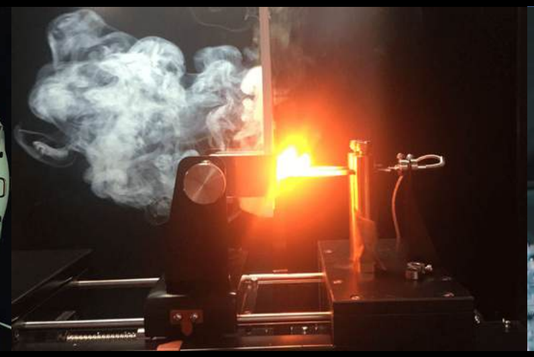
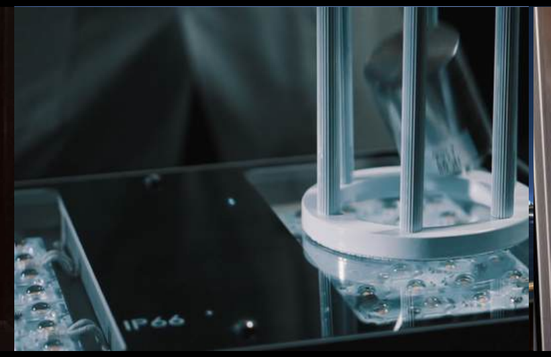
noral® GmbH

Noral GmbH

Test and Measurement Laboratory

“Optimize your light, minimize your cost and maintanence.”





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2 System Integrity

3 International Accreditation

4 Electrical & Mechanical Design - Electronic R&D

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The Importance of Testing and Measurement Laboratories

At Noral, we understand that quality, performance, and safety are fundamental to lighting solutions. To uphold these principles, we have established advanced testing an measurement capabilities designed to ensure full compliance with national ar international standards, strengthen quality assurance processes, and consistently exce customer expectations.

Our Testing and Certification Approach Includes:

- Ensuring Quality and Safety: Conducting rigorous tests to guarantee produ reliability, safety, and longevity.
- Verifying Compliance with Standards: Assessing conformity with international ar local regulations, including IEC, EN, UL, ENEC standards.
- Enhancing Energy Efficiency: Evaluating LED and advanced lighting technologies t optimize energy performance and support sustainability goals.
- Assessing Durability: Testing products under various environmental conditions and mechanical impacts to ensure resilience and long-term functionality.
- Supporting R&D Initiatives: Contributing to the development of next-generation lighting solutions through advanced testing and engineering support.
-

Equipped with state-of-the-art technology and a team of experienced engineers, Noral's laboratory ensures not only the uncompromising quality of its own products but also offers comprehensive testing and certification services to its partners. This enables the delivery of high-performance, durable, and reliable lighting solutions that meet and exceed the highest industry standards.



System Integration

Noral demonstrates its unwavering commitment to delivering superior quality, ensuring safety, promoting environmental sustainability, and maintaining regulatory compliance through globally recognized certifications and standards. The company implements ISO 9001 to drive continuous improvement in product and service quality, while ISO 45001 establishes best practices for occupational health and safety. ISO 31000 provides a structured framework for effective risk management, and ISO 14001 supports sustainable production by minimizing environmental impact. To further optimize operations, ISO 50001 promotes energy efficiency across all processes, and ISO 27001 ensures robust data security and protection against cyber threats.

In terms of product compliance, Noral adheres to CE marking requirements, confirming compliance with EU health, safety, and environmental regulations. ENEC certification guarantees conformity with European electrical safety standards, and RoHS compliance ensures the restriction of hazardous substances in electrical and electronic equipment. Noral's testing and accreditation processes are further strengthened by ISO 17025, which ensures laboratory competence and accuracy in testing procedures, and full adherence to IEC standards, aligning with globally recognized electrotechnical requirements.

Through these certifications and accreditations, Noral reinforces its dedication to excellence, innovation, and reliability, consistently delivering energy-efficient and high-performance lighting solutions that meet and exceed the highest industry expectations.





System Integration



DESIGN

The initial design concepts are developed in collaboration with the design team to create a product aligned with market analysis. A prototype is produced, and necessary improvements are made if required.



TEST

The prototype undergoes comprehensive testing to ensure compliance with quality and performance standards. An in-depth analysis is conducted to identify any non-conformities, and necessary product improvements are implemented if required. Additionally, all potential risks are thoroughly assessed, and appropriate preventive measures are taken to mitigate any issues (RA).



CERTIFICATE

All necessary certifications and compliance documents are obtained for the final product, ensuring adherence to regulatory requirements, industry standards, and market expectations.



SALES

The product, now ready for mass production, is launched based on market analysis and economic evaluation, ensuring a strategic and competitive entry into the market.



SUPPLYING

A demand-based needs analysis is conducted, and the final product is prepared for market launch. All components are procured to ensure readiness for mass production, enabling a seamless and efficient manufacturing process.



MANUFACTURING

The process flow for the final product is established, and mass production is carried out in full compliance with manufacturing instructions and quality standards.



AFTERSALES

The sold products are tracked on an order basis using their serial numbers, ensuring accurate monitoring and traceability throughout the process.

International Accreditation

ILAC
(International Laboratory Accreditation Cooperation)

Regional Accreditation Agency

Test and Measurement Laboratory

UL SOLUTIONS (DEMKO)
CTF2 (Customer Testing Facility - Stage 2)



Electrical & Mechanical Design

Innovative Design Team

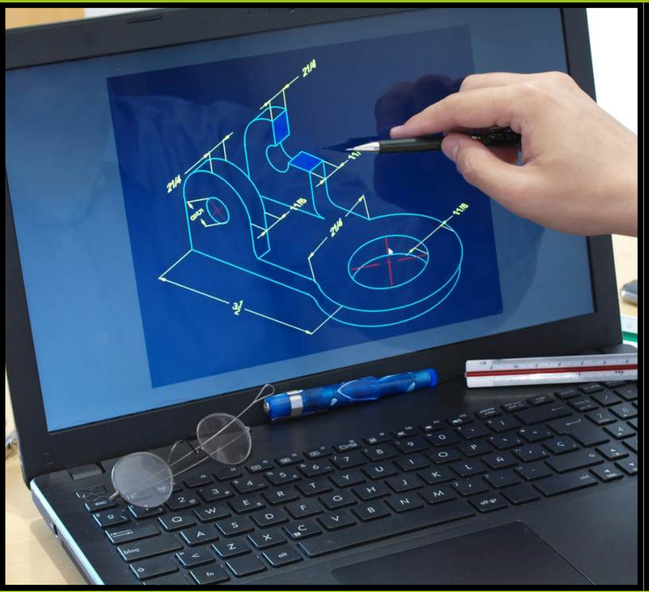
Our highly skilled and forward-thinking design team continuously explores cutting-edge technologies and creative approaches to develop advanced lighting solutions. By integrating innovation with technical expertise, we transform concepts into high-performance, sustainable products.

