



## MES Manufactures Critical H2 Sensor Component for Honda's Clarity Fuel Cell Vehicle – MES

Innovation has long been the hallmark of Honda engineering, production, and design of automotive vehicles. It was no surprise, then, that Honda introduced its hydrogen-cell vehicle, the Honda Clarity, to great fanfare.

*Car and Driver* said that the EV “actually realizes the potential that hydrogen fuel-cell engineers have long worked toward” and that the Clarity “drives just like a battery-powered car.”

So, when it came to needing a highly specialized housing for the hand-built vehicle's H2 sensor, MES stepped in to help.

Here's how we delivered a lightweight yet durable H2 sensor housing, manufactured to Honda's exacting engineering specifications and renowned 120% product quality standards.

### **Application:** High-Stakes, Mission-Critical Hydrogen Sensors

According to Honda, the Clarity uses a two-tank hydrogen system as its main power source. The system holds roughly 120 pounds of hydrogen fuel at high pressure and can accommodate compressed hydrogen at up to 10,000 psi of pressure.<sup>1</sup>

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sensors are located and insulated inside of a die-cast aluminum base housing.

The H2 sensor and corresponding housing are, of course, safety critical. Even the slightest defect in the sensor housing could lead to failure, so Honda needed a Tier 1 manufacturing supplier to provide a precision-manufactured insulative component.

The base sensor (part number 3F711 6GS) component needed to be

**Lightweight** enough to support fuel efficiency

**Robust** enough to withstand high pressures without leaking

**Precision** aluminum gravity diecast

**Machined to exacting specifications** (holes, dimensional tolerances, textures)

“Honda was looking for a component that could house the H2 sensor, be lightweight and not add excessive weight, and still have the durability to pass crash testing,” explains MES Senior Engineer Dave Skeens. “MES has a well-vetted, global supplier network, so we were able to source this project with a supplier that had previous experience with safety-critical automotive parts. In addition, MES and our supplier developed special packaging to protect the part from damage during shipping.”

## The Challenge: Overcoming Manufacturing and Tolerancing Hurdles

Unlike traditional automotive components, which can be quickly pushed into mass production, Honda follows a multi-stage development process with multiple New Model Reviews (NMR). Each review phase requires the part to show progressive improvement, making iterative design and testing a must.

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Honda employs a methodology they call Honda Engineering Standard (HES) for dimensional tolerancing. This methodology goes above and



was crucial.

“The part cannot have any leakage when assembled,” says Skeens. “So our teams performed radiographs to demonstrate no porosity in critical areas. Plus, we did elongation material testing to ensure that the part would pass crash tests.”

## **The MES Solution: Precision Engineering & Manufacturing Excellence**

With specifications in hand, MES iterated through development, proved the part, and delivered to our customer’s expectations. Our teams considered everything from material to machining to safety to packaging. The result is a high-quality, consistently manufacturing EV component.

### **Gravity Die Casting**

To achieve the required balance of lightweight strength and durability, MES selected aluminum gravity die casting to ensure:

High structural integrity with low porosity for leak prevention

A lightweight yet strong manufacturing material, essential for hybrid vehicles

Cost-efficient scalability for low-volume, hand-built production

### **Specialized Supplier**

MES leveraged its global supplier network to source an experienced manufacturing partner in India because the supplier was:

Experienced in manufacturing safety-critical automotive

Highly collaborative with the MES team and the customer

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## Rigorous Quality Testing

To ensure compliance with Honda's HES tolerancing system, MES and its gravity diecasting supplier implemented:

- CNC precision machining for exact surface finishes

- Leak testing to confirm zero escape points

- Radiographic analysis to detect internal defects

- Elongation material testing to validate crash resistance

## End-to-End Project Management

In keeping with our mission to deliver agility, flexibility, and resiliency, MES provided comprehensive project oversight from design to delivery, including:

- Sourcing & Supplier Management

- Quality Control & Compliance

- Global Logistics & Secure Packaging

## The Results: A High-Precision Solution for a High-Stakes Application

From flawless engineering to safety compliance to efficient production processes, this project highlights the importance of strategic partnerships in achieving next-generation automotive solutions.

"Honda engaged with MES because of our global supplier network, experience in precision aluminum diecasting, and our ability to collaborate seamlessly with their iterative manufacturing processes and industry-leading quality methodology," says Skeens. "What made the project a real success, though, was collaboration with our customer,

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## Conclusion: A Model for Future Automotive Innovation

As the automotive and e-Mobility industry continues to push the boundaries of EV and hydrogen technology, MES remains committed to delivering engineering excellence, manufacturing precision, and end-to-end project management for cutting-edge automotive applications.

Here are the top 3 lessons learned from this project and partnership:

### 1. Collaboration is everything

. Working closely with Honda at every phase ensured smooth and seamless engineering, development, manufacturing, and quality processes.

**2. Attention to detail matters.** Since small tolerancing variations could impact part functionality, precision manufacturing and machining was crucial.

**3. Planning combined with being flexible is key.** MES continually demonstrated its expertise in planning ahead and delivering on time while also demonstrating flexibility in adapting to Honda's specialized tolerancing approach.

To learn more about the MES way or to explore how MES can help with your next project, contact us today.

H2 Sensor Base (Housing) Specifications At-a-Glance

**Application:** Hydrogen motor

**Type of material/metal:** Aluminum

**Process:** Gravity diecasting

**Component dimensions:** 3.5" x 3.5" x 2"

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machined mounting surfaces. Mounting surfaces required Rz 25 surface finish.

**Aesthetic considerations:** No scratches or damage in machined areas

**Other specifications:** Material must meet elongation and elongation specifications.

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## References

1 HondaiInfoCenter.com. Clarity Fuel Cell:

<https://www.hondainfocenter.com/2021/Clarity-Fuel-Cell/Feature-Guide/Engine-Chassis-Features/Hydrogen-Tank-System/>

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