

Press Information

KYOCERA Develops World's First Full-Spectrum LED Aquarium Lighting

Innovative technology mimics sunlight at specific underwater depths; designed to optimize growth of corals and marine plants.

Kyoto/London, August 16th, 2018. Kyocera announced that the company developed the world's first¹ full-spectrum LED lighting for aquariums. Kyocera's high-color-rendering LED lighting combines its proprietary violet LEDs and RGB (red, green and blue) phosphors to create lights close to natural sunlight at specific underwater depths. Kyocera's new LED lighting is ideal for growing various water creatures as it reproduces the light close to the natural habitats of corals and water plants. The optical spectrum can also be customized to reproduce the deep blue color for ornamental purposes.



Kyocera's LED Aquarium Lighting

¹ Among LED aquarium lighting for hobby purposes which emit full spectrum light from a single element
(Based on a survey by Kyocera, as of July 26, 2018)

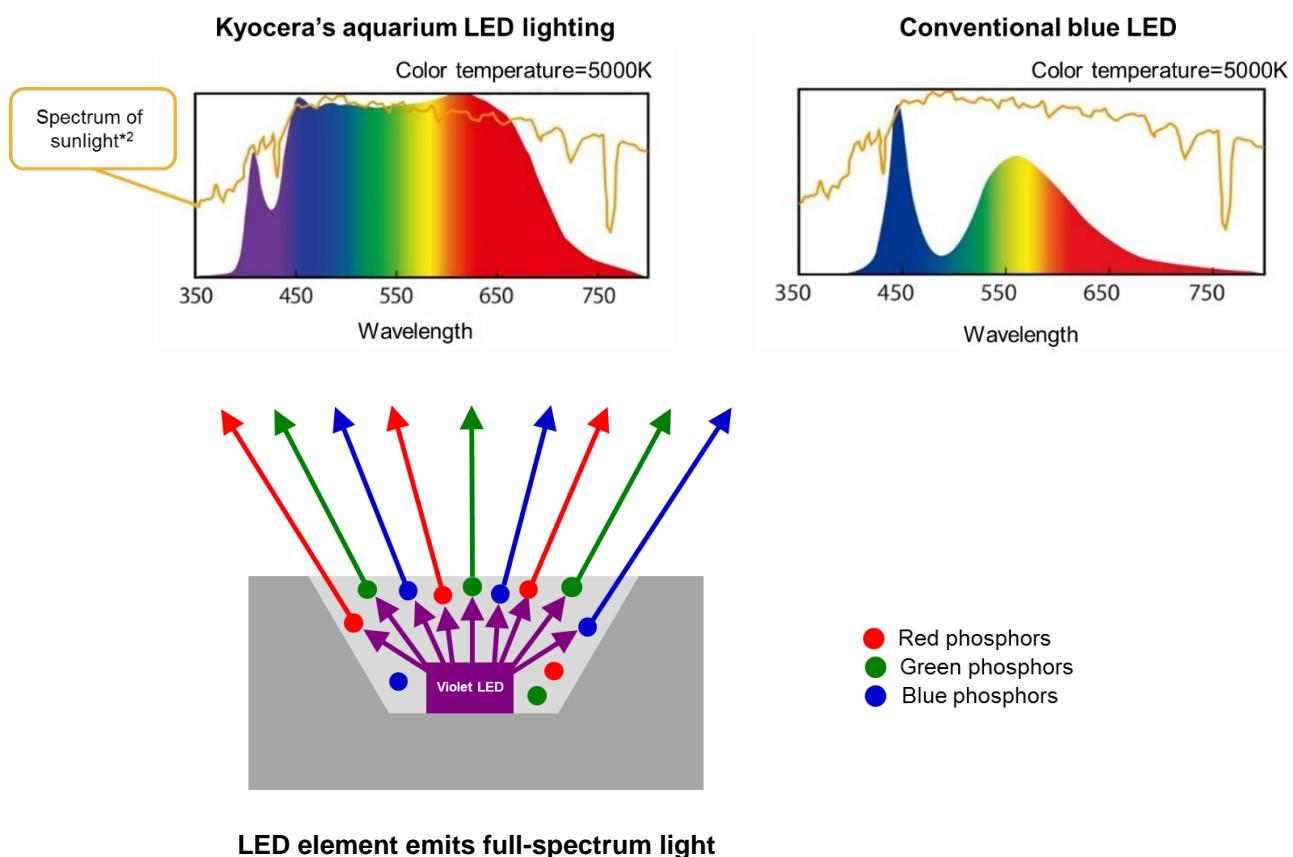
Kyocera's aquarium LED lighting will be available to the Japanese market in the middle of August in four types:

- Marine Blue reproducing spectrum of sunlight at 2.5m below sea level
- Aqua Blue reproducing spectrum of sunlight at 11m below sea level
- Natural White reproducing similar spectrum of sunlight above ground
- Deep Blue for ornamental purposes

Product Features

1. Lamps emitting light mimicking natural sunlight helps grow coral and water plants

By combining violet LEDs and RGB phosphor blending technology, Kyocera's high-color-rendering LEDs produce light extremely close to natural sunlight. By customizing the spectrum, it reproduces the light close to that of the natural habitats of corals and water plants at specific underwater depths.





