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FIELD NOTES

Transparency in
floodlight testing,
highlighting the FIFA
Quality Programme



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Floodlight testing, a changing landscape with more integrity



In a stadium or grass roots facility the lighting performance has a direct impact on the quality of play, and thus the safety of the users. Having the lighting output **independently verified** is a key step any facility owner, or procurement manager should include it in the scope of works. There are also governing body approval schemes we should adopt more regularly, most notably launched recently by FIFA.

This edition of Field Notes will delve into what floodlight inspection entails, why it's crucial, who benefits from it, and the comprehensive services Sports Labs offers in this domain.

Floodlight systems ensure **optimal pitch visibility during matches and training sessions**. Comprising of metal halide or now more commonly LEDs strategically positioned around the pitch, these systems provide sufficient and uniform lighting for night play.



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TESTING TECHNOLOGY FOR SPORT

Quality control in sports lighting

Who benefits



The players, the buyer, the neighbours, the broadcaster and the viewer at home all benefit from good, reliable lighting solutions. Common problems are short of the minimum lux tolerances and poor uniformity from location to the adjacent locations.

A design audit



Checking the actual output of the lights on site versus the theoretical design is a key part of checking as a buyer you are getting what you have invested in. The spill and light pollution out with the main playing area can also have an impact on residential properties.

The inspection



Our trained and accredited technician independently record the readings from the pitch. This means setting out a grid, recording readings at 96 points on the pitch with different devices, then analysing the results for compliance and uniformity.

Test time

The assessment takes approximately 3 hrs on site to conduct all vertical lux, horizontal lux, main camera directional testing and flicker factor tests on a 96 point grid, across a standard 105m by 68m field. This includes goal line positions.

Certification

On completion of the testing, a report can be sent to the client and relevant governing body. The FIFA program, a 5 step process, allows licensees and preferred producers the opportunity to apply for a certificate which is conducted by a FIFA accredited test institute.



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Independent testing is key

FIFA Product Approval (Stage 1)

This part of the process is a desktop product audit (stage 1) prior to installation and carried out by the manufacturer before selling the product. It covers checks on General safety, Electromagnetic compatibility, Environmental requirements, Painting, Corrosion, Shock and Vibration, LED module/Luminaire performance and Warranty expectations.



FIFA Quality Pro: for football venues using football technologies.

FIFA Quality: for football venues and training sites

FIFA Basic: for football venues and training sites for non-commercial use

Field Test Equipment

We use state-of-the-art testing equipment that is **calibrated under ISO 17025** conditions, ensuring accuracy and reliability in our assessments.

With equipment geographically located to make independent testing accessible, our equipment can take 5 orientations in one set with 5 Lux receptor heads set up on a custom built tripod.

The key tests (Stage 4)

Vertical Lux - The illuminance on the vertical plane. The illuminance on the Ev 0°, 90°, 180° or 270° vertical plane along with the main camera direction

Horizontal Lux - (Eh) The average illuminance on the horizontal plane.

Uniformity (MAUR) - The minimum adjacent uniformity ratio or maximum permissible difference between any two adjacent points.

Flicker Factor, Colour Rendering Index, Colour Temperature and **Glare** are other notable tests.



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Industry levels to achieve

FIFA Levels of installation Test (Stage 4)

For the site test, the competition requirements define the tolerances.

Within the FIFA manual, ([View here](#)) there is detail for FIFA Lighting Standard A, B, C and D as well as provisions for training pitches Grade 1 to Grade 6. As an example Eh (Horizontal lux) average expectations can range from 1000 to 2500 lux.

An extract from the FIFA QUALITY PROGRAMME FOR FLOODLIGHTS, Test Manual October 2023.

Illuminance requirements	FIFA Lighting Standard A	UEFA Lighting Elite Level A	AFC Lighting Category 1	FIFA Lighting Standard B	UEFA Lighting Level A	AFC Lighting Category 2
Eh	Average > 2,500 lux Minimum > 1,500 lux	Average > 2,000 lux	Average > 2,400 lux	Average > 2,000 lux Minimum > 1,200 lux	Average > 1,500 lux	Average > 2,000 lux
U1h	> 0.50	> 0.50	> 0.50	> 0.50	> 0.50	> 0.50
U2h	> 0.70	> 0.70	> 0.70	> 0.70	> 0.70	> 0.70
Ev 0°/90° /180°/270°	Average > 1,500 lux Minimum > 1,000 lux	Average > 1,500 lux Minimum > 1,000 lux	Average > 1,200 lux Minimum > 800 lux	Average > 1,000 lux Minimum > 650 lux	Average > 1,250 lux Minimum > 700 lux	Average > 1,100 lux Minimum > 700 lux
U1v-0°/90° /180°/270°	> 0.50	> 0.40 (> 0.50 - 2022 onwards)	> 0.40	> 0.40	> 0.40	> 0.40
U2v-0°/90° /180°/270°	> 0.60	> 0.50 (> 0.60 - 2022 onwards)	> 0.50	> 0.50	> 0.50	> 0.50

There are also standards set within the FIFA manual for beach soccer and Futsal.