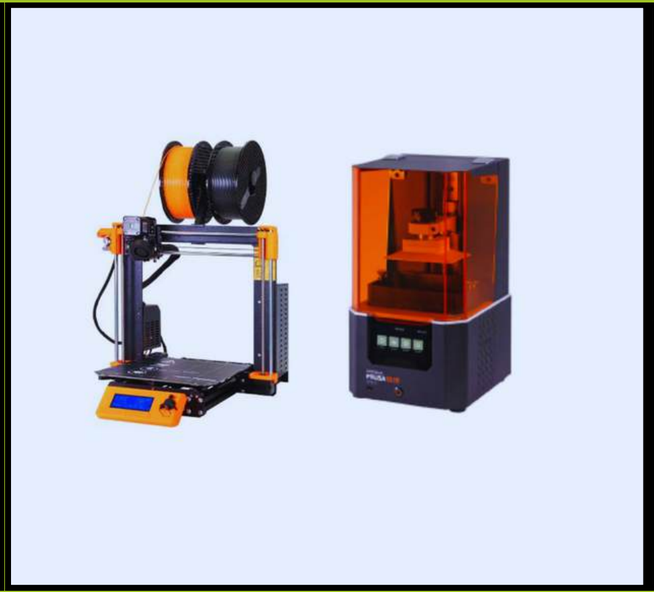
Product Design

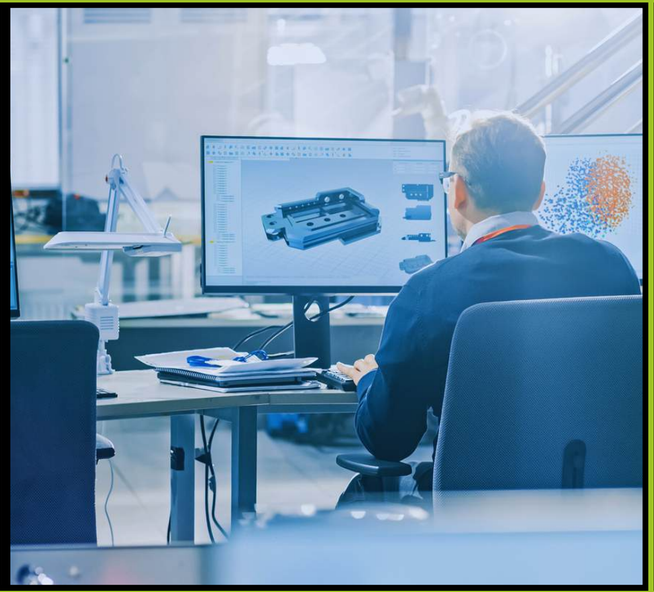
We conduct in-depth research and market analysis to create user-centered, efficient, and aesthetically refined product designs. Using the latest software and prototyping technologies, we ensure seamless integration of functionality, durability, and design excellence.

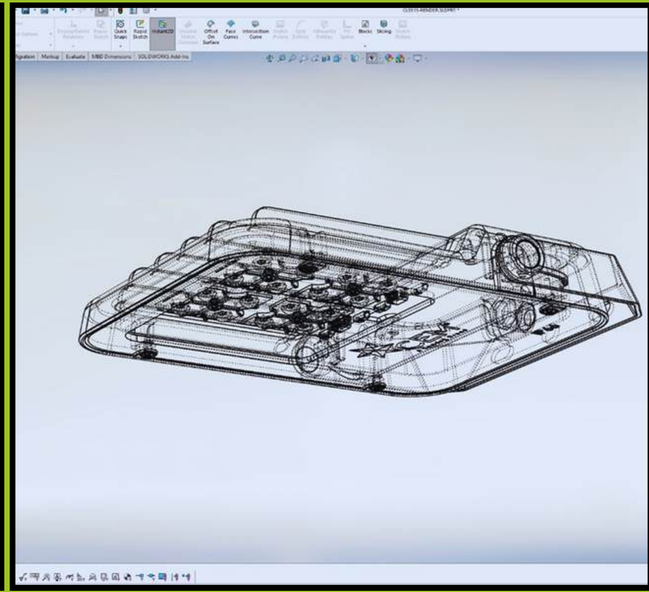
Patents and Utility Models

With a strong focus on intellectual property and innovation, we actively pursue patents and utility model registrations. These efforts reinforce our commitment to developing unique and high-value products while strengthening our competitive edge in the lighting industry.





