WÄRTSILÄ **Engine Services**

ENERGY
ENVIRONMENT
ECONOMY

PERFORMANCE MEASUREMENT SERVICES

Verification of the real performance of a power system is an important issue for the owner of an engine-based installation. The performance parameters can include fuel consumption, power output, noise, temperature and vibration. Optimising these parameters can help to maintain and improve the operational economy of the power system and ensure compliance with existing standards and regulations.

PERFORMANCE PARAMETERS AT DIFFERENT LIFECYCLE STAGES

It is crucial to know the exact performance of the power system at several phases of its lifecycle. During commissioning of the installation, the agreed performance must be verified. The same verification measurements can be used to optimise the installation in case of changes in power production conditions. With the results the owner can make decisions about changes in running profile, or about modifications or upgrades. If the owner decides to upgrade the installation, the same indicators can again be used to verify the effect of the modification.

MEASUREMENT, ANALYSIS, AND RECOMMENDATIONS FOR IMPROVEMENT

Wärtsilä offers a wide range of performance measurements. All of the measurements are done by experienced measurement experts using the latest tools adapted to the actual conditions and requirements. Wärtsilä's network of experts is available worldwide. They report measurement and analysis results, with recommendations for performance improvement, within two weeks.

These performance parameters can be verified:

- Turbocharger efficiency
- Fuel consumption
- Output power of the engine
- Cylinder pressures
- Noise and vibration of the whole installation
- Torsional vibrations
- Pressures and temperatures of the installation
- Thermal scanning for SOLAS compliance and electrical systems
- Engine parameters

KEY BENEFITS

- Verify the performance of the engines in commissioning
- Verify the performance of the engine after major overhauls compared to factory test protocols
- Optimise efficiency and safety of the installation throughout its lifecycle
- Verify the effect of engine and installation conversions and updates
- Ensure accurate result with network of experts using advanced tools and specialised knowledge

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AVAILABILITY

All performance measurements are available for all 4-stroke engines in the Wärtsilä portfolio, both in Marine and Power Plant applications. Most of the measurements are also applicable for other 4-stroke and 2-stroke engines. Torque, stress, temperature, pressure, vibration and noise measurements can be applied for several kinds of installations, even non-engine based cases.

For successful measurements the engines should be run according to a specified measurement programme. This may require different loading and speed conditions as well as shut-downs and start-ups. The required downtimes depend on the installation time of the measurement equipment and must be estimated case by case.

PARAMETERS AND MEASUREMENT METHODS

The time required for installing the measuring equipment depends on the parameter and measurement method. For example, basic vibration measurement does not need any installation time, while full instrumentation of telemetry torque measurement takes about 8 hours per shaft. The time required must be estimated case by case.

Upon completion of the measurement a written Measurement report will be presented including condition statements and recommended actions. Measurement and analyses results are reported within two weeks after completion.

TURBOCHARGER EFFICIENCY

- Pressure and temperature logging unit, “turbobox”

FUEL CONSUMPTION

- Mass-flow meters, possibly one for fuel inlet and one for outlet
- 3-phase electrical power meters
- Strain gauges and telemetry systems

VIBRATION

- Triaxial and single axis accelerometers, also for high temperature
- Non-contact laser vibrometer
- 4-channel handheld FFT analysers
- 8 and 16-channel PC-based FFT analysers

TORSIONAL VIBRATION AND COUPLING TWIST

- Strain gauges and telemetry systems
- Speed pick-ups, magnetic and optical
- Special extension pieces for crankshaft, dedicated for each engine type
- Angle encoders
- Non-contact laser vibrometer for torsional vibration
- 4-channel handheld FFT analysers
- 8 and 16-channel PC-based FFT analysers
- Multi-purpose data acquisition units up to 24 channels

NOISE

- Microphones for free field and in-duct sound pressure
- Handheld real-time 1/3-octave noise analysers
- Handheld FFT analysers
- Sound recorders
- Boompoles

THERMAL SCANNING

- High resolution thermal camera
- Contact thermometers

CYLINDER PRESSURES AND OTHER COMBUSTION PARAMETERS

- Cylinder pressure sensors
- Combustion analysers
- Multi-purpose data acquisition units up to 24 channels

Wärtsilä’s experts report the measurement and analysis results and make recommendations for improving engine performance.

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