# lighting

quality tool

# Innovation
## our history

**We have a great passion: innovation.**

A calling that turns into a steady force for change, a predisposition for excellence that demands imagination, knowledge, entrepreneurship and enthusiasm: qualities that form part of our history and that have enabled us to grow, demonstrating our capacity to “look beyond”.

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# design


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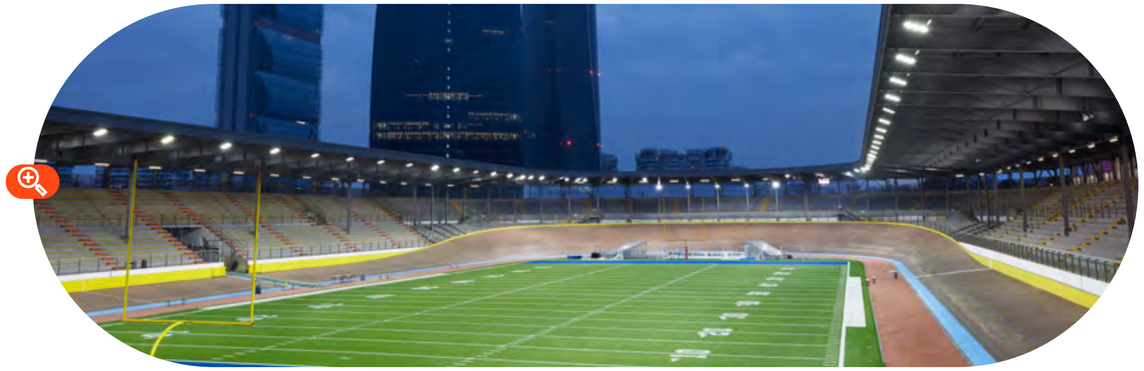
# High performance and quality of the components

**A component for every application.**

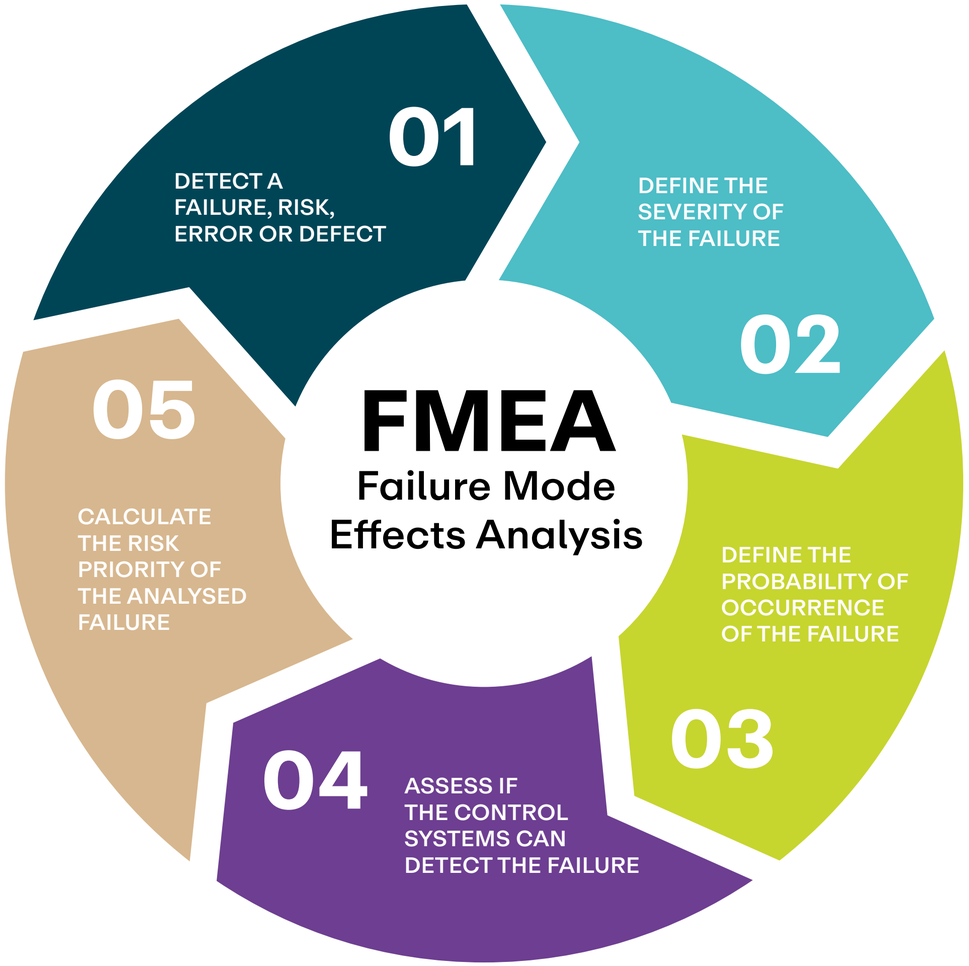
An ample portfolio of lighting solutions, which ranges from industrial to sports and street & urban, faces many challenges: for this reason, we carefully study every type of application, assess the critical points, and select the most suitable electronic (LED/driver) and mechanical components.

