

Dynetek Insider

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fall 2006

UPCOMING EVENTS:

California Clean Vehicle Technology Expo
October 10-11, 2006
Ontario, CA
USA

Association of School Bus Officials
October 13-16, 2006
Pittsburg, PA
USA

Marine CNG Standards Forum
November 7-9, 2006
Newfoundland
Canada

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INDUSTRY NEWS - Joint Industry Project:

Dynetek Supply Compressed Natural Gas Fuel Storage Systems for Demonstration Bus Project in New Delhi, India.

Dynetek Industries Ltd. ("Dynetek"), a leader in developing, producing and marketing lightweight compressed natural gas (CNG) storage systems and compressed hydrogen storage systems, announced today the signing of a sub-project agreement with ATF Advanced Technologies & Fuels Canada Inc. (ATFCAN), to supply six CNG fuel storage systems, including related engineering and on the ground support to Tata Motors Limited of India. ATFCAN funding, made available from the Government of Canada's Technology Early Action Measures Program, will contribute towards Dynetek costs for the project.

Dynetek's CNG fuel storage systems will be used to launch the CNG bus demonstration project in New Delhi. The six buses in this demonstration project will feature advanced CNG engines from Cummins Westport Inc. of Vancouver, and Dynetek's Advanced Lightweight Fuel Storage Systems. Work on this project will begin immediately and the demonstration buses are expected to start rolling in the fall of 2006.

"We are pleased to be working with Tata Motors and our Canadian project partners on this demonstration bus project in India," said Robb Thompson, Dynetek's President and CEO. "This project provides an excellent opportunity for our industry to showcase our leading CNG technology for public transportation."

"This new partnership with Tata

Motors is an important step for ATFCAN as well as for Dynetek and Cummins Westport" said Rodney Semotiuk, President and Chief Executive Officer of ATFCAN. "Tata Motors is one of

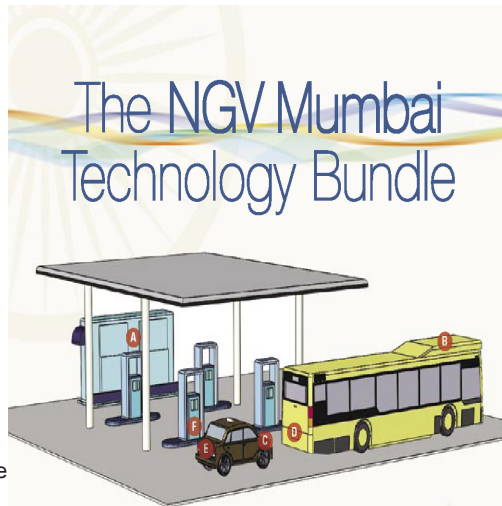
emissions, higher fuel efficiency and reliable performance.

Dynetek Industries Ltd. designs, produces and markets one of the lightest and most advanced fuel storage and refueling systems for compressed natural gas, low emission vehicles and compressed hydrogen, zero-emission fuel cell vehicles. Dynetek is recognized around the world for its solutions-of-choice to the alternate fuel vehicle sector, evidenced by strategic relationships with major manufacturers around the globe. Dynetek is listed on the Toronto Stock Exchange, symbol: DNK.

ATFCAN designs and delivers clean energy projects in international markets. A not-for-profit corporation, it was established in 2003 to address the energy needs of new markets and the requirements for more environmentally friendly, sustainable methods of power generation for mobile and stationary applications.

Established in 1945, Tata Motors is India's largest and only fully integrated automobile company. Tata Motors

began manufacturing commercial vehicles in 1954 with a 15-year collaboration agreement with Daimler Benz of Germany. Since 1969, the company's products have come out of its own design and development efforts. Today, Tata Motors is India's largest commercial vehicle manufacturer with a 59 percent market share and ranks among the top six manufacturers of medium and heavy commercial vehicles in the world.



Canadian Project Partners



the principal economic partners in India who is trying to raise the bar and introduce significant new CNG technology to India."

This demonstration bus project will replace current engines and fuels with the new lean-burn CNG engines and Dynetek's fuel storage systems, which are more than 60% lighter than standard steel cylinders, which translates into a higher storage capacity, extended driving range, substantially lower

IN THE NEWS:

4 years of successful cooperation between Elgin Sweeper Company, Elgin, Illinois and Dynetek Industries

LEGISLATION UPDATES:

NEW TO CNG?

Contact Dynetek's sales department for assistance regarding your states incentive programs for alternative fuel vehicles.

Simply send your inquiry via e-mail to: info@dynetek.com and our sales professionals will gladly assist you with the potential programs and incentives available in your state.

Elgin Sweeper Company is a sweeper manufacturer, whose head office is located in Elgin, Illinois. Dynetek has been working together with Elgin now for 4 years and supplies Elgin with fully integrated fuel storage systems for the CNG Elgin sweepers.

The fuel storage system consists of Dynetek cylinders which are fully integrated into the truck body. The result is a sleek design which looks similar to the sweepers on the road today.



The Elgin Broom Bear, one of the most rugged and efficient mechanical sweepers on the market today, is powered by the state of the art Cummins 8.3G+ natural gas engine making the Broom Bear a fully EPA/CARB/ULEV certified single engine street sweeper. With it's 3600 PSI composite fuel tanks from Dynetek, the Broom Bear has a generous 53 diesel gallon equivalent fuel capacity giving a sweeping range even beyond the standard diesel Broom Bear.

Technical data
Fuel Storage System:

- 53.2 gallon Diesel equivalent
- 7280 scf total gas capacity
- 3600 PSI nominal service pressure
- High flow CNG filter with coalescing and particulate elements.
- Meets all North American NGV system standards.