Industry levels to achieve

Training Pitches (Field Test Stage 4)

Article 11: Annexe – Overview of FIFA lighting standards for training pitches

Illuminance requirements	Grade 1 FIFA World Cup training	Grade 2 Match practice	Grade 3 Standard training
Eh ave	Average > 750 lux	Average > 500 lux	Average > 300 lux
Uniformity U1h	> 0.40	> 0.40	> 0.40
Uniformity U2h	> 0.60	> 0.60	> 0.60
Ev 0°	Minimum > 350 lux Average > 500 lux	not applicable	not applicable

Impact on the game

Quality floodlight systems significantly impact game quality

- **Enhancing Player Visibility:** Better lighting helps with ball tracking and precise movements.
- **Improving Referee Accuracy:** Consistent lighting allows accurate observation of player actions and decisions.
- **Increasing Safety:** Optimal lighting reveals potential pitch hazards.

UEFA - Confederation

The UEFA Lightng Guide 2023 gives guidance on minimum requirements for competitions as stated in the UEFA Stadium Infrastructure Regulations.

This is for UEFA member associations and suppliers to provide appropriate illuminance at stadiums in the UEFA region

The levels range from Elite Level A for example hosting the UEFA Euro's final to level D being non broadcast matches.

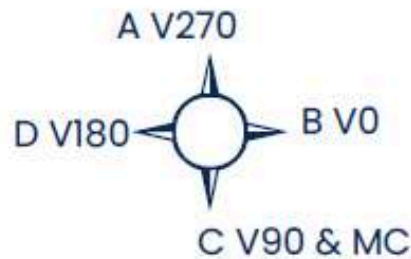


Heat Mapping

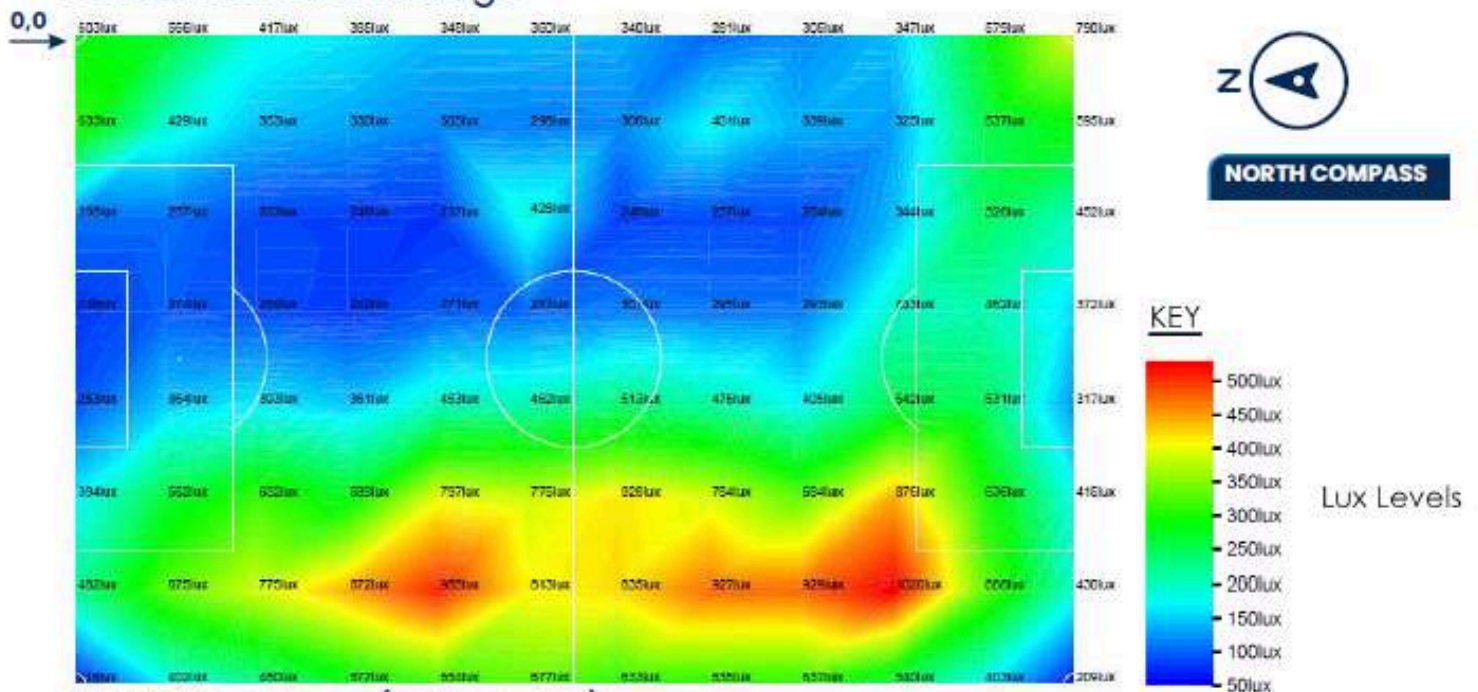
HORIZONTAL LUX READINGS

Lux Readings (Taken 1.0m above surface level)

