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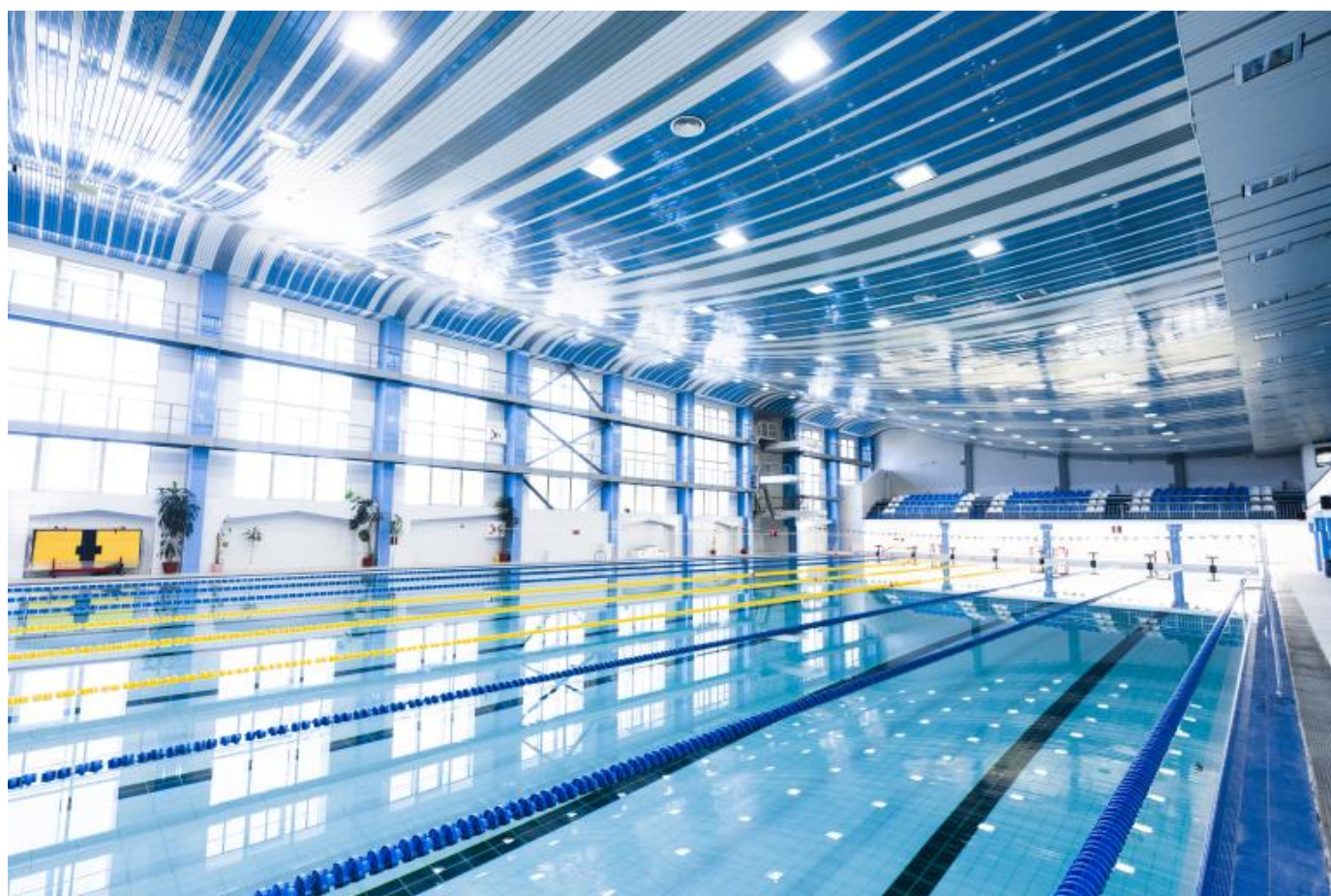


Safety and certification

A splash of light: The importance of reliable lighting in water sports

By Priyanka Dasgupta, 18 September 2023

Discover how lighting impacts water-based competitions and how IEC Standards ensure safety of electrical lights, so that the only thing you're shocked by is the swimmers' performance.



Lighting design plays an important role in water sports like swimming. Image by Freepik.

Imagine trying to watch a swimming competition, but instead of the captivating strokes of a synchronised swimmer, all you can see is the glare of the stadium lights reflected in the water. Not ideal!

Ensuring a good viewing experience for spectators is just one of the many reasons why lighting design is important. In water sports, avoiding glare for the swimmers, catering to specific needs of different competitions, balancing lighting efficiency with maintenance costs, all constitute factors that demand thoughtful lighting.