PRODUCT PROFILE: Fuel Storage System for Transit

Dynetek Industries Ltd. designs and manufactures lightweight fuel storage systems used in low and high floor transit and shuttle buses fueled by compressed natural gas (CNG) or compressed gaseous hydrogen (H2).



Dynetek Fuel Storage System Features and Benefit:

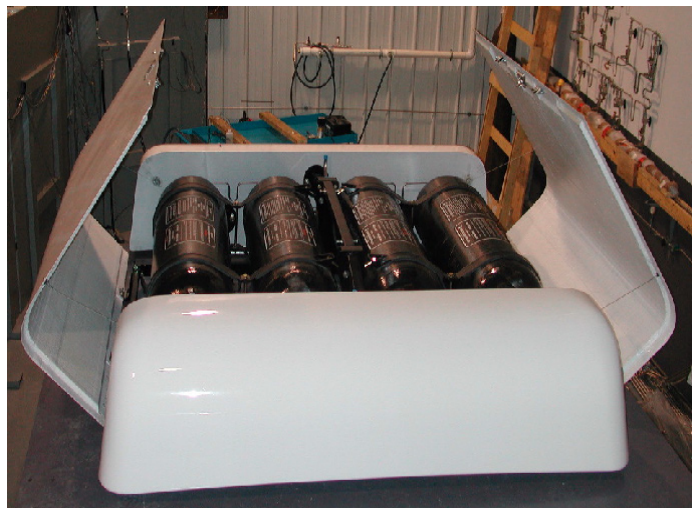
FEATURES	BENEFITS
Lightweight Fuel Storage Systems	<ul style="list-style-type: none"> • High strength-to-weight ratio. • Reduced Gross Vehicle Weight (GVW). • Easy inspection and maintenance. • Maximizes on board fuel. • Potential for increased passenger loads.
True Fast Fill	<ul style="list-style-type: none"> • Maximum fill pressure achieved. • Extended driving range. • Efficient fleet operation.
Drop-In-Place Installation	<ul style="list-style-type: none"> • Assembly line ready providing time efficient installation. • Custom moulding points to accomodate individual bus designs.

Through its state-of-the-art manufacturing facilities and commitment to quality management, customers receive products and services of consistent quality that meet their requirements.

A world leader of storage systems for alternative fuel vehicles, Dynetek's systems and components are certified to and compliant with international industry standards.

The unique storage advantage of the Fuel Storage Systems lies in the use of Dynetek's DyneCell® cylinder made from a seamless, thin wall aluminum liner covered with a full carbon fibre overwrap. DyneCell cylinders are extremely lightweight, non-permeable, and exhibit limited expansion under pressure and temperature change.

The Dynetek fuel storage system for transit is designed to accommodate unique bus requirements. Fuel storage systems are assembly line ready, and designed for ease of access for maintenance and cylinder inspection, while providing operators with dependable, long-term performance and extended driving range.



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COMMENTS FOR THE EDITOR?

Is there a topic or product of interest you would like to learn more about?

If so, please feel free to contact Dynetek's newsletter editor with your feedback or requests:

editor@dynetek.com

Dynetek now offers a standard 20 year life with all NGV-2 2000 250 bar cylinders !!!



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R&D UPDATE:

Safety in Strength

By: Mark Duncan P.Eng., Cylinder Research and Development Manager

Ensuring adequate and reliable burst performance for high-pressure, composite storage cylinders addresses the primary safety concern of burst during operating life of a cylinder. In establishing an appropriate burst factor there are a number of key considerations. These considerations include: operating pressures, laminate properties and results of performance testing.

The operating pressure for a vehicle storage cylinder is defined as the Service Pressure at a settled temperature. For example, the NGV2 standard for natural gas vehicle fuel containers defines a Service Pressure of 200 bar at 21 °C. To allow for complete filling a maximum gas temperature and pressure are established. For example 250 bar and 57 °C for NGV2 cylinders. The logic being that the internal gas pressure and temperature will settle back to the defined Service Pressure upon cooling. Service Pressure is the reference point for gas pressure and temperature, and is therefore the logical basis for establishing minimum burst pressure requirements.

The strength-limiting characteristic of a composite cylinder is stress rupture of the laminate. Stress rupture is a property of the particular type of fiber reinforcement, and describes the force as a function of time to cause fiber rupture. Carbon fiber is known to have very good stress rupture characteristics and from experimental data¹ will sustain greater than 45% of its rated strength for 10,000,000 hours (over 1,000 years) with high reliability (99.9999%). In comparison fiberglass can only be loaded to approximately 25% of its rated strength to yield similar performance.

Fiber Stress Ratio is the stress in the fiber at Design Burst Pressure divided by the stress in the fiber at Service Pressure. Logically, the fiber stress at Service Pressure should be kept below 45% of the fiber stress at Design Burst Pressure (or a Fiber Stress Ratio of around 2.22). The NGV2 standard is more conservative and has set a minimum fiber stress ratio of 2.25 for carbon fiber composite cylinders.

Cylinder testing is an important part of proving a cylinder design. Cylinder burst strength must be demonstrated by at least three design qualification tests and by burst tests for each batch of cylinders produced. Each burst test must demonstrate an actual Burst Pressure to Service Pressure ratio exceeding 2.25.

Dynetek Industries Ltd Type 3 cylinders are designed and tested in full accordance with governing standards and are witnessed and approved by certifying bodies such as TUV. Actual burst pressures exceed the requirements of standards and typically provide actual Burst Pressure to Service Pressure ratios of 3.0.

References:

1. E. Y Robinson, Design Prediction for Long-Term Stress Rupture Service of Composite Pressure Vessels, Aerospace Report No. ATR-92(2743)-1, The Aerospace Corporation, 1 December, 1991.