working from home: Even in the evening, JOKER provides pleasant, glare-free lighting without casting light directly into the user's eye.

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PLEXIGLAS® molding compounds can be processed with highest precision. Jungbecker produces the light guide for JOKER in a multi-step hot stamping process. LED optical couplings and the fastening and positioning elements for the LED circuit board are located at the thicker end of the v-shaped component.

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Sophisticated optics design: The light guide for JOKER requires an asymmetrical light distribution which evenly illuminates the work surface without causing glare.

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About Röhm

With 3,500 employees and 15 production sites worldwide, Röhm is one of the leading manufacturers in the methacrylate business. The medium-sized company with branches in Germany, China, the USA, Russia, and South Africa has more than 80 years of experience in methacrylate chemistry and a strong technology platform. Our best-known brands include PLEXIGLAS®, ACRYLITE®, MERACRYL™, DEGALAN®, DEGAROUTE® and CYROLITE®.

Polymethyl methacrylate (PMMA) products from Röhm are sold on the European, Asian, African and Australian continent under the registered trademarks PLEXIGLAS® and PLEXIMID®, in the Americas under the registered trademarks ACRYLITE® and ACRYMID®.

More information is available at www.roehm.com.

About Regent Lighting

Headquartered in Basel, Regent Lighting is the market leader in Switzerland and one of the leading manufacturers in Europe. The company has approximately 600 employees in six countries. Regent Lighting products are sold internationally through distribution partners in 35 countries around the world.

For more information go to <https://www.regent.ch/en/>

About Jungbecker

Karl Jungbecker GmbH & Co. KG in Olpe is the technological leader in producing large-format, micro-structured sheets and complex optical systems made from plastic using highly precise hot stamping and innovative injection molding technologies. The company's areas of expertise range from concept studies and development, to tool making and the automated series production of products for the lighting and automotive industry, medical technology and other market segments.

For more information, go to <http://www.jungbecker.de/index.php?id=2&L=1>