FiTS2: ABB's Flexible integrated Turbocharging System for large two-stroke engines

With FiTS2, operators of large marine applications running on two-stroke engines can benefit from maximum fuel savings at part and low load while maintaining highest flexibility to go to full output immediately.

ABB's Flexible integrated Turbocharging System for large two-stroke engines offers significant economic benefits for vessel operators and charterers, with potential cost savings of up to 3 percent, depending on load profile. As a proven technology designed by industry experts, FiTS2 assures maximum fuel savings at part and low load, with flexibility to go to full engine output immediately.

The FiTS2 advantage

FiTS2 is a complete, integrated turbocharging system. It comprises sequential turbochargers of different specifications and wide compressor maps. Two or more turbochargers act to complement each other's air delivery at different engine loads. Specially developed FiTS2 tuning software controls the turbochargers. Dedicated valves that can operate under full load deliver unprecedented fuel savings and unmatched flexibility.

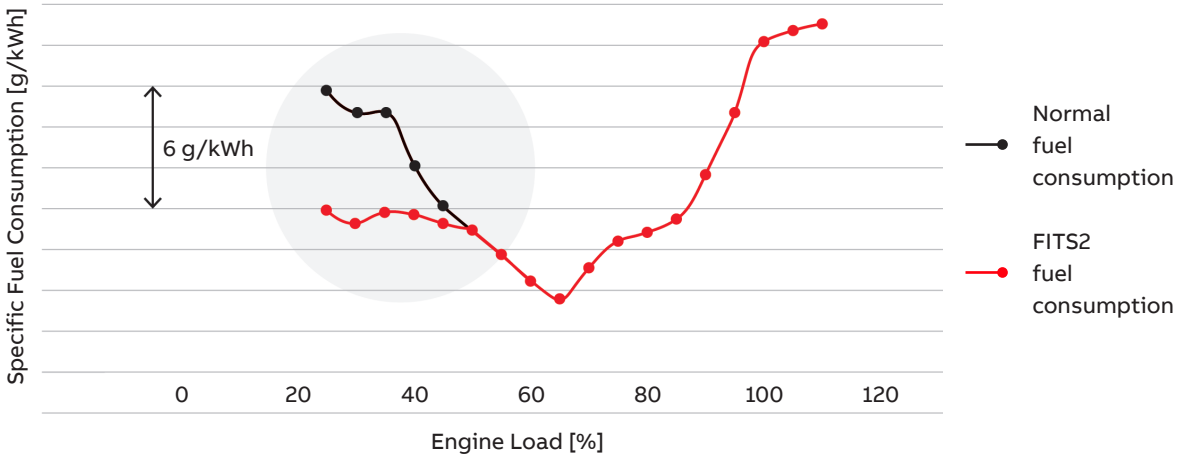
Cost savings for sustained efficiency

Reflecting a commitment to ensure the continued value of ABB turbochargers in the long term, FiTS2 delivers both direct and additional indirect fuel savings. Fuel savings of up to 6 grams per kWh are achievable on the main engine. This is around 3 percent compared to fuel consumption levels typical of conventional turbocharging systems on low-speed diesel engines.

FiTS2 has been engineered to deliver additional fuel savings through a lower auxiliary blower switch-off point. Conventionally, this is at 35 percent of engine load. FiTS2 introduces it at 25 percent. This saves energy and ensures IMO Tier II limit compliance for emissions performance. Reducing the need to use auxiliary blowers in slow-steaming conditions means fewer operational hours, with lower maintenance costs.

FiTS2 benefits

Big benefits	• A significant **fuel reduction of up to 6gr/kWh** in part and low load • Potential cost savings **of up to 3%**, depending on load profile • **Dynamic turbocharger cut out under load**, with no interference to normal engine operation • Additional savings: slow steaming without auxiliary blower. Switch-off point already at ~25% load (instead 35% load)
Setup	• Integrated solution with the engine through **special tuning, and with automated full sequential turbocharging** • Turbocharger configurations **optimized for sequential turbocharging** (engines with 2 or 3 turbochargers) • The Engine Control System **automatically switches** turbocharger cut out valves **under engine load** • Full potential of FiTS2 achieved by means of **optimized engine tuning**
Further details	• FiTS2 is fully compatible with IMO Tier II and IMO Tier III solutions



The gains made with FiTS2 at engine loads below 50 percent. Higher efficiencies are possible with one turbocharger switched off.

Optimized flexibility for ultimate control
By increasing flexibility offered to marine operators, FiTS2 delivers greater control over load and engine output. FiTS2 advances the control and synchronization of an engine and turbochargers. ABB's engineering ensures a smooth transition when a turbocharger is switched on or shut down. This is critical for engine operation. In turn, this assures the ability to increase engine power rapidly, moving from slow-steaming to full power when required, both seamlessly and without disruption.

The operator can rapidly – and safely – adapt the engine's performance to suit conditions: slow-steaming to save fuel, and faster steaming to meet contractual requirements, all without compromising on performance. This ability to increase engine power quickly is one of the clear benefits of FiTS2. Turbocharger response and rapid valve operation make this possible.

Correct matching ensures optimized efficiency at all loads and good engine response to load demand changes. Each unit has a compressor and turbine stage matched to engine requirements at defined operating points, including considering operation with and without the controlled turbocharger running. The best thermodynamic matching of individual turbochargers to engine requirements is critical, and this remains an important feature of the FiTS2 concept.

Trusted technology from industry experts
FiTS2 has been engineered for excellence. It was developed by ABB Turbocharging and WinGD, a leading two-stroke engine manufacturer, with testing in collaboration with engine designers assuring reliability. The system set up is straightforward, with FiTS2 requiring a compact installation for vessel operators and charterers.

As an original equipment manufacturer (OEM), ABB is writing the future of industrial digitalization, and continuing a history of innovation spanning more than 130 years. ABB Turbocharging is committed to providing marine customers with products, such as FiTS2, that exceed their expectations and support efficiency and flexibility for premier performance long-term.

Subject to fuel prices and the load profile of an engine, a very large crude carrier (VLCC) could see fuel savings of $US500,000 in 10 years, and well over $US1 million for a container vessel.

ABB Turbo Systems Ltd
Bruggerstrasse 71 a
CH-5401 Baden/Switzerland
Phone: +41 58 585 7777
Fax: +41 58 585 5144
E-mail: turbocharging@ch.abb.com

abb.com/turbocharging

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