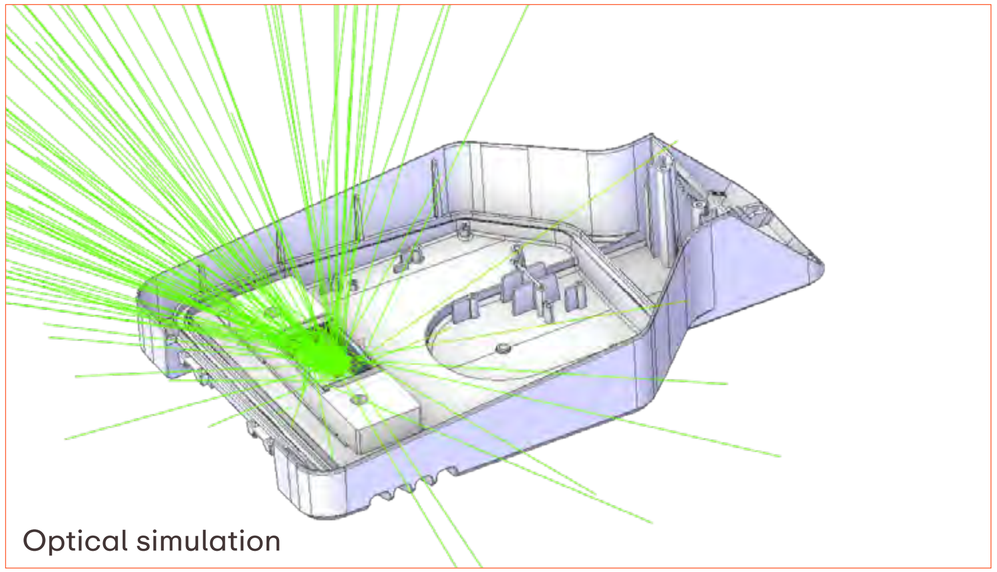


# Preventive analysis of critical issues

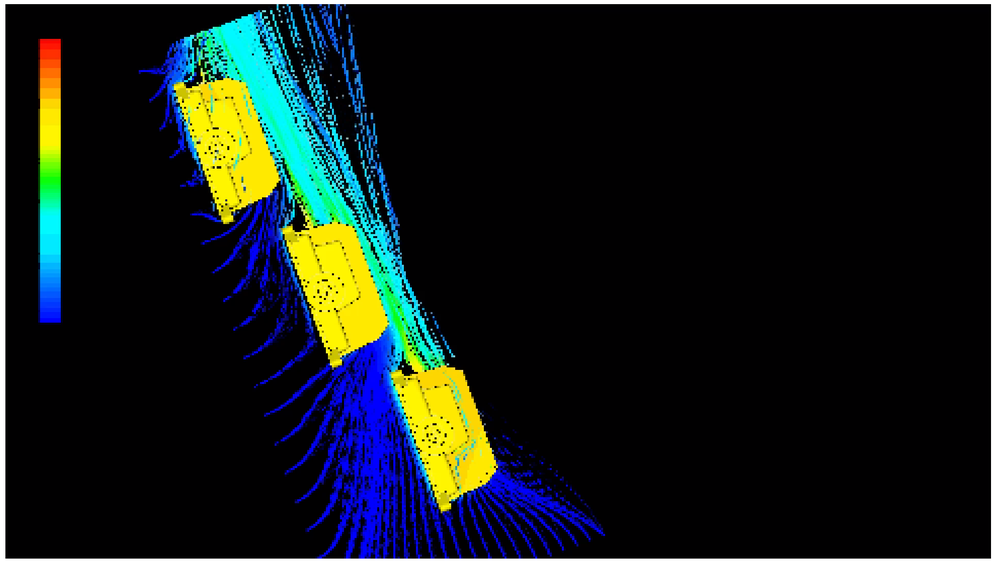
**Reliable and rugged solutions.**

During the initial technical development phases of every new product, we conduct **FMEA** studies (Failure Mode and Effects Analysis), an essential process to anticipate and report potential critical issues on our products, helping our engineers design more reliable and rugged solutions.





