
PRESS RELEASE

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Saft Li-ion battery system powers Kalmar Motor's world-first hybrid electric tractor for wide body aircraft

- *Kalmar Motor's TBL 800 eSchlepper hybrid tractor to commence real-world test programme with Lufthansa LEOS at Frankfurt Airport in January 2015*
- *Effective energy storage provided by Saft's SLFP™ Li-ion battery system enables new generation hybrid tractor to achieve more than 50 percent reduction in fuel costs and greenhouse gas emissions*

Las Vegas, October 14, 2014 – Kalmar Motor AB, the aircraft tractor specialist, is currently completing construction of the world's first hybrid electric tractor designed specifically for wide body aircrafts – the TBL 800 'eSchlepper' – ready for its real-world test programme to commence with Lufthansa LEOS in January 2015. This hybrid tractor, which combines a state-of-the-art Saft lithium-ion (Li-ion) battery system with a diesel engine, is being deployed at Frankfurt Airport in Germany for evaluation of its performance and life cycle costs compared with conventional ground handling tractors.

This development is part of the "[E-PORT an](http://www.e-port-on.com/)" <http://www.e-port-on.com/> project, focused on electromobility at Frankfurt Airport. Partners in this initiative include the State of Hesse, Fraport AG and the Rhine-Main Electromobility Model Region. The initiative aims to implement electromobility projects of the future in order to make aircraft towing and surface traffic as environmentally friendly as possible. The construction of the 'eSchlepper' TBL 800 tractor is funded by the German Ministry of Traffic and Digital Infrastructure and administered by the National Organisation Hydrogen and Fuel Cell Technology NOW.

Kalmar Motor has developed the new generation hybrid TBL 800 eSchlepper to enable airports to reduce their reliance on diesel-driven tractors, helping to address growing demands for lower environmental emissions while significantly reducing running costs. Quiet and emission-free hybrid tractors also offer interesting new possibilities for operating inside buildings, such as workshops and hangars.

Saft's Li-ion battery system powers the TBL 800's electric drive on a 24/7 basis. Saft's patented iron phosphate technology (SLFP™) has been selected for its fast-recharging capability facilitating regenerative braking as well as charging during break periods. The 740 V battery system offers excellent energy storage capacity with continuous power capability as high as 100 kW in charge and 400 kW in discharge.

The TBL 800 has its own onboard charger, so it simply needs to be hooked up to an electric point in the tractor parking area or workshop. The diesel engine is used only for charging, to ensure that the battery never becomes fully discharged, and is expected to run for less than 30 percent of the time.

"It is absolutely critical for our airport tractors to deliver the total reliability and full availability that keeps life cycle costs to a minimum, even when running round the clock in extremely hot or cold temperatures. There could be no compromise on any aspect of the quality and robustness of the components and subsystems for our new generation hybrid TBL 800. That's why we specified Saft Li-ion



batteries that have a field-proven track record for reliability and long service life”, says Magnus Johansson, Sales Director, Kalmar Motor AB. “A further major advantage for us was Saft’s unique in-house capability to span the battery supply chain from manufacturing the cells to delivering a fully integrated battery system.”

TBL 800 to carry out a number of ground handling roles

The TBL 800 will be tested in various roles at Frankfurt airport. These include towing aircraft to and from their hangars for maintenance over distances up to 7 km one way, as well as pushback operations for A380 aircraft, weighing up to 569 tonnes when fully laden.

Test programme to establish true potential for major savings in fuel costs and emissions

A key aim of the six-month test programme is to collect real-world information to establish the total cost of ownership (TCO) credentials of the new hybrid electric tractor. Kalmar Motor has incorporated experience from its smaller hybrid tractors into models indicating that the TBL 800 will reduce fuel usage costs (compared with a conventional tractor) to Euro 17 per hour from Euro 40 per hour. Maintenance costs, even allowing for scheduled battery replacements, should also be lower, at Euro 15 per hour against Euro 20. Over a typical 2,500 hours per year usage, this represents a potential saving of Euro 70,000 per vehicle.

A further major benefit is that greenhouse gas (CO₂) emissions will be more than halved by the hybrid tractor at 169,000 tonnes per year – down from 355,000 tonnes per year. The service life of the Saft Li-ion battery system will depend on the specific usage of the hybrid tractor, but is estimated to be around 8 years.

About Saft

Saft (Euronext: Saft) is a world leading designer and manufacturer of advanced technology batteries for industry. The Group is the world’s leading manufacturer of nickel batteries and primary lithium batteries for the industrial infrastructure and processes, transportation, civil and military electronics’ markets. Saft is the world leader in space and defence batteries with its Li-ion technologies which are also deployed in the energy storage, transportation and telecommunication network markets. More than 3,800 employees in 18 countries, 14 manufacturing sites and an extensive sales network all contribute to accelerating the Group’s growth for the future.

Saft batteries. Designed for industry.

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