



## Mercury-Free Projector

### Background

#### Increased use of mercury-free solid state light sources

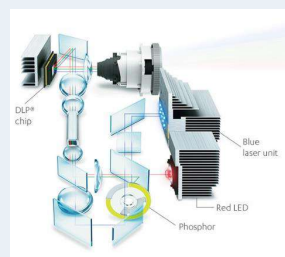
Super-high pressure mercury lamps that are used in projectors are not subject to phase out by 2020 under the Minamata Convention on Mercury. However, manufacturers in Japan are increasingly employing “solid state light sources” that use lasers or LEDs as diodes instead of mercury. “The Basic Policy on Promoting Green Procurement”, stipulated by the Ministry of the Environment in February 2019, clearly stated that “a solid state light source should be used for light source lamps as much as possible”. Therefore, domestic demand for mercury-free projectors is expected to increase in Japan.

### 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 CO<sub>2</sub> 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.



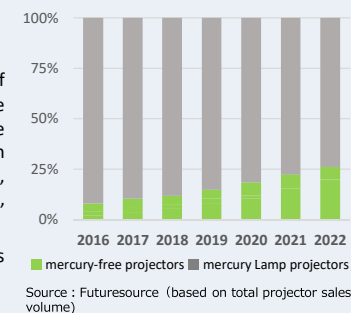
\* Comparison between projector models with equivalent features. Data provided by Casio Computer Co., Ltd.

#### Applicability to Other Countries

##### ■ Global trend of projector light sources

In 2016, global sales volume of mercury-free projectors was only 8% of the total projector sales volume. However, global awareness of the mercury problem has increased due to the entry into force of the Minamata Convention in 2017, and because of technological innovation such as smaller product size and higher brightness, currently, approximately quarter of the projectors sold worldwide are mercury-free, and the proportion is increasing every year.

The laser and LED hybrid light source projector made in Japan is currently being used in over 70 countries worldwide.



#### References

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Office of Mercury Management, Ministry of the Environment  
1-2-2 Kasumigaseki, Chiyoda-ku, Tokyo 100-8975, Japan  
Tel: 03-5521-8260, E-Mail: [suigin@env.go.jp](mailto:suigin@env.go.jp)  
<http://www.env.go.jp/en/chemi/mercury/mcm.html>