Optical simulation



# Tests and digital simulations

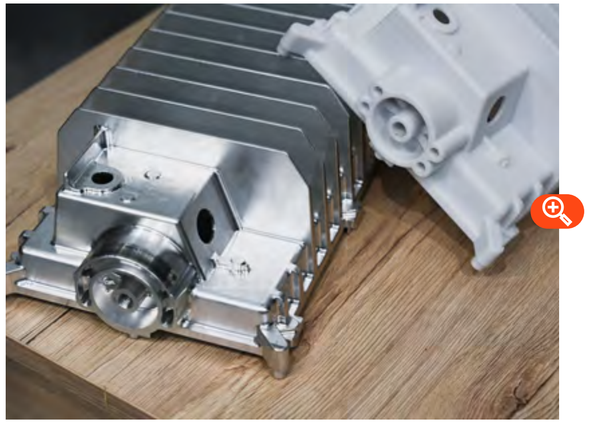
**Simulations are a team game.**

All main components are designed in-house: LED boards, optical systems, heat sinks, and structural elements are developed following a structured design process, from the conceptual phase to manufacturing. The development is assisted by **3D modeling and simulation softwares** that reproduce real application contexts to draw inferences about the best optical, thermal, and mechanical configuration.

# Prototyping and in-house testing

**Prototyping is anticipating.**

The use of the most advanced simulation software results in a lean design process, optimizing the amount of samples required for testing. However, prototypes are still fundamental to assess and test the final design. Our laboratories are equipped with the latest tools and technologies to build them, such as 3D printing and computer-aided manufacturing, which are key to anticipating exigent regulatory compliance. This way, we can certify our LED platforms according to the latest European regulation (Ecodesign).