Furthermore, as each LED element emits full-spectrum light close to the natural sunlight, it produces light with luminance uniformity without color separation making it ideal for growing corals and other sea creatures for a long period of time.

2. High light output

Kyocera's proprietary ceramic technology provides excellent durability in an LED light. In addition, an air-cooling function utilizing air convection offers a high output while maintaining high color rendering. Assuming this light would be used near the sea, Kyocera developed a robust design with a heat dissipation structure to use natural air. As this design does not require a fan, which was traditionally considered one of the main reasons for product breakdown, the new aquarium LED light can minimize failures.

Endorsements from collaborators

Dr. Beatriz Estela Casareto, Professor at Research Institute of Green Science and Technology, Shizuoka University

"Whether corals can normally grow strongly depends on the health status of their symbiotic algae named zooxanthellae. As a result of their photosynthesis, zooxanthellae provide corals with essential organic matter that corals utilize for their growth. Light is a very important environmental factor that determines the photosynthetic performance of zooxanthellae and, therefore, the coral health status. At Shizuoka University, we had developed an experiment to test the abundance of zooxanthellae and their photosynthetic pigments (chlorophyll a and peridinin) in aquariums at 24°C, to test the effect of light on coral growth using Kyocera's Natural White's LEDs (KNW) and a conventional LED (CLED) at 400 $\mu\text{m cm}^{-2} \text{ sec}^{-1}$. The experiment was conducted for 2 months using two coral species, Montipora digitata and Acropora spp. from Okinawa. Results showed that corals incubated under KNW kept their original color intact against corals under CLED that appeared pale after 2 months. Zooxanthellae density increased 32 to 47%, Chl-a 17 to 44 % and peridinin 26 to 125% in KNW treatments when compared to CLED treatments. Results clearly showed that, due to its similarity to the natural sunlight, the KNW lamp is highly suitable for growing corals during a long period of time. It is also expected that, using KNW, new results in the study of coral physiological responses and coral bleaching will be obtained."

Mr. Tetsuo Takeshima, Director of Enoshima Aquarium

"We had been looking for a high-quality light source alternative to metal-halide lamps since manufacturing and importing mercury products will be restricted from 2020 based on the Minamata Mercury Convention signed in 2013. It had been a big challenge for us because many sea water creatures cannot grow well with conventional LED lighting. We found Kyocera's LED lighting and tried using it for an experiment to raise eelgrass, which is difficult to grow with conventional LED, and this experiment showed positive results. We expect Kyocera's LED to drastically reduce power costs while creating a good environment for raising marine life."