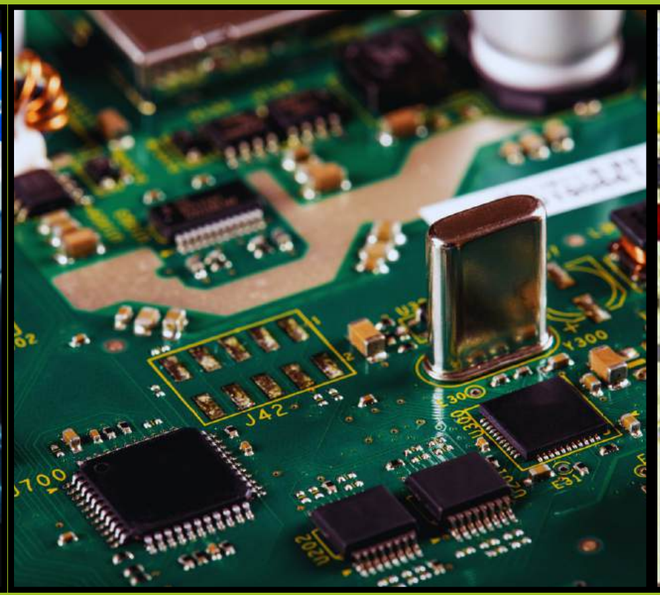


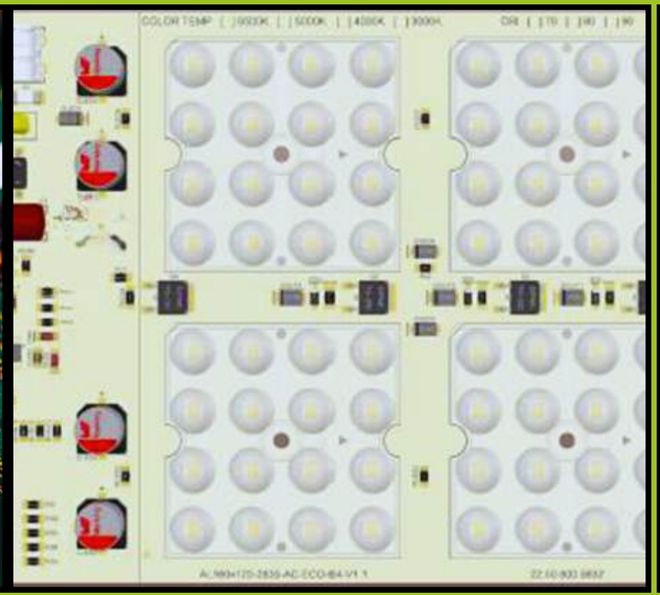


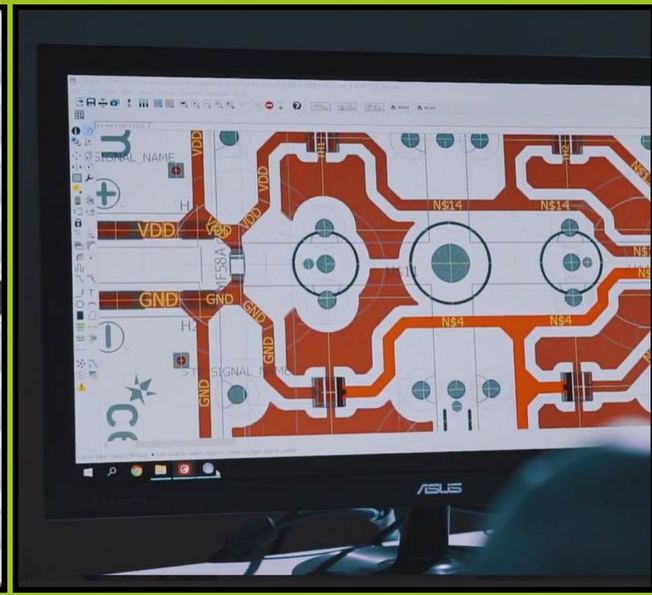
Electronic R&D

Noral's **Electronic R&D Department** develops advanced lighting technologies, including **high-performance LED modules** such as **DOB and DC-DC DOB (Driver on Board) modules**, ensuring efficiency and reliability. Our expertise extends to **MPPT charge controllers** for optimized energy management and **DMX-SPI controlled solutions**, including **Linear LEDs, Dot LEDs, 0-10V Converters**, and **Pixel Master Controllers**, enabling precise and dynamic lighting applications. Additionally, we offer **Single Color Linear LEDs, RGB Power LED Modules, and Surge Protectors** to enhance system performance and longevity. Through continuous innovation, Noral delivers cutting-edge, sustainable lighting solutions that meet industry standards.









Electrical Performans Test

At Noral, **electrical performance testing** plays a crucial role in ensuring the safety, efficiency, and reliability of our lighting products. Our advanced testing facilities conduct comprehensive evaluations, including **power consumption analysis, voltage and current stability tests, power factor measurement, and total harmonic distortion (THD) assessments.** These tests verify compliance with **international standards (IEC, EN etc.)** while optimizing energy efficiency and performance. Additionally, we assess **surge protection, electromagnetic compatibility (EMC), and thermal behavior** to enhance product durability and operational stability. Through rigorous electrical performance testing, Noral guarantees high-quality lighting solutions that meet industry expectations for safety, efficiency, and long-term sustainability.









Water Ingress Protection Test (IPX5, IPX6, IPX7, IPX8)

For water resistance, the following IPX ratings apply:

- **IPX5** – Protection against low-pressure water jets **(IEC 60529)**
- **IPX6** – Protection against high-pressure water jets **(IEC 60529)**
- **IPX7** – Protection against temporary submersion **(1 meter depth for 30 minutes) (IEC 60529)**
- **IPX8** – Protection against continuous submersion **(Water resistance at a depth, pressure, and duration specified by the manufacturer, typically deeper than 1 meter.) (IEC 60529)**









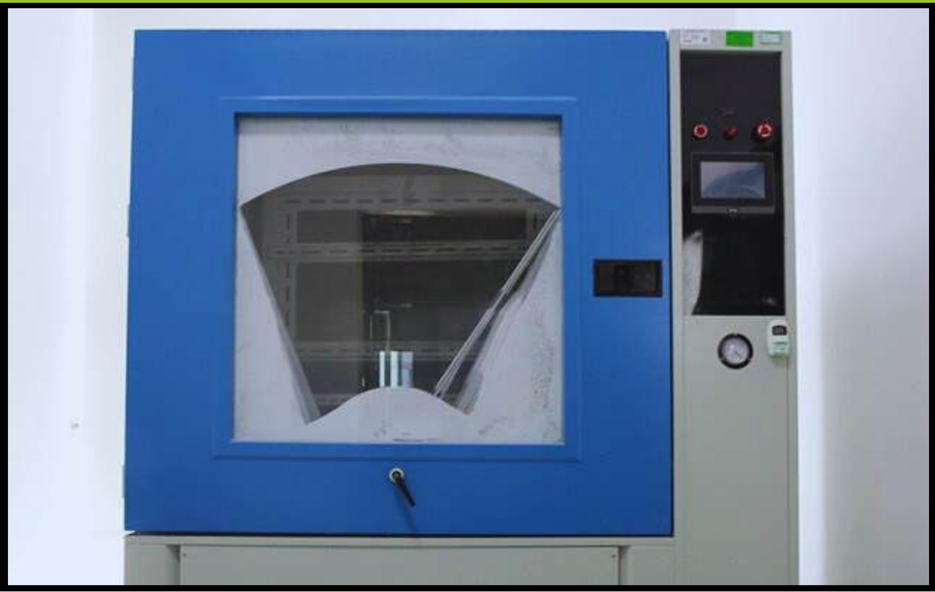
Dust Protection Test (IP6X)

At Noral, our lighting luminaires are rigorously tested and certified to meet the **IP6X** protection standard, in full compliance with the **IEC 60529** international standard. This certification guarantees that **our products are completely dustproof, ensuring outstanding performance even in the most challenging environmental conditions.**

The **IP (Ingress Protection)** rating system defines the level of protection a product offers against solid particles and liquids. **IP6X certification** confirms that Noral **lighting products are fully protected against dust, sand, dirt, and other solid particles.**
Noral products undergo rigorous testing in accordance with the **IEC 60529** standard, including exposure to a dust chamber for **8 hours using fine talcum powder particles (≤75 microns)**.







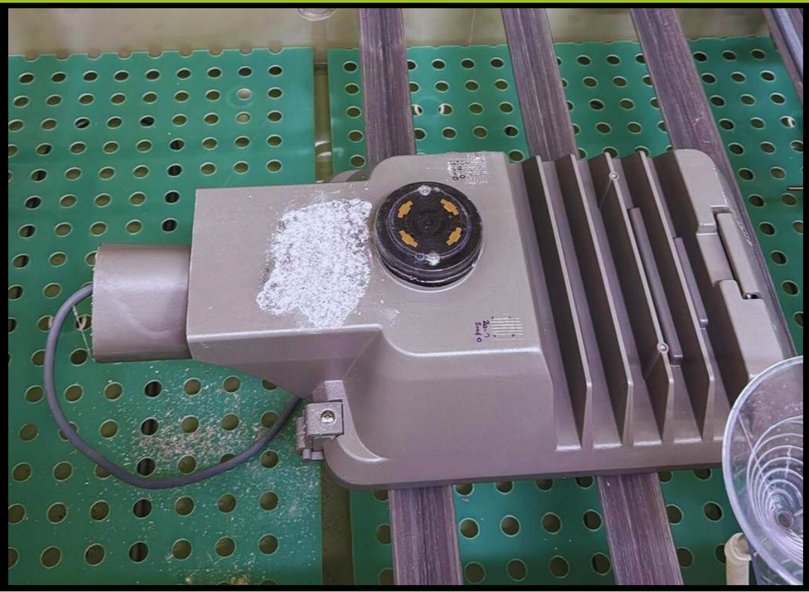
Salt Sprey Test

ASTM B117 – Standard Practice for Operating Salt Spray (Fog) Apparatus
ISO 9227 – Corrosion Tests in Artificial Atmospheres - Salt Spray Tests
IEC 60068-2-52 – Environmental Testing - Part 2-52: Tests for Salt Mist
DIN 50021 – Salt Spray Testing (Deutsches Institut für Normung - Germany)

Lighting fixtures must be resistant to corrosion due to exposure to harsh environmental conditions, especially in humid, salty, and acidic environments. To ensure durability and reliability, these fixtures undergo various tests, including the **salt spray test**, which evaluates their resistance to corrosion in saline conditions. Noral, a leading lighting manufacturer, conducts this test to verify the quality and durability of its products. By adhering to international standards, Noral ensures that its lighting solutions withstand challenging environmental conditions, providing customers with high-quality and long-lasting products.