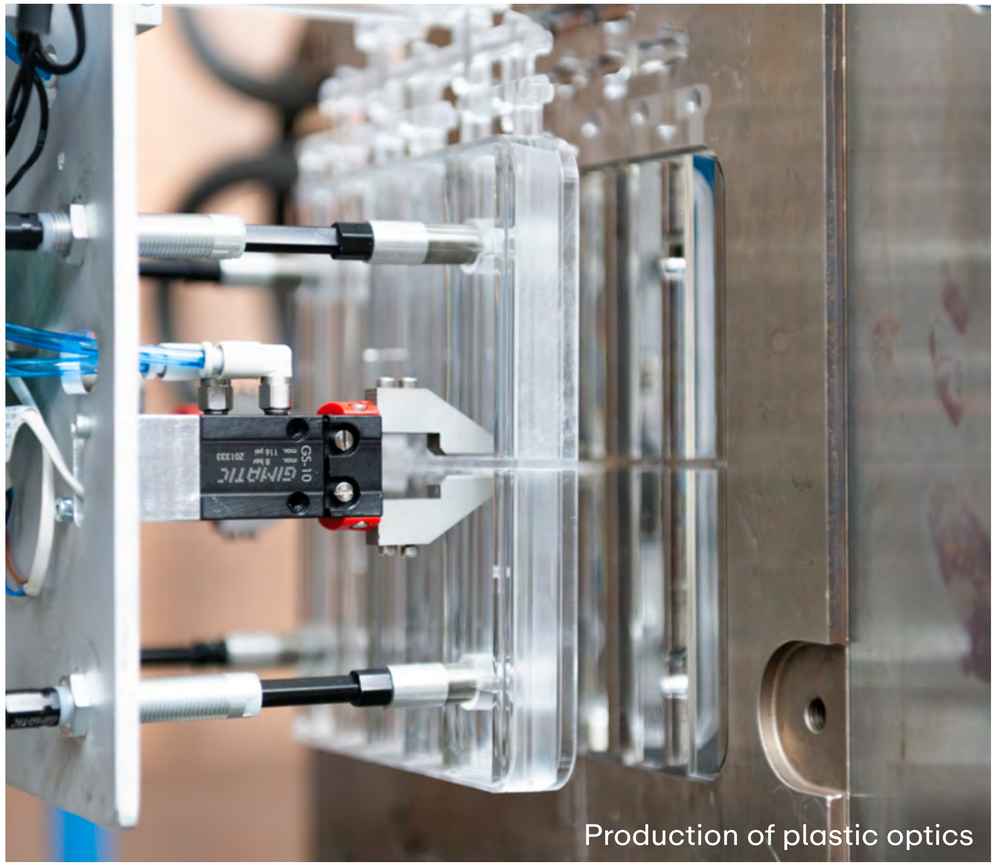

Goniophotometer

# Photometrical, spectral, and thermal tests

**Constant monitoring, from all points of view.**

During the product's development phase and life cycle, our **laboratories** carry out periodic testing to check if our solutions can withstand even the most critical installation conditions. We perform **electrical parameters and cabling checks**, electromagnetic EMC and **climatical chamber tests**, and **flickering, spectral, and luminous output measurements**. These are just a few of the inspections performed regularly to ensure the product's conformity before launch or during its lifetime.

Automated production line




Production of plastic optics

# In-house optical design and manufacturing

**Broad expertise in every process.**

Gewiss was born over 50 years ago from a brilliant idea that defined its success: the use of technopolymers in electrical systems. Since then, the company has matured its expertise on the matter, ranging from the design of tiny plastic pieces to whole injection molds and all the production processes. Gewiss has gathered remarkable know-how about the **development and manufacturing of optical systems for LED platforms**, notably one of the most difficult plastic components to produce. The whole manufacturing process is aided by CAE simulation of injection molding, which results in components that meet the highest quality and precision standards.

# quality control

# The automotive industry approach

**Performance and competitiveness, without compromise.**

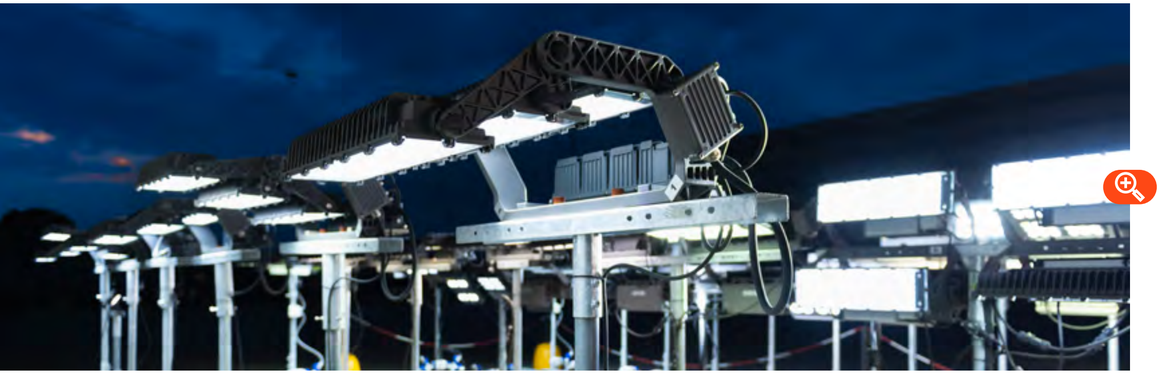
Our continuous process of quality improvement led us to adopt **modern quality control procedures, like PPAP** (Production Part Approval Process) and **FMEA** (Failure Mode and Effects Analysis), inspired by the automotive industry. These are efficient and proven methodologies to guarantee the highest quality and safety standards and conformity to regulations. Our pioneering application of these methodologies in the lighting industry allowed us to enhance the performance and competitiveness of our solutions and processes, thanks to **improved reliability, supplier management and customer support, and reduced defect rates**.

# Continuous quality monitoring

**Quality at its highest level.**

When assessing and testing the quality of critical components from a lighting device, like die-cast elements, we run a qualitative analysis with a **3D scanner** to ensure that our products meet the highest expectations from our customers and set new standards of excellence. To guarantee that these high standards are shared with all of our supply chain, we adopt innovative strategies (such as PPAP) to improve the collaboration, transparency, and reliability of our suppliers. We run **burn-in** and **run-in tests** in 100% of our production output to ensure that our customers receive only the best, building a bond of trust and reducing defective returns after sales.

