

ENERGY  
ENVIRONMENT  
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## INTELLIGENT COMBUSTION MONITORING FOR TWO-STROKE DIESEL ENGINES



Wärtsilä Intelligent Combustion Monitoring for two-stroke diesel engines is a comprehensive system for continuous engine performance measurement and monitoring, based on the sophisticated technology of the well-known ABB Cylmate® system. A unique combination of measurements of cylinder pressure and crankshaft position in combination with advanced mathematical modelling of the engine provides highly accurate, real-time data for monitoring and diagnostic analysis.

The quality of the data ensures a significant benefit from improved reliability, reductions in operating costs and minimizing off-hire costs.

With the Intelligent Combustion Monitoring you will get the key knowledge for obtaining optimum and reliable engine performance:

- Performance monitoring 24/7 will detect and identify errors in the engine at a very early stage.
- A “black-box function” will keep track of the history behind the combustion alarms.
- Condition-based maintenance will prolong the life of components and minimize the operating costs.
- An engine in good balance will avoid thermal and mechanical overloads by assuring that the power distribution is equal between the cylinders.
- An optimized engine will make it easier to comply with environmental regulations.

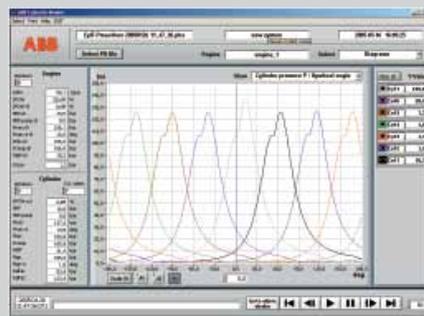
Intelligent Combustion Monitoring is a powerful tool for diesel engine performance monitoring. The combustion pressure is

measured in each cylinder, continuously and in parallel, under all load conditions. The risk of mechanical or thermal overload of individual cylinders or the engine itself can be avoided thanks to the Cylmate analysis and monitoring functions. Further, the cylinder conditions can be optimized and the engine can easily be balanced and tuned in order to improve the running performance. With this system you will reduce the costs for maintenance and fuel – resulting in a short payback time.





The unique cylinder pressure transducer is an integral part of the Intelligent Combustion Monitoring system which provides maintenance-free operation under MTBF of more than 10 years.



Deviations are continuously alarm monitored against performance references. The Cylmate Viewer is the first commercial tool on the market that has all information of the combustion process stroke-by-stroke, before the alarm, at the alarm, and after the alarm. That means it is possible to see the development of a fault and to get understanding of the mechanism that led to the fault.

The unique feature is that every single stroke is measured and used in the data evaluation. This feature makes it possible to identify errors in the engine at a very early stage, and to follow up the running conditions of the engine.

#### SCOPE OF SUPPLY

All parts and deliveries

- Combustion pressure sensors
- Crank angle sensors and brackets
- Controller and operator station
- Cabling, brackets & consumables etc.

Full installation on board from Wärtsilä Services engineers during commercial operation

- 12-24h engine standstill in port for sensor installation on engine side
- Cabling and operator station installation in port or on sea
- Commissioning and verification of the system during sea trial
- On board training for crew

#### OPTIONAL SUPPLY

- Integration possibility to CBM system and expert evaluation and recommendation services by Wärtsilä
- Preparation for later upgrade on RT-flex engines for the "Intelligent Combustion Control" system

- You can protect your main engine by continuous monitoring in order to detect any deviation from recommended running condition according to the performance curves issued by the engine builder. Using the performance curves you can set up load-dependant alarm limits for desired performance parameters. Any deviation from normal performance will be monitored, according to the alarm limits. An alarm will be generated when a monitored parameter value exceeds its alarm limit. The alarm is presented on the alarm page as well as on a digital output, which can be connected to the main alarm system.

#### KEY COMPONENTS

The system consists of a pressure transducer on each cylinder and an angle transducer at the engine flywheel, which all are connected to transducer bus. The controller collects all measured data within each engine working cycle via the transducer bus. A built-in mathematical engine model computes.

The Cylmate system has comprehensive on-screen presentation of all collected data, both current and historical. Alarm, event and trend pages as well as graphic and tabular forms of the engine parameters are available e.g. Pcomp, Pmax,  $\alpha$ Pmax, MIP, Indicated Power, engine speed, SFOC, etc.