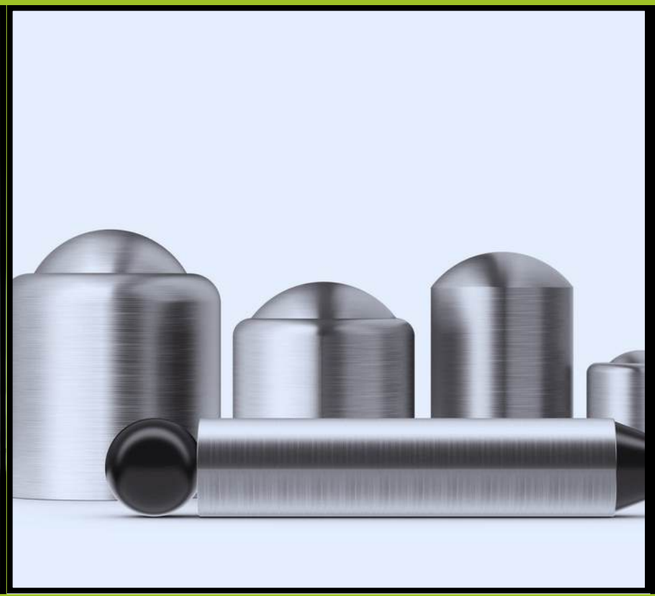
Impact Protection Test (IK09-IK10)

At Noral Lighting, we prioritize durability and resilience in our lighting solutions. Our products undergo rigorous testing in accordance with the **IEC 62262 (EN 62262)** standard to ensure maximum mechanical impact resistance. Noral fixtures are certified with **IK09 and IK10 ratings**, making them **highly resistant to external shocks, vandalism, and harsh environmental conditions.**

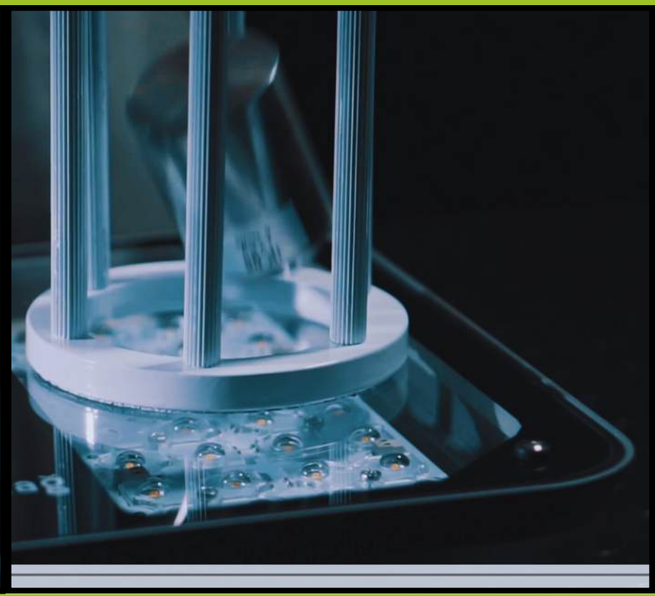
- **IK09 – High Impact Resistance (10 Joules):** Withstands an impact equivalent to a **5 kg object dropped from 200 mm height.** Suitable for public areas, industrial applications, and outdoor installations.

- **IK10 – Maximum Impact Resistance (20 Joules):** Endures an impact similar to a **5 kg object dropped from 400 mm height,** making it ideal for vandal-proof and high-risk environments such as parking lots, tunnels, and urban infrastructure.









Paint Thickness Test

At Noral Lighting, we conduct **paint thickness testing** with the utmost precision to guarantee that our lighting fixtures are **long-lasting, corrosion-resistant, and aesthetically flawless**. Adhering to international standards such as **ISO 2808, ASTM D7091, and DIN 50981**, our testing procedures ensure that our products deliver maximum protection against harsh environmental conditions.

To ensure the highest coating quality, Noral Lighting employs advanced testing methods, including:
Magnetic Induction Method (For Ferromagnetic Surfaces) – Measures paint thickness on steel and iron surfaces.
Eddy Current Method (For Non-Ferrous Surfaces) – Used for coatings on aluminum, copper, and other non-magnetic metals.
Ultrasonic Testing – Ensures accurate thickness measurement for thicker coatings and specialized surfaces.
Destructive Testing – Physically verifies coating layers through cross-sectional analysis.





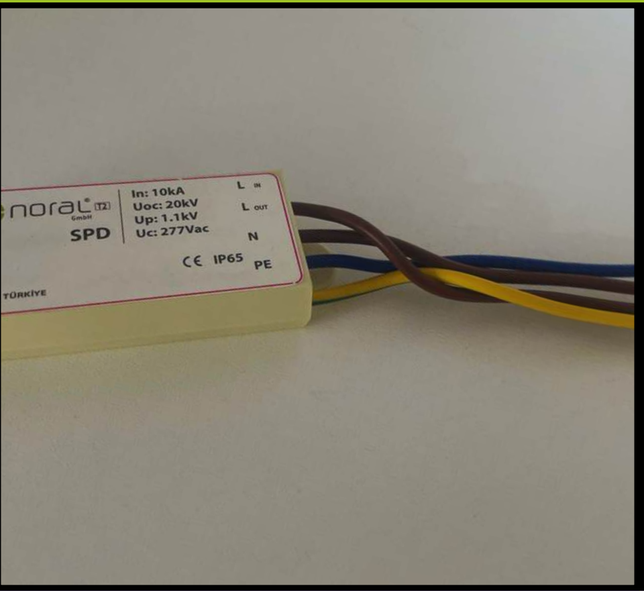


High Voltage Test (10.000V)

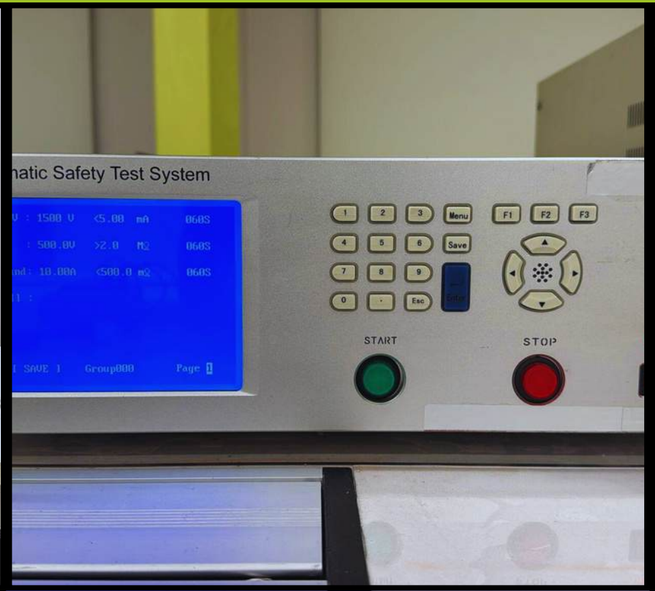
At **Noral Lighting**, we prioritize safety, durability, and compliance in every lighting solution we produce. One of the critical quality control measures we implement is **high voltage testing (hipot testing)** to verify the **electrical insulation integrity** of our fixtures. This test ensures that our products can withstand high voltage stress without breakdown, preventing potential **electrical failures, short circuits, and safety hazards.**