3D scanning



# Simulation and in-house field test

**Safety, performance, and reliability.**

Our internal field tests are an essential part of the development process, ensuring that only high-quality solutions reach the market. For this reason, before any launch, we simulate actual application conditions on our devices to check the safety, performance, resistance, and impact on the lifetime and reliability of the electronic components. These field tests are a preventive measure to secure an enduring partnership with our customers and their satisfaction in the long run, resulting in a high reputation in the competitive lighting market.

# laboratory

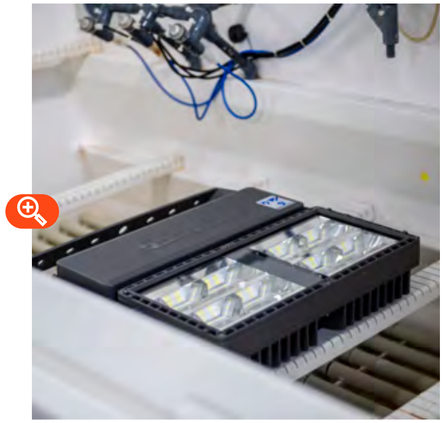
# Facts and figures about our laboratory

**State-of-the-art facilities.**

Among the over 2,000 IECEE-certified laboratories (IEC System of Conformity Assessment Schemes for Electrotechnical Equipment and Components) in the world, Gewiss' Cenate Sotto laboratory is **ranked 6th on a global level** and **2nd on a European level**, certified to manage up to 89 different types of standards.

## GEWISS laboratory's ranking among over 2,000 IECEE-certified laboratories

| | |
|---|---|
| 2nd place | European ranking |
| 6th place | Global ranking |
| 89 | Different types of standards managed |



# Tests for thermal shock, corrosion, and impact resistance

**Tested to endure.**

Our lighting devices are tested in our laboratories to check their performance under harsh conditions: **thermal shock, corrosion resistance** (salt mist/spray), **protection against solid or liquid bodies ingress** (IP), and **impact resistance** (IK) are some of the tests that we perform on our products.

# Product return analysis and management and preventive replacement

**Product return rate analysis for continuous improvement.**

The rigorous analysis of returned products and close monitoring of our quality control key performance indicators are crucial measures to improve the perceived quality of our solutions and our after-sales assistance. Our customer's feedback is valuable to continually refine the quality and reliability of our solutions and to quickly react with precision in case of need. This process triggers a virtuous cycle of high quality, which leads to enhanced customer assistance and evolved lighting solutions.

# The Lighting quality translated into figures

(last update october 2023)

| | | |
|---|---|---|
| FMEA | 45 | Designers engaged in the preventive analysis of critical issues |
| | 5,900 | Hours dedicated to this activity |
| design review | 2,500 | Hours dedicated to the preliminary conceptual analysis and design |
| | 4,000 | Hours dedicated to conceptual design refining and CAD modeling |
| thermal simulations | 1,120 | Hours dedicated to the dimensioning and refining of heat dissipation systems |
| photometrical simulations | 800 | Hours dedicated to the verification of the photometrical distribution of optical systems |
| FEM simulations | 400 | Hours dedicated to FEM simulations for the dimensioning and refining of mechanical elements |
| co-design | 500 | Hours dedicated to the fine-tuning of the CAD models, in a joint design effort with the tooling and mold suppliers |

# The Lighting quality translated into figures

(last update october 2023)

| | | |
|---|---|---|
| photometrical measurements | 380 | Photometrical and other measurements performed on average every year |
| 3D scans | 204 | Die-cast lots and samples checked |
| burn-in tests | 1,961 | High-power projectors subjected to burn-in tests |
| | 8,000 | Total amount of test hours |
| field tests | 109 | Devices subjected to field tests |
| | 1,182,000 | Total amount of test hours |
| extra-regulatory compliance tests | 2,980 | Total amount of test hours for checking the reliability and resistance to corrosion |
| | 5 | The equivalent amount of years of lifetime tests |
| consolidated products update | 96 | Technical modifications implemented for the update and maintenance of consolidated products (average of the last three years) |
| | 2,800 | Hours dedicated to the analysis and development of updates and improvements of consolidated products |

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