

## **Mechanically Robust Stacks For Solid Oxide Fuel Cell Applications**

Delphi Automotive Systems, LLC

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Delphi Automotive Systems, LLC is developing mechanically robust cells and stacks for solid oxide fuel cell applications. Stacks for all SOFC applications need to be robust to stresses from shipping, handling, system assembly and maintenance, and other sources of mechanical stress over their lifetimes. Specific to SOFC auxiliary power unit transportation applications, stacks need to be robust to vibration and shock levels consistent with heavy duty truck usage. To confirm the robustness of the stack design, Delphi has conducted ambient temperature vibration and dynamic shock testing.

Vibration testing of a stack in three axes, per Mil Std 810G, "Truck and Transportation over U. S. Highways", has demonstrated repeatable stack electrochemical performance out to 3.75 million miles of equivalent operation. Dynamic shock testing of stacks, per schedules developed from instrumenting real-world Class 8 trucks over a variety of road surfaces, has demonstrated repeatable stack electrochemical performance to a 4 year/1 million mile equivalent lifetime for a 96th percentile driver.