Noral's high voltage testing is conducted in strict accordance with global safety regulations, including:

- **IEC 60598-1** – General safety requirements for luminaires
- **IEC 61180** – High-voltage test techniques for low-voltage equipment
- **IEC 60060** – High-voltage test techniques
- **UL 1598** – Luminaires safety standard
- **ANSI C82.77** – Electrical safety and harmonic emission limits





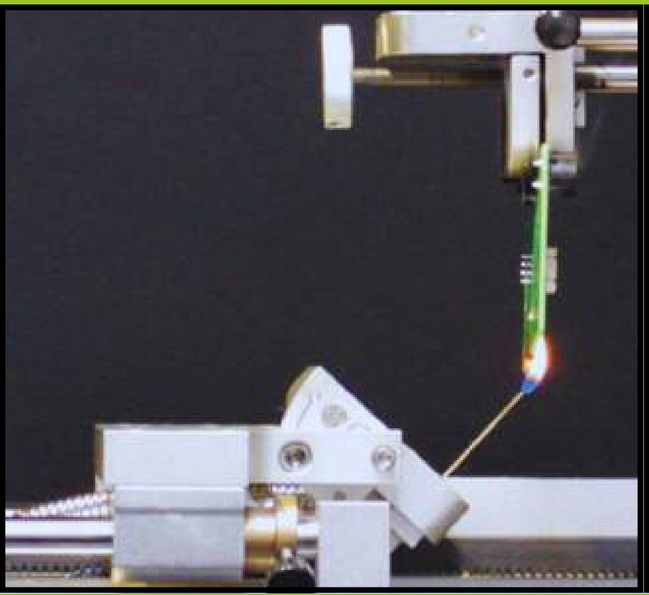




Needle Flame Test

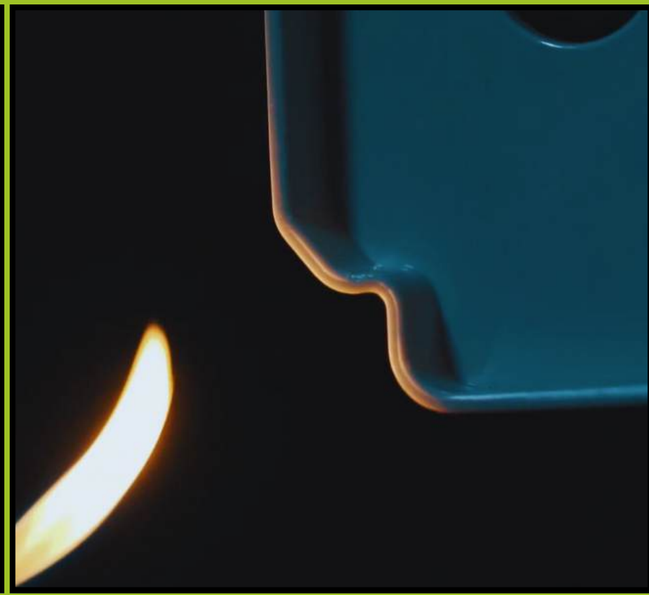
Noral Lighting ensures the highest safety standards by conducting the **Needle Flame Test** in compliance with **IEC 60695-11-5** to assess the fire resistance of plastic and insulation components used in our lighting products.

This test simulates potential ignition sources by exposing materials to a **500°C to 960°C flame** for a specified duration, evaluating **self-extinguishing properties, dripping behavior, and flame spread.** Our products meet **EN, IEC, and UL fire safety standards**, demonstrating our commitment to delivering **safe, durable, and internationally certified lighting solutions** that prioritize fire resistance and quality.







