ACT Expo Pre Blog -

**Title**: **Cummins Engine Components to Showcase New E-Compressor, and Hydrogen Loop BOP (Balance of Plant) Products at ACT 2024**

Cummins Inc. is gearing up to showcase its latest e-compressor and hydrogen loop BOP products at the ACT (Advanced Clean Transportation) Expo in Las Vegas, NV, from May 20 to 23, 2024. This year, Cummins Engine Components will introduce several new products and technologies, including the newly launched e-compressor and hydrogen loop BOP components, reinforcing its position as a leading manufacturer of components for Zero-Emission Vehicles (ZEVs).

Cummins has a rich history in turbomachinery and fuel system development, accumulating significant experience in product design, testing, and validation. This wealth of experience has been instrumental in the development of adjacent products tailored for fuel cell engines, boasting customized design and enhanced efficiency.

**First E-Compressor for Fuel Cell Engine**

One of the highlights of Cummins' showcase is the 650V e-compressor for fuel cell engines, launched in February 2024. This e-compressor represents a significant advancement in Cummins' commitment to lead the industry towards a decarbonized future.

The e-compressor boasts several key characteristics, including low noise, high speed, and high efficiency. It features a 45kW high-speed motor with a maximum design speed of 110,000 rpm, making it suitable for use in 150-200 kW and 240-260 kW fuel cell engines with turbine energy recovery.

Notable features and advantages of the e-compressor include:

* Low-inertia rotor design for faster start-up and improved acceleration performance.
* Full-blade impeller design for noise reduction and smoother operations, achieved by lowering the frequency of blade pass noise.
* High-efficiency aerodynamic design that utilizes less energy and improves fuel economy, leveraging Cummins' extensive development experience.
* Low-thrust loading wheel design for smoother rotation and higher reliability, achieved through optimized impeller sizing.
* The e-compressor also features a robust containment design, providing larger design margins from containment testing and enhancing product safety during operation.

**Innovations in Fuel Cell Ejector and Injector**

Cummins will also showcase hydrogen loop BOP (Balance of Plant) products, including the fuel cell ejector and injector.

**FC Ejector**: The ejector is designed to recirculate unused hydrogen from the fuel cell stack, enhancing efficiency and protecting the fuel cell membrane from damage. It is tailored for heavy-duty commercial on-highway applications with a system power of 180kW. The ejector design leverages Cummins' Fuel Systems design expertise and is optimized using a suite of simulation tools. Paired with a fuel recirculation blower, the ejector improves fuel cell module efficiency and component durability. Moreover, the design is scalable for various fuel cell power ranges.

**FC Injector**: The injector supplies fresh hydrogen to the fuel cell stack, where it reacts with oxygen to generate an electrical current. Designed for heavy-duty commercial on-highway applications with a power range of 120-300kW by integration different quantity of injectors, the injector offers precision control of hydrogen to meet customer duty cycle demands. It shares commonality with Cummins' natural gas injector, allowing the use of an established supply base. Additionally, the injector leverages Cummins Fuel Systems expertise on regulator and actuator to enhance the core development capabilities of in-house solenoid design.

**Interactive Virtual Display**

In addition to the physical components, Cummins will feature an interactive display at its booth, showcasing four key components: the ejector, e-injector, e-compressor, and e-turbo. This display will allow visitors to virtually tour a fuel cell engine while highlighting the flows and interactions with the components. The interactive display offers a unique opportunity for attendees to engage with new technologies in a hands-on, immersive way. Through this interactive experience, visitors can gain a deeper understanding of Cummins' innovative products and their role in advancing clean transportation.

Cummins' participation in the ACT Expo 2024 underscores its commitment to driving the transition to clean, efficient, and sustainable transportation solutions. Visit Cummins at West Hall, booth number 2230/2231 at the ACT Expo to learn more about its latest innovations in e-compressors, fuel systems, and more.