

Wärtsilä 46 Performance upgrade – Miller valve timing and TPL76-C8X



To stay competitive in energy-production markets, power plant operators need to maximise plant efficiency. Introducing higher Miller inlet valve timing and upgrading the turbocharger can reduce specific fuel oil consumption (SFOC), improve reliability and reduce both OPEX costs and emissions. Wärtsilä and ABB have jointly developed a performance upgrade package for W18V46 power plant installations equipped with TPL76C turbochargers.

TECHNICAL CONCEPT

The upgrade involves replacing the camshafts to allow for higher Miller inlet valve timing and installing a new TPL76-C8X cartridge to improve the efficiency of TPL76C turbochargers. The combination of earlier inlet valve timing and the new cartridge provides increased boost pressure to the engine while remaining within engine design parameters.

The upgrade reduces maintenance costs by extending the overhaul interval of the turbocharger's rotating parts to 75,000 running hours and resetting the maintenance interval of the camshafts.

The upgrade consists of:

- Engine modification including replacement of Miller camshafts with units that have an earlier inlet valve closure
- Turbocharger modification with a new TPL76-C8X cartridge
- Performance measurements for projects that include performance guarantees.

KEY BENEFITS

- Reduce SFOC by up to 4 g/kWh
- Reduce maintenance costs
- Cut emissions
- Improve lifecycle support
- Increase engine output and reliability





A combined engine and turbocharger upgrade can enable savings that are two to three times greater compared with a turbocharger-only upgrade. In cases where a gas conversion is planned in the future, the upgrade ensures that the required camshafts will already be installed.

SCOPE OF SUPPLY

The upgrade involves replacing the turbocharger's cartridge or specified components based on customer needs and simulations.

Affected settings include:

- Valve timing
- Turbocharger type and/or specification
- Start of injection (SOI, in a range allowed by emission regulations)

We offer the upgrade as a complete turnkey project including:

- All necessary parts
- Installation work
- Modification of the turbocharger
- All needed performance and smoke measurements

Savings example from a W18V46 engine baseload plant

| | |
|-----------------------------------|---|
| Output: | 17550 kW |
| Yearly running hours: | 6500 |
| SFOC reduction: | 4 g/kWh* |
| Total fuel savings: | 456.3 tons (17550 kW × 6500 h × 4 g/kWh) |
| Total yearly cost savings: | €200,772 (€440/ton × 456.3 tons) |

*Savings are greater when replacing an aged turbocharger

WHY CHOOSE WÄRTSILÄ?

As an engine manufacturer, Wärtsilä has extensive experience and expertise in engine and turbocharger technology. We provide a full range of services including parts, services and upgrades.

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