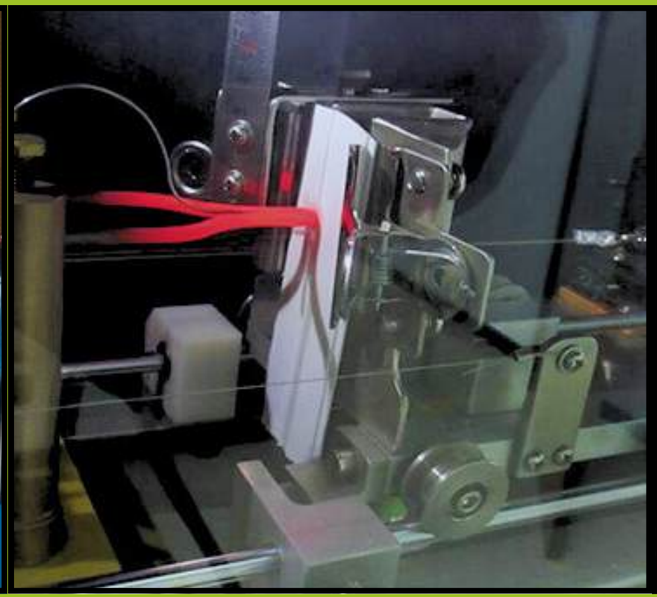


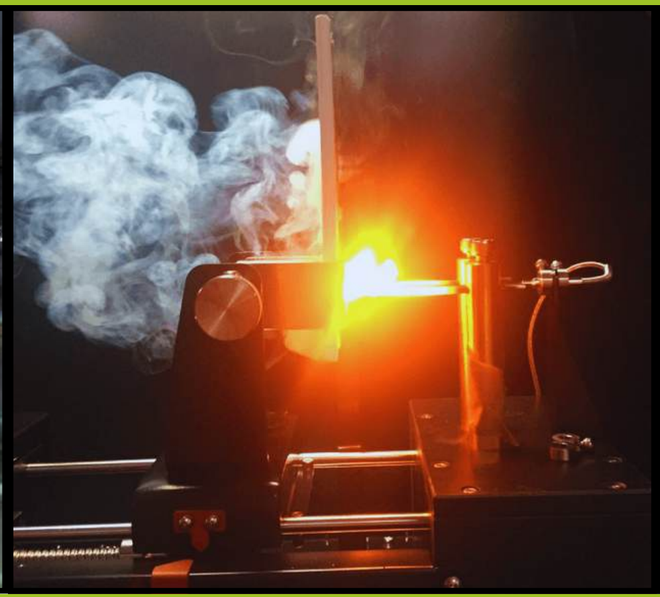
Glow Wire Test

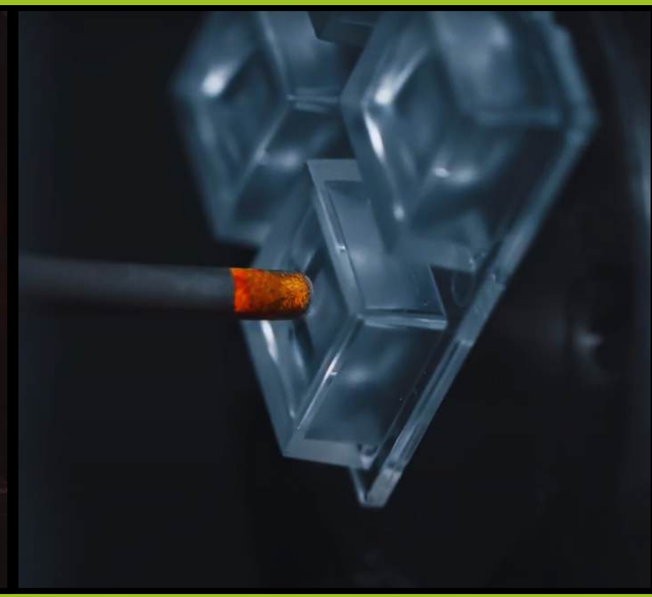
Noral Lighting ensures compliance with international safety standards by conducting the **Glow Wire Test** in accordance with **IEC 60695-2-10 to IEC 60695-2-13, EN 60695, and UL 746A.**

This critical test evaluates the fire resistance of electrical insulation and plastic components, ensuring they meet stringent **flammability, ignition, and self-extinguishing** criteria. By adhering to these global norms, Noral enhances product safety, minimizes fire hazards, and guarantees reliability in diverse lighting applications, reinforcing its commitment to superior quality and regulatory excellence.









Vibration Test

Noral Lighting ensures compliance with international safety and durability standards by conducting the **Vibration Test** in accordance with **IEC 60068-2-6, IEC 60068-2-64, and MIL-STD-810**.

This essential test evaluates the structural integrity and performance of lighting products under mechanical stress, **simulating real-world vibrations experienced in transportation, installation, and operation.** By adhering to these global norms, Noral guarantees the reliability, longevity, and safety of its products, reinforcing its commitment to exceptional quality and industry-leading standards.





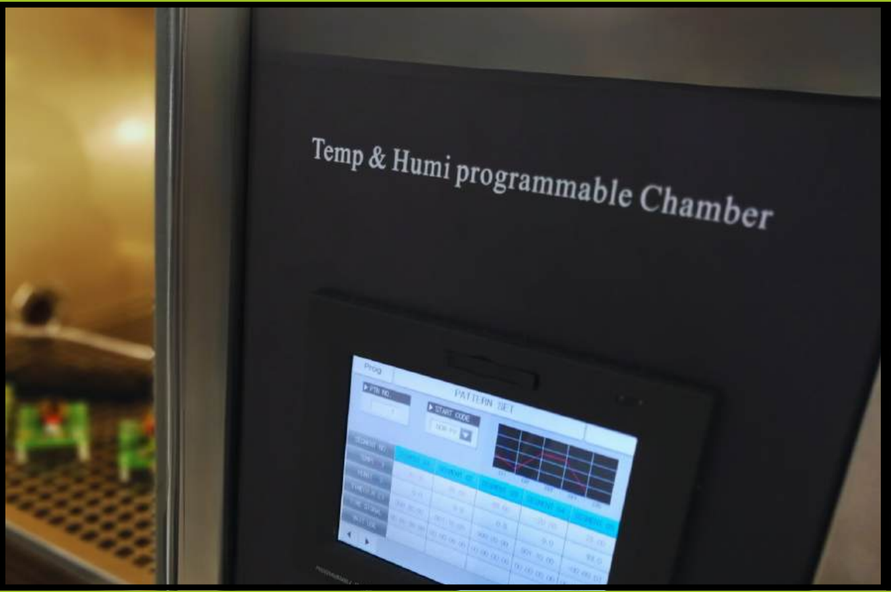




Humidity Test

Noral Lighting ensures compliance with international safety and durability standards by conducting the Humidity Test in accordance with **IEC 60068-2-3, IEC 60068-2-30, and MIL-STD-810.**

This critical test evaluates the resistance of lighting products to high humidity conditions, simulating prolonged exposure to **moisture, condensation, and temperature fluctuations.** By adhering to these global standards, **Noral guarantees the reliability, longevity, and performance** of its products in diverse environmental conditions, reinforcing its commitment to superior quality and industry-leading excellence.



