



## Design for Environment

In order to minimize our impact on the environment to the extent possible and achieve the "creation of new values in harmony with the environment," we in the Stanley Group promote energy and resource conservation and the prevention of pollution over the entire life cycle of our products, while also working to cut down on our environmental impact globally.

### Achieving Miniaturization and Weight Reductions through the Development of Bi-function LED Units

#### Improving both the design freedom of headlamps and vehicle fuel economy performance

Adopting LEDs as the light source for headlamps has allowed us to achieve substantial power savings. With conventional LED headlamps, switching between high and low beams required a special module, which resulted in a 4 lamp system LED unit. But with our newly developed Bi-function LED unit, it is possible to switch between high and low beams with a single unit. This device comes equipped on the Mazda CX-5. This allowed us to substantially miniaturize the LED light source relative to conventional ones. We also replaced die-cast aluminum with resin as the material for the bracket and shrank down the size of the light circuit in an effort to further reduce its weight. Regarding the signature lighting, we were able to successfully reduce the number of LEDs and achieve energy savings while still improving the feel of lighting. This also contributed to improving styling freedom for the headlamp and the vehicle fuel economy performance.



Views

With the evolution to a 12-segment ADB, we devoted ourselves to improving visibility and achieving a visual quality with our signature lighting

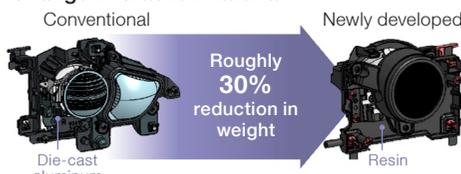
We carried out development with the view of equipping vehicles with Stanley's first ever 12-segment ADB. We devoted ourselves to achieving a visual quality for the signature lighting more than ever before, for which we earned rave reviews. We were aiming to achieve both power-savings and size reductions, while also making it easy to assemble. Its structure was devised by integrating production, marketing, and technical know-how. We will continue to work towards design for the environment in the future.

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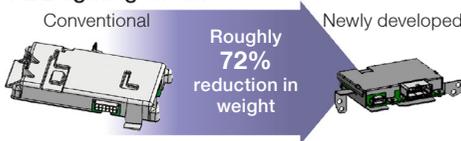
#### Switch from 4 lamp system LED units to the Bi-function LED unit



#### Change in bracket material



#### ADB lighting circuit



#### Number of LEDs



### Successfully reducing resources through integrated installation Responding to market demand for small size and high output



In response to the market demands placed on LED light sources for small size and high output, we were able to install LED elements within a single package in an integrated manner without any significant loss in efficiency. We also worked to miniaturize the installation size and reduce the area of the installed circuit board, thereby reducing their size by roughly 15% relative to the area of the product's external size. Adopting a structure where the points of light are arranged next to one another produces a light source that can contribute to reducing the size of the system in combination with the external lenses and other parts.

### Conserving energy and improving recyclability by overhauling the structure Reducing the number of screws used and shortening manufacturing times



When it comes to headlamps, improving product performance leads to increasing the number of parts as well as the number of screws used to assemble them. Therefore, through design for the environment, we overhauled the assembled structure to use thermal coupling and coupling to fasten multiple parts together, thereby reducing the number of screws used. This reduced CO<sub>2</sub> emissions by shortening the manufacturing time per product, while also leading to improvements in recycling by boosting the efficiency of segregating parts.



## Design for Environment

### Life Cycle Assessment (LCA)

#### Promoting design for the environment through the use of a checklist

In order to promote the manufacture of products designed for the environment we use our Design for Environment Guidelines and apply them to the full range of our product design. We perform evaluations through the use of checklists in order to reduce our impact on the environment to the extent possible.

