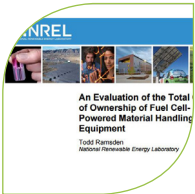


NUVERA®



Qualifications and Experience for Forklift Operations

Nuvera is the first fuel cell company to have joined the Industrial Truck Association, and was among the early leaders to introduce fuel cell solutions in materials handling.



From top: Fuel cell power and hydrogen supply products in deployment. Participation in DOE fuel cell trials for materials handling. 2009 commercial shipments of PowerEdge® fuel cell systems.

Early commercial deployments of Nuvera® products at customer sites such as H-E-B Grocers and the Department of Defense's Defense Logistics Agency helped address the technical, operational, and economic hurdles that a new technology faces when entering an industry with long-established incumbent technologies. Nuvera's contributions to the materials handling industry include fuel cell stack technology to meet the durability and efficiency demands of materials handling, cost-effective hydrogen generation products, and demonstration of the productivity gains hydrogen fuel cell solutions offer.

In recent years, the market for forklift fuel cell power systems has been established through the adoption by giants in retail, food distribution, and manufacturing sectors such as Walmart, Sysco, and BMW. Now part of the Hyster-Yale Group, Nuvera has begun deploying the next generation of drop-in power alternatives. More than ever, Nuvera is positioned to deliver the most comprehensive all-in fuel cell solutions.

The fuel cell power and hydrogen supply experience of Nuvera includes truck manufacturer engagement and validation, technology innovations spanning the hydrogen value chain, codes and standards development, customer deployments, and service.

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Making hydrogen make sense.

QUALIFICATION HIGHLIGHTS

CUSTOMER DEPLOYMENTS of Nuvera® fuel cell systems, hydrogen generators and fueling stations. As of 2017, Nuvera has provided more on-site hydrogen generation installations for materials handling facilities than any other company in the U.S.

PROPRIETARY FUEL CELL DESIGN that features unique metallic bipolar plates and an open flow field architecture for superior shock resistance, and increased output and efficiency.

EXTENSIVE ON- AND OFF-ROAD VEHICLE EXPERIENCE that drives Nuvera® fuel cell development, including fuel cell cars and trucks, a mining locomotive, a fuel cell tractor, a fuel cell rail car for Japan Railways, and an ice resurfer, in addition to multiple forklift deployments.

PARTICIPATION IN FUEL CELL TRIALS FOR MATERIALS HANDLING and evaluation by the National Renewable Energy Laboratory in a technical report analyzing the Total Cost of Ownership of Fuel Cell-Powered Material Handling Equipment. The 2013 report verified productivity gains achieved with fuel cell-powered forklifts.

TECHNICAL CONSULTATION with the experience of Nuvera's participation on the Technical Advisory Committee for Hydrogen Powered Industrial Trucks (HPIT) advising the Department of Energy (DOE).

FORWARD THINKING R&D, such as the development of a fuel cell system for transport refrigeration to help capitalize on hydrogen investments with synergistic hydrogen opportunities at food distribution centers encompassing lift truck, refrigerated trailer, and automotive fleet power.

INDUSTRY ENGAGEMENT including a board of directors position on the California Hydrogen Business Council (CHBC), a chair position with the Fuel Cell & Hydrogen Energy Association (FCHEA), and a chair position on the Canadian Standards Association (CSA) committee for hydrogen-powered industrial truck (HPIT) dispenser codes and standards development.

DISCOVER MORE
www.nuvera.com/experience