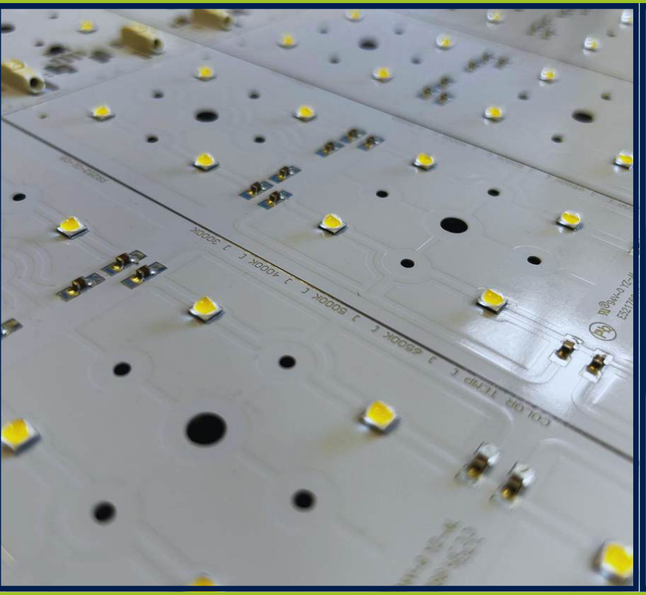




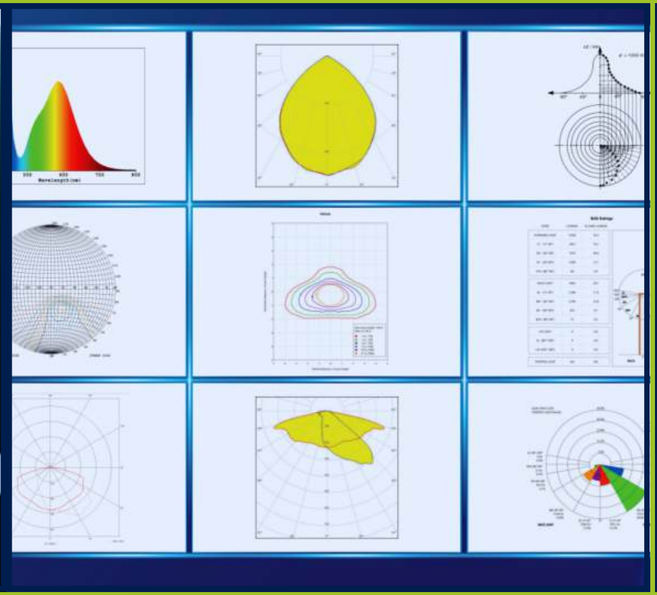
Led Module Test

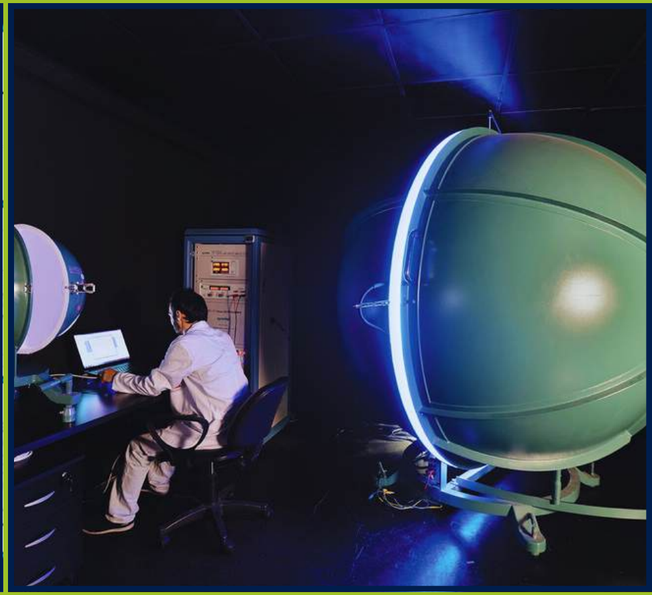
Noral Lighting ensures compliance with international lighting performance standards by conducting the **LED Module Ulbricht Sphere Test** in accordance with **EN62031, IEC 62722, LM-79, and CIE 127.**

This essential test precisely measures **luminous flux, color temperature, color rendering index (CRI), and luminous efficacy of LED modules** using an integrating sphere. By adhering to these global standards, Noral guarantees the **accuracy, efficiency, and consistency** of its LED solutions, reinforcing its commitment to superior quality and cutting-edge lighting technology.









Thermal Resistance Test

Noral Lighting ensures compliance with international safety and durability standards by conducting the Thermal Chambers Test in accordance with **IEC 60068-2-1, IEC 60068-2-2, and IEC 60068-2-14**.

This critical test evaluates the **performance, reliability, and thermal resistance** of lighting products under extreme temperature variations, simulating real-world environmental conditions. By adhering to these global standards, Noral guarantees the **longevity, stability, and efficiency of its lighting solutions**, reinforcing its commitment to superior quality and industry-leading excellence.









Static Load Suspension Test

Noral Lighting upholds international safety and quality standards by performing the **Static Load Suspension Safety Test** in compliance with **IEC 60598-1 and EN 60598-1.**

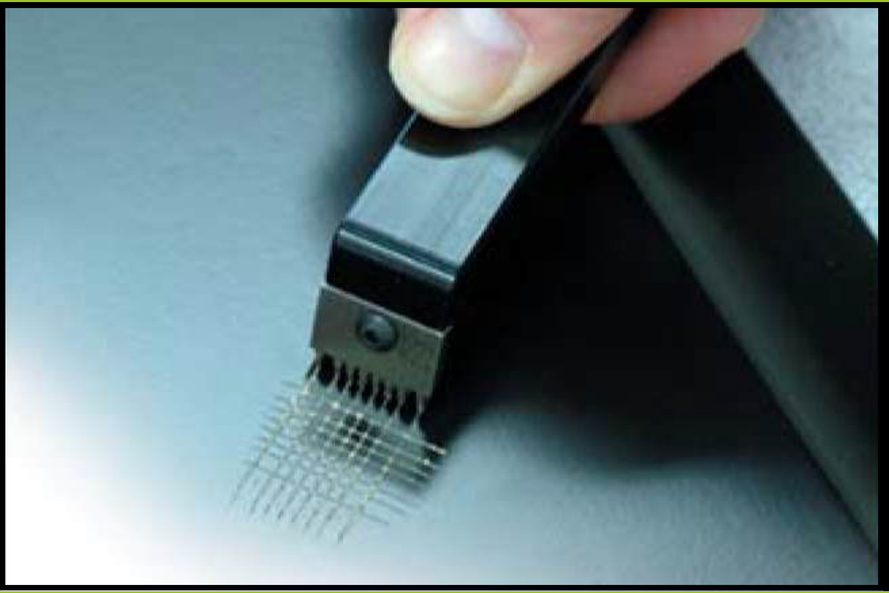
This essential test assesses the **load-bearing capacity, mechanical stability, and structural integrity** of suspended lighting fixtures, ensuring they can withstand prolonged static loads without compromising safety. By meeting these global standards, **Noral guarantees the durability, reliability, and secure installation of its suspended lighting solutions**, reinforcing its dedication to superior craftsmanship and industry-leading excellence.

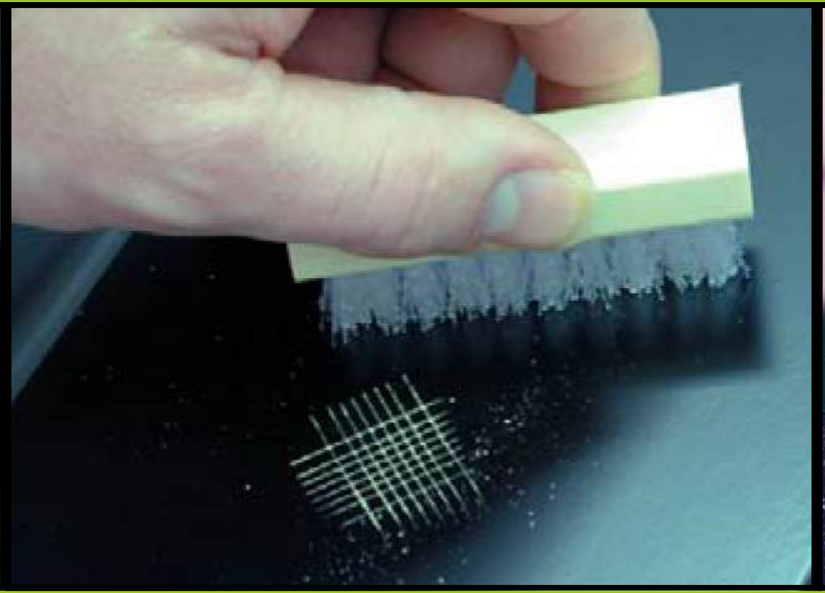


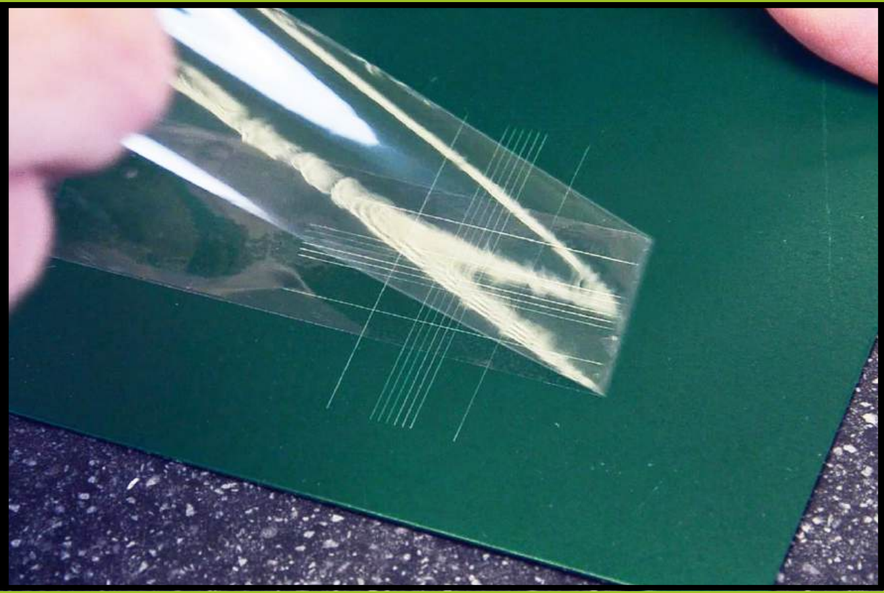
Cross Cut Test

Noral Lighting ensures compliance with international quality and durability standards by conducting the **Cross-Cut Test** in accordance with **ISO 2409 and ASTM D3359.**