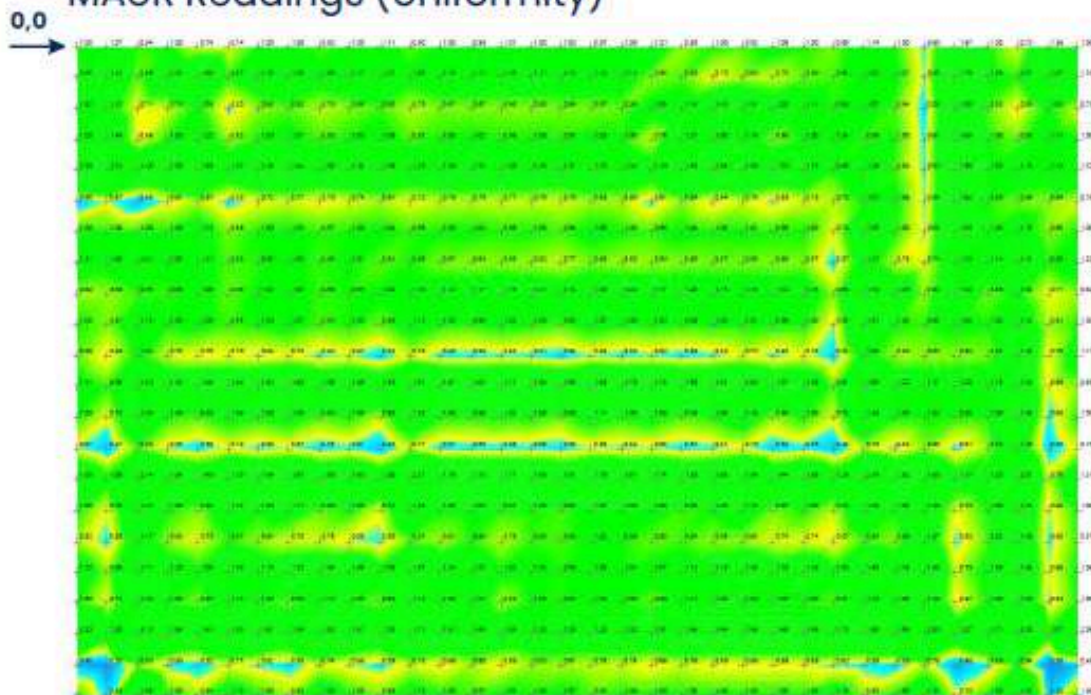
For safety and performance, consistency in lux at adjacent points is analysed. This uniformity is a pass/fail criteria, shown in more detail below with an example provide below.



Horizontal Lux Readings



MAUR Readings (Uniformity)



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Taking the next step.....

Checklist for certification

- Product audit is carried out and approved.
- Installation characteristics are met:
 - Quality Pro stadiums only.
 - Quality & Basic, stadiums or training venues.
- Performance characteristics
 - < 10% from the modelled performance for Quality Pro & Quality
- Competitions requirements
 - Pass all the category requirements

Who is it for?

The testing can be commissioned by various stakeholders and performed independently.

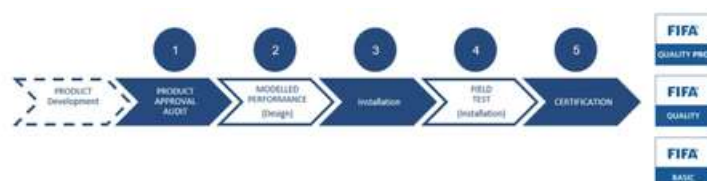
Councils, Clubs, Leagues, and Competition Organisers from the perspective of a buyer and user.

For **Installation Contractors** it allows sign off, completion and closure, releasing retention from a project.

Recap on the key stages

The initial stage is completed by the manufacturer, which is an audit by the laboratory against the product for FIFA Quality and Quality Pro.

Then the site test is carried out by a test institute, and if passing an approval certificate it released by FIFA.



A turnkey relationship

Supporting our clients we can combine additional services in the same visit, reducing facility downtime and for our clients less administration effort.

- FIFA Surface testing and Inspection
 - (both natural and artificial surfaces)
- FIFA Goal Post Testing
- FIFA Goal Line Technology Testing
- FIFA VAR Offside Line Testing



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