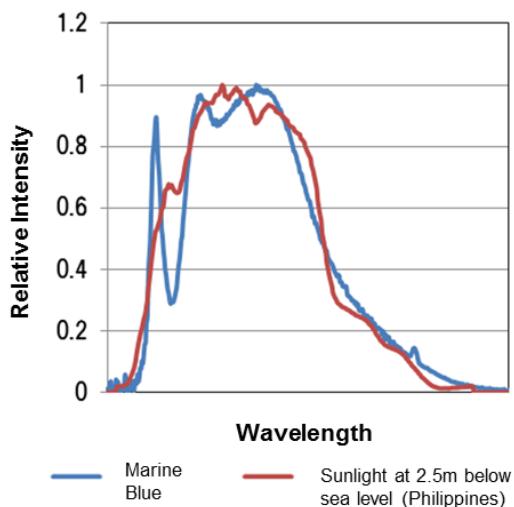
Product lineup

1. Marine Blue (CSL-SMBB0000)

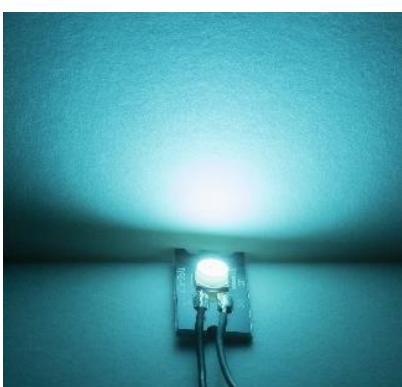


Reproducing spectrum of sunlight at

2.5m below sea level

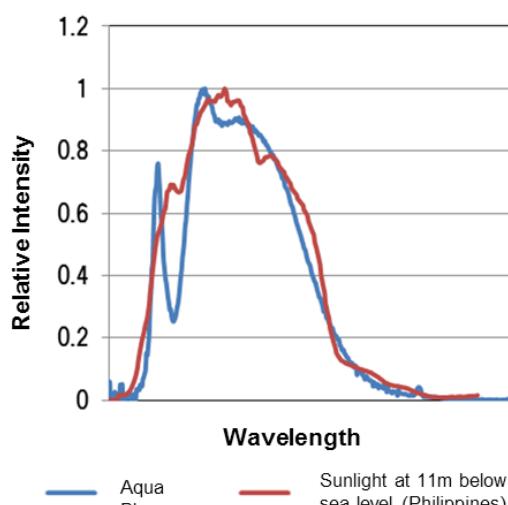


2. Aqua Blue (CSL-SABB0000)



Reproducing spectrum of sunlight at

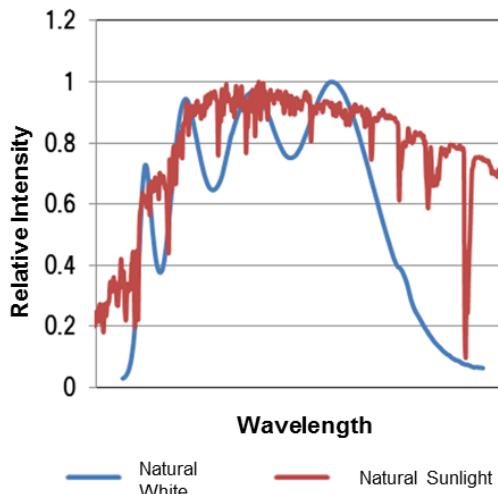
11m below sea level



3. Natural White (CSL-S50B0000)



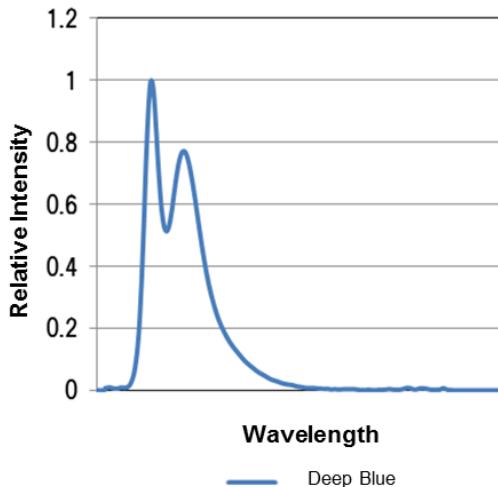
Reproducing spectrum of sunlight
above ground



4. Deep Blue (CSL-SDBB0000)



For ornamental purpose



Specifications

Weight	1,400g (lamp), 900g (light source)
Dimension	Diameter: 107mm (body); depth: 145mm (body); Width: 110mm (clip)
Input voltage	AC100V (50Hz/60Hz)
Energy consumption	51.2W

Source of spectrum data: ASTM International (ASTM G173 – 03)

For more information on KYOCERA: www.kyocera.co.uk

About KYOCERA

Headquartered in Kyoto, Japan, KYOCERA Corporation is one of the world's leading manufacturers of fine ceramic components for the technology industry. The strategically important divisions in the KYOCERA Group, which is comprised of 264 subsidiaries (as of March 31, 2018), are information and communications technologies, products which increase quality of life, and environmentally friendly products. The technology group is also one of the oldest producers of solar energy systems worldwide, with more than 40 years of experience in the industry.

The company is ranked #522 on Forbes magazine's 2017 "Global 2000" listing of the world's largest publicly traded companies. With a global workforce of over 75,000 employees, KYOCERA posted net sales of approximately €12.04 billion in fiscal year 2017/2018. The products marketed by the company in Europe include printers, digital copying systems, microelectronic components, and fine ceramic products. The KYOCERA Group has two independent companies in the United Kingdom: KYOCERA Fineceramics Ltd. and KYOCERA Document Solutions.

The company also takes an active interest in cultural affairs. The Kyoto Prize, a prominent international award, is presented each year by the Inamori Foundation — established by KYOCERA founder Dr. Kazuo Inamori — to individuals and groups worldwide who have contributed significantly to the scientific, cultural, and spiritual betterment of humankind (converted at approximately €764,000 per prize category).

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