This essential test evaluates the **adhesion strength and resistance** of coatings on lighting products by assessing their ability to withstand cuts and peeling under controlled conditions. By adhering to these global standards, Noral guarantees the longevity, surface durability, and aesthetic quality of its coatings, reinforcing its commitment to superior craftsmanship and industry-leading excellence.





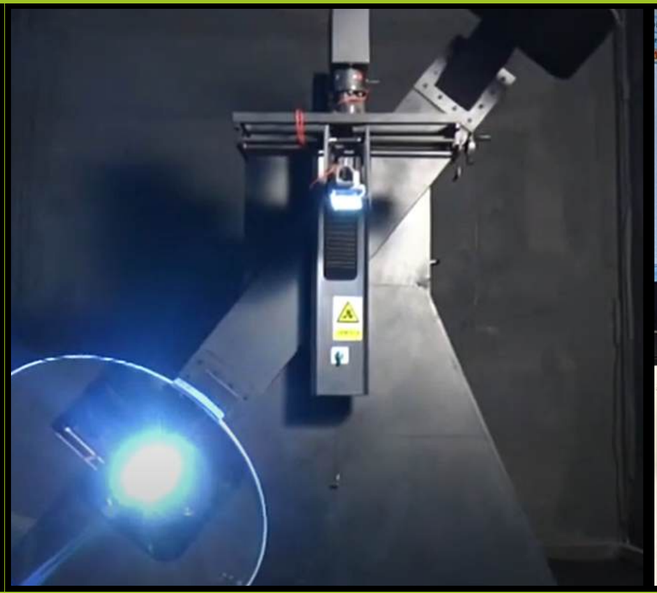


Goniophotometer Test Laboratory

Noral Lighting ensures compliance with international lighting performance standards by conducting tests in its **Goniophotometer Test Laboratory** in accordance with **IES LM-79, EN 13032-1, and CIE 121.**

This advanced test precisely measures the **light distribution, luminous intensity, beam angle, and efficiency** of lighting products, ensuring optimal performance and compliance with industry regulations. By adhering to these global standards, Noral guarantees the **accuracy, consistency, and high efficiency of its lighting solutions,** reinforcing its commitment to superior quality and cutting-edge photometric technology.









Field Measurement Test

Noral Lighting upholds international standards by performing Accredited Field Measurement Tests in compliance with **IES LM-79, EN 13201, and CIE 140.** These tests assess the **illuminance levels, luminance levels, uniformities, flicker, color rendering index, glare control, correlated color temperature and energy efficiency** of lighting installations under real-world conditions, ensuring they meet regulatory and performance requirements.

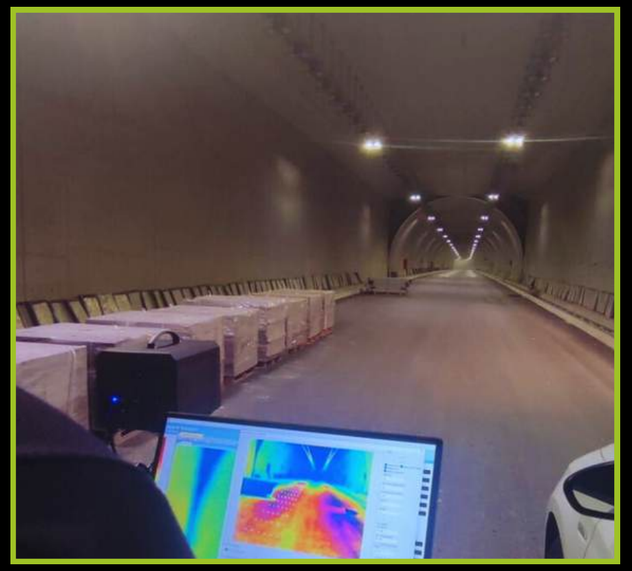
By conducting precise on-site measurements, Noral enhances the reliability, accuracy, and efficiency of its lighting solutions, demonstrating its commitment to superior quality and industry-leading expertise.



- Highways
- Sport Facilities
- Tunnels & Underpasses
- Outdoor Lighting
- Factories
- Offices & Educational Center
- Hospitals
- Airport & Aprons
- Ports

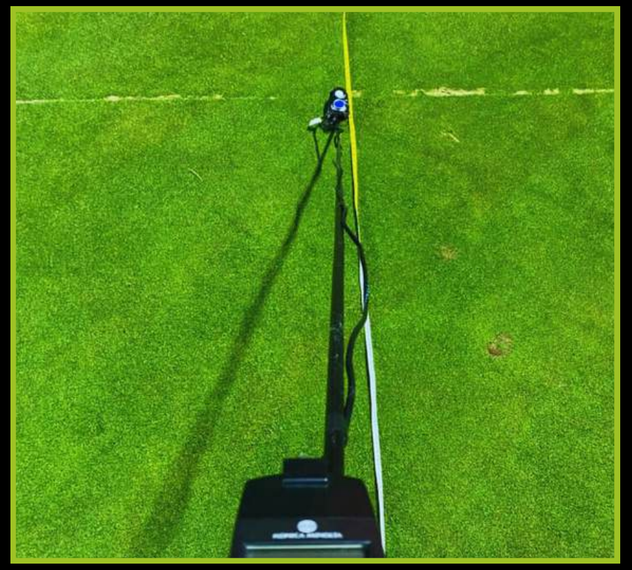
Field Measurement Test













Quality & Safety Certificates

Noral Lighting upholds the highest quality and safety standards across its Çiğli and Aliağa production facilities, ensuring compliance with internationally recognized certifications. With ISO 9001, ISO 14001, and ISO 45001 quality management systems in place, Noral also holds ENEC, CE and other globally accredited certifications, guaranteeing the reliability and durability of its lighting solutions.

Through advanced testing processes and stringent quality control procedures, Noral enhances manufacturing efficiency while delivering world-class lighting solutions to its customers. These certifications reflect Noral's unwavering commitment to excellence, safety, and sustainability, further strengthening its reputation in the global market.



ISO 31000 · ISO 45001 · ISO 9001 · ISO 50001 · ISO 27001 · ISO 14001 · RoHS · CE · ENEC · ISO 17025 · IEC · ENEC PLUS 10

Quality & Safety Certificates



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