

News Release

FOR IMMEDIATE RELEASE

Hitachi Astemo awarded the “Imperial Invention Prize” for invention of a mold sealing structure for high-precision airflow sensors

Tokyo, May 25, 2021 --- Hitachi Astemo, Ltd. received the “Imperial Invention Prize” in the National Commendation for Invention in 2021 hosted by the Japan Institute of Invention and Innovation (JIII). The prize was awarded for the invention of a mold sealing structure for high-precision airflow sensors*.

The airflow sensor is a component to measure the flow rate of intake air to the engine, which optimizes the amount of fuel injected into the engine for efficiency and to reduce CO₂ and emissions. The sensor contains a semiconductor element that detects the amount of air intake. This element, as thin as several micrometers (1 μm: 1/1000 mm), is fixed in place with resin known as an encapsulant, and functions as the detection unit.

Typically, encapsulation is done using a method known as potting, in which liquid resin is injected onto the semiconductor element which then hardens. However, this method can be inaccurate because the thickness of the resin tends to vary. By using a sealing method known as molded resin, in which the semiconductor element is placed, a mold and resin is poured in and the thickness becomes consistent resulting in better measurement accuracy. However, this counter measure leads to other issues such as the resin flowing unnecessarily during sealing, damaging the detection area including the semiconductor elements or blocking the detection area where the incoming air flows.

In response to these findings Hitachi Astemo’s patent, for which it received the Imperial Invention Prize, establishes a sealing technology that prevents resin from flowing into the detection area, including the semiconductor element. By placing guides called “inserts” around the semiconductor element that detects the flow rate and an elastic film around the flow detection area, and by controlling the resin that is poured into the area, it is possible to prevent damage to the flow detection area and the flow of resin into the flow detection area. By encapsulating the semiconductor element with such a molded resin, we have achieved an airflow sensor with higher measurement accuracy than ever before.

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The National Commendation for Invention was established in 1919 to contribute to the improvement of science and technology, and the development of industry by awarding the creators of inventions, devices and designs, as well as those who have contributed to the implementation and encouragement of inventions in Japan.

By providing advanced mobility solutions that improve safety and comfort as well as enhance environmental protection, Hitachi Astemo will increase social, environmental, and economic value to realize a sustainable society, contribute to improved quality of life, and enhance corporate value.

* Patent number 5208099

About Hitachi Astemo, Ltd.

Headquartered in Tokyo, Japan, Hitachi Astemo is a joint venture between Hitachi, Ltd. and Honda Motor Co. Hitachi Astemo is a technology company that develops, manufactures, sells and services automotive and transportation components, as well as industrial machinery and systems. For more information, visit the company's website at <https://www.hitachiastemo.com/en/>

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