Then there is the more crucial element of safety to be kept in mind – it is essential that the different lighting fixtures around water are protected against humidity and accidental electrical leakage.

This is where IEC International Standards have been ensuring, almost since the beginning of electrical lights, that the technology involved meets the required safety and performance specifications.

Why does lighting design matter?

With water sports, **different needs** must be kept in mind while adjusting the stadium lighting.

Besides spectators, attendants also need to be able to see across the pool clearly enough to identify the swimmers or spot any accidents. Having lights directly above the pool must be avoided to prevent reflections and disability glare which makes it difficult to see a target. Backstroke swimmers definitely don't want to stare into harsh lights directly shining into their eyes while trying to concentrate on optimising their speed.

Instead, positioning luminaires around the pool and tilted lighting can help reduce the reflections in the swimmers' line of sight. Alternatively, asymmetric distribution lighting or using secondary reflections may be positioned above the water.

Supplementary lighting may be required to improve vertical illuminance during diving events, especially since judges need to assess the divers' point of entry into the water. Used more often in non-competitive scenarios, underwater lights may also help viewing conditions at the bottom of the pool.

Several other factors must be evaluated for better viewing and to avoid adversely affecting the swimmers or the spectators – strobe lighting treatment, lighting height, colour and uniformity needs for television broadcast.

In the past decade, with issues of energy efficiency coming into global focus, stadiums started seeking out light emitting diode (LED) technology which had several benefits with regards to energy savings, longer life and environmental cost.

How the IEC helps protect the lights and the swimmers

Speaking of LEDs, IEC experts recognize the need for international standards to be set for not only safe, but also efficient lighting technologies. Hans-Gerd Kaiser, Chair of [IEC SC 34D](#), a subcommittee dedicated to luminaires in contact with water, gave an example of such work: “LED lights offer more energy savings and are increasingly being used both for underwater and flood lighting. As with other electrical lighting, the IEC has been leading the path for safety measures and optimum performance specifications for LED lights as well. For instance, SC 34D has updated [IEC 60598-1](#), a generic standard which establishes general requirements and tests for luminaires to include LEDs.”

In general, if the fixtures are in an indoor pool, they must be protected against chlorine, and in some cases, salty air, to avoid corrosion or malfunction.

For this, the lighting equipment must have the appropriate [ingress protection \(IP\) ratings](#). These ratings were developed by the IEC to grade the resistance of an enclosure against the intrusion of dust or liquids. They are widely used throughout industry by manufacturers, to specify the water resistance of the electronic devices they produce – including lights.

While the first IP digit refers to dust, the second is specific to water ingress. Depending on regulations of the area, the requirements may vary. Usually IP 68 may be recommended for LED lights that need to go underwater, with IP 65 being enough for those that wouldn't be submerged underwater.

Underwater or not, the area surrounding a swimming pool can have high humidity levels. And as we know, water and electricity are not a good mix. [IEC Standards](#) are required to ensure that electrical installations in swimming pools perform adequately and remain safe:

- [IEC TC 64](#): Electrical installations and protection against electric shock, publishes [IEC 60364-7-702](#), which applies to swimming pools and specifies how to select and install electrical equipment near or under water.
- [IEC SC 34D](#): Luminaires, issues [IEC 60598-2-18](#) on the requirements for swimming pool lights. Among other things, this standard for low-voltage installations describes tests for mechanical strength and corrosion that underwater lighting fixtures must pass.
- [IEC TC 70](#): Degrees of protection against enclosures, publishes a key standard, [IEC 60529](#), which rates water resistance using the IP rating code.
- IEC SC 34D publishes [IEC 60598-2-5](#), which specifies requirements for floodlights on supply sources not exceeding 1000 V.

Beyond the standards, the [IECQ scheme for LED lighting](#) provides a quality management platform that certifies component suppliers and the manufacturing processes of LED lighting products. This scheme has been set up to guard against the risk of low-quality and unreliable products entering the market.

With growing research in sports and lighting, technological innovation is in no short supply. Experts at the IEC continue to learn, monitor and evaluate needs in standardization with the advent of new solutions to lighting.

“In the technical committee, we are in the centre of the market. Different stakeholders raise the various concerns and challenges for innovation in the industry, which feeds into effective standardization” says Andreas Scholtz who’s the chair of IEC Technical Committee 34, the leading IEC TC on lighting standards.

While developments in lighting design and their use in a better sporting experience will continue to emerge, the IEC’s work will be crucial to defining specifications for safer equipment and efficient performance of these influential lights.



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Close to 20 000 experts from industry, commerce, government, test and research labs, academia and consumer groups participate in IEC Standardization work.

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