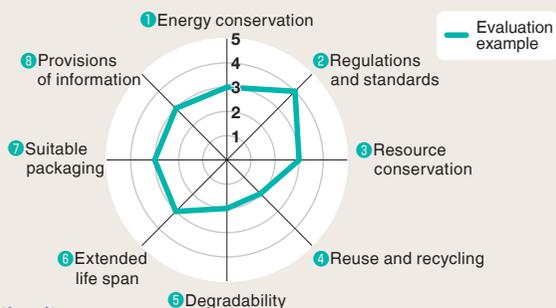
Our approach to evaluating these is to use an eight-item checklist that includes: ① energy conservation, ② regulations and standards, ③ resource conservation, ④ reuse and recycling, ⑤ degradability, ⑥ extended life span, ⑦ suitable packaging, and ⑧ provisions of information. Our designers personally quantify and evaluate these in an effort to improve our environmental friendliness.

What is more, our checklists allow us to determine the CO<sub>2</sub> emissions given off in every step from the selection of the raw materials to the manufacturing of the product and its delivery to customers.

#### Overview of the Evaluations

##### Evaluations via Checklists

As indicated in the figure on the right, we perform quantitative evaluations for different items on a five-point scale in the aim of creating more products designed for the environment.



##### \* Supplement to the evaluation items

- ② Regulations and standards: We must meet standards like the REACH Regulations and RoHS Directive. But over and above these, we are aiming to meet our own, even stricter, voluntary standards.
- ⑧ Provision of information: We disclose environmental items that warrant attention as stipulated by law. On top of this, we aim to disclose information based on the guidelines of industry associations and the like.

#### Major Initiatives in FY 2016

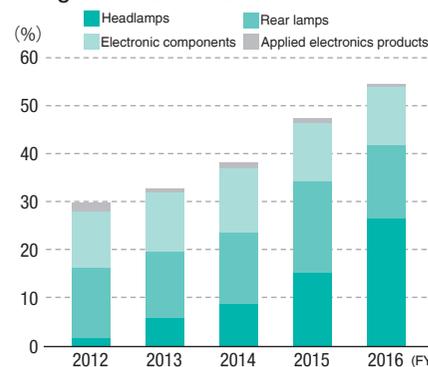
Using the Design for Environment Checklists allows us to evaluate all of our products by the same indicators to determine their strengths and weaknesses. Our domestic group companies have worked to improve their environmental friendliness with respect to the following items.

- ① Energy conservation: Further progress was made in switching to LEDs in our car light products and their power consumption was reduced, thereby reducing the energy consumed at the usage stage.
- ③ Resource conservation: Progress was made in reducing the materials used by combining together different functions, such as for car light products.
- ④ Reuse and recycling: Progress was made in giving consideration to using recycled materials for parts that do not have an impact on quality, and in actually adopting these.

For our overseas group companies as well, in FY 2016 we completed the education provided to our overseas design departments and started having the designers themselves perform evaluations using the checklists. This was done in order to promote the creation of products that are designed for the environment.

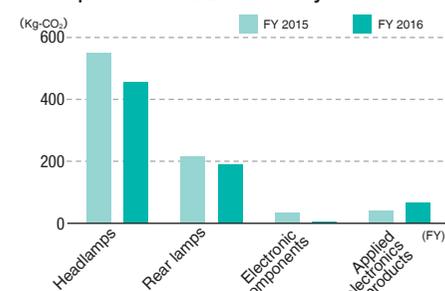
Moving forward, we will continue to advance design for the environment by making greater use of this checklist at the global level.

#### Changes in the proportion of products designed for the environment



The percentage of our sales accounted for by products designed for the environment over the past five years is shown in the above graph. For FY 2016, headlamps using LEDs continued to increase, due to which the sales ratio of products designed for the environment grew, and such products came to account for more than 50% of our products.

#### CO<sub>2</sub> emissions up through the manufacturing of our products and their delivery to customers



The above graph shows the CO<sub>2</sub> emissions for each of our product categories given off in every step from the extraction of the raw materials to the manufacturing of the product and its delivery to customers. Determining the CO<sub>2</sub> emissions for each product leads to boosting the environmental responsiveness of our products.

Comparing the CO<sub>2</sub> emissions for each and every one of our products in FY 2016 with those from the previous fiscal year reveals that these decreased for products other than applied electronics products.

We will continue with our initiatives to enhance design for environment, improve our production processes, and reduce transportation energy, through which we aim to cut CO<sub>2</sub> emissions across the entire life cycle of our products.