Derating
A vessel’s engine and propeller are optimised and designed for a given operational and max. speed. If the operational speed of the vessel is generally lower than the one originally optimised for, it may be beneficial to consider derating of the main engine and propeller.

Derating as a retrofit product offers reduction of the total fuel consumption by improving the match between the operational speed and optimisation speed.

Derating is usually an attractive option for fuel oil savings if a reduction of 10-15% of the max. speed at SMCR can be accepted. A standard derating calculation made by MAN Diesel & Turbo takes into account the benefit gained from exchanging the original propeller with a new propeller having an optimised diameter designed for the required optimising speed and reduced max. speed.

Saving potential
10-12% fuel saving potential based on new optimisation speed

The above saving is based on a reduction of 10-15% of the max. speed at SMCR.

Fuel saving originates from
- Optimisation of the engine and propeller layout to the actual operational speed
- Utilisation of the latest engine tuning methods
- Utilisation of state-of-the-art high efficiency propeller design.

De-rating benefits
- Reduced SFOC at optimisation load
- New refurbished turbocharger(s)
- Increased overall propulsion efficiency with new propeller
- Less power demand for same vessel speed.
**Derating**

Change of Engine SMCR

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**Derating includes**

In order to change the engine SMCR, a number of engine and turbocharger components must be exchanged along with retrof of a new optimised propeller matching the chosen SMCR.

A derating project includes:

- Specification of new operating/optimisation speed and max. speed of the vessel
- Engineering
- Design of new propeller
- Derating of the engine
- Rematching of turbocharger(s)
- On board NOx measurements (parent engine)
- New technical file
- Torsional vibration calculation report
- Shaft alignment calculation report.

**Price indication**

A rough budget price estimate for derating of an engine and a new optimised propeller is approx. EUR 0.9-3.0 million (5S50MC - 12K98MC) depending on bore size and number of cylinders and turbochargers.

An example of a budget price estimate for a derated 6S70MC, including new optimised propeller is: ~EUR 1.3 million

**Vessel and Engine Specific Study**

In order to clarify the full optimisation potential of an actual vessel (series), it is necessary to carry out a ‘Vessel and Engine Specific Study’, which establishes the optimisation potential and possible tuning methods in detail. The study will cover the actual vessel and possible sister vessels and result in one or more solutions for fuel reduction. As the study is vessel specific, MAN Diesel & Turbo will have to charge an engineering fee to cover the comprehensive calculation and design work involved. If the derating project is ordered based on the ‘Vessel and Engine Specific Study’, the engineering fee will be considered as a down payment and as such be deducted from the project price.

**The Vessel and Engine Specific Study includes**

- Specification of a new operational and max. speed of the vessel
- Full engine derating potential is investigated – one or more solutions are described
- Turbocharger rematching is included
- Propeller performance for new propeller at new rating
- Torsional vibration calculation analysis
- Torsional vibration countermeasures are decided upon, designed and included in the project
- Quotation for engine derating
- Quotation for new propeller.