



Mercury-Free Projector

Background

Increased use of mercury-free solid state light sources

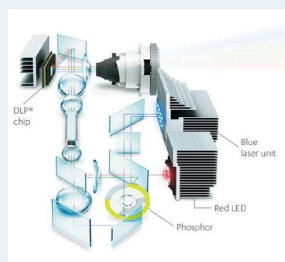
At the fifth meeting of the Conference of the Parties to the Minamata Convention in November 2023, it was decided to prohibit the manufacture, export, and import of all general lighting fluorescent lamps by the end of 2027. However, super-high-pressure mercury lamps used in projectors are considered a "special purpose" under the Convention and are therefore not subject to these requirements. In Japan, however, an increasing number of manufacturers are adopting "solid-state light sources" that use semiconductor technologies such as lasers or LEDs instead of mercury. In addition, the "Basic Policy on Promoting Green Procurement," established by the Ministry of the Environment states that solid-state light sources should be used as much as possible. Therefore, domestic demand for mercury-free projectors is expected to increase in Japan in the future.

Overview of Technology

Laser and LED Hybrid Light Source Technology

In 2010, a Japanese manufacturer successfully developed a mercury-free projector that combines lasers and LEDs as a light source, as an alternative to super-high pressure mercury lamps. Mercury-free projectors with a brightness less than 2,000 Lumens already existed then, but it was the first mercury-free projector greater than 2,000 Lumens. They are used in typical meeting rooms and classrooms.

Super-high pressure mercury lamp

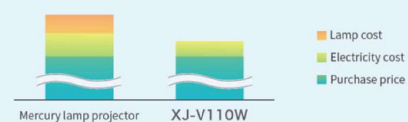


Source: Casio Computer Co., Ltd.

An optical engine that combines a high-intensity blue laser with a red LED enables a bright projection light with lower electricity consumption compared to super-high pressure mercury lamps or other solid state light source methods. This is due to its optimization of optic blocks and superior energy-efficient technology that creates a high performance images. In addition, another advantage is that the product size can be downsized because of its flexible design layout and high-density mounting technology.

The laser and LED hybrid light source method has a higher initial cost compared to super-high pressure mercury lamp methods. However, taking into consideration electricity costs and lamp replacement costs, the cost over the long term (TCO; Total Cost of Ownership) is lower.

[Comparison of total cost over 5 years]



Conditions: Usage of 5 hours a day, 200 days a year
Comparison with a conventional mercury lamp projector

Benefits of converting to a laser and LED hybrid light source

The following benefits can be obtained by shifting from super-high pressure mercury lamps.

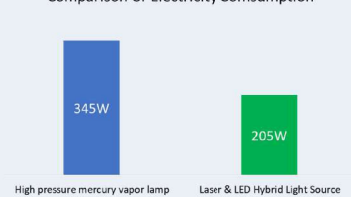
1. Reduction of environmental impact

Energy consumption is about 40% less than a super-high pressure mercury lamp, so electricity cost and CO₂ emissions will decrease. In addition, while the average lifespan of a super-high pressure mercury lamp is about 3,000 to 6,000 hours, the laser and LED hybrid light source has a longer lifespan of about 20,000 hours, meaning the elimination of the need to dispose of or replace the lamp.

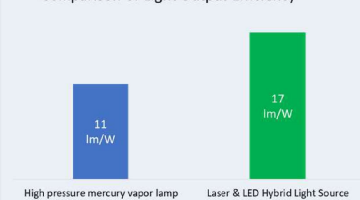
2. Improvement of usability

The laser and LED hybrid light source has a high energy-to-light conversion, which has the benefit of enabling the downsizing of the light source itself. Therefore, downsizing of the device itself is also possible, leading to benefits such as portability, and lessening the workload during installation. Moreover, maximum brightness is achieved instantly during use, meaning preparation time is short, and it can be turned on and off often, contributing to the increase in usability. It can also project in any direction for 360 degrees, increasing the opportunities to utilize the projector.

Comparison of Electricity Consumption



Comparison of Light Output Efficiency

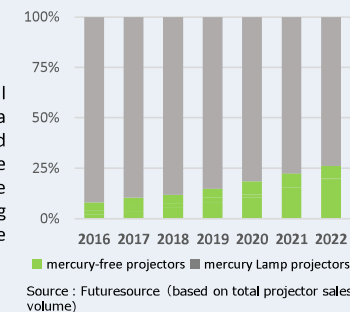


* Comparison between projector models with equivalent features. Data provided by Casio Computer Co., Ltd.

Applicability to Other Countries

Global trend of projector light sources

In 2016, mercury-free projectors accounted for only about 8% of global projector sales. However, following the entry into force of the Minamata Convention in 2017, awareness of mercury issues increased, and technological advances such as miniaturization and higher brightness have accelerated the adoption of mercury-free technologies. As a result, the number of mercury-free projectors sold worldwide has been increasing year by year. Today, mercury-free projectors manufactured in Japan are used around the world.



References

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