

Ready for Tier III

EGR retrofit on newbuildings



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MAN Diesel & Turbo




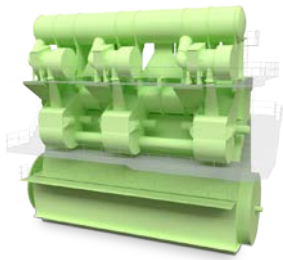
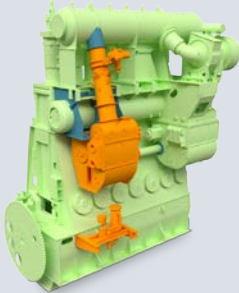
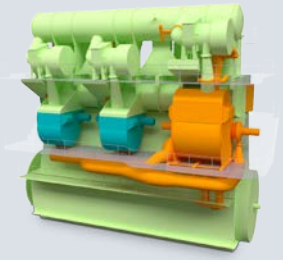
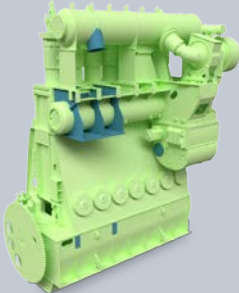
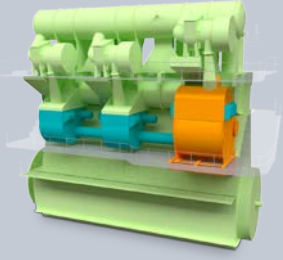
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The current IMO Tier III regulation will apply only to vessels keel laid after January 1st 2016, and as a retrofit installation will be rather comprehensive, MAN Diesel & Turbo has primarily investigated two different EGR Tier III solutions for MAN B&W two-stroke diesel engines.

SMALL BORE

LARGE BORE

Tier II Standard		
Tier III Option 1		
Tier III prepared Option 2		

Along EGR Tier III retrofit concept it is further important to consider along planning of new building:

- Engine room space for EGR sub-systems such as RTU, WTS, SU, NaOH dosing tank, sludge tank
- Ship central cooling system capacity, e.g. central cooler size, FW and SW pumps designed for future EGR Tier III operation
- Design cross-check for aux. power demand and switchboard layout of vessel





OPTION 1:
EGR Tier III DS (Design Specification)

A solution fit for owners who definitely expect to retrofit a solution in the future, but who would like to postpone the first-cost expenses for sub-components.

This solution entails that a parent engine of a certain vessel series is tested and certified as a Tier III engine from start and, subsequently, the components are removed from the (parent and not installed on member) engine(s) and blinding flanges are installed accordingly. This makes retrofit easier and limits certification issues with very limited Tier II SFOC changes, compared to Tier II engines.

OPTION 2:
EGR prepared Tier II DS (Design Specification)

A solution fit for owners who do not know whether retrofit for Tier III is going to be relevant in the future.

This solution only includes making space in the engine room and ensuring tank capacity along with minor modifications to the engine, such as preparing specific faces for more weight and making room for certain valves. This solution would require a major retrofit job. In addition to the cost of the Tier III equipment and its installation, expenses for modification of the engine and T/C components should be included. In conclusion, the engine will need re-certification or technical file amendments for both Tier II and Tier III modes, which calls for a sea trial, onboard survey and class approval.

CEAS Engine Calculations Step 1/9

Engine: 8G70ME-C9.5 DI-TII

Query Date: 2015-04-13

Data Access: External
Internal

IMO Tier Regulation: Tier I
Tier II
Tier III

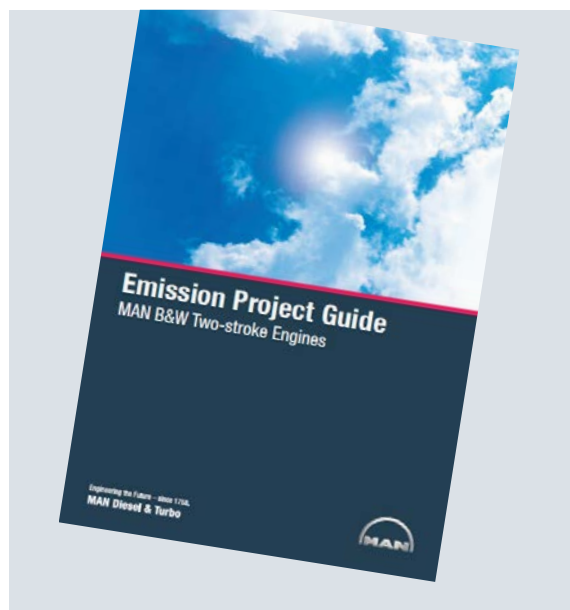
Catalogue: Official Catalogue
Replaced Catalogue

Fuel Injection Concept: Diesel (DI)
Gas (GI)
Gas (GVE)
Gas (LGVP)
Gas (LGM)

Engine Category: ME
ME-B

Engine Type	No Of Cylinders
G45ME-C9.5	5
G45ME-C9.5	5
G50ME-C9.5	5
G50ME-C9.5	5
G60ME-C9.5	5
G60ME-C9.5	5
G70ME-C9.5	5
G70ME-C9.5	5
G95ME-C9.5	5
G95ME-C9.5	5
G120ME-C8.5	5

Visit www.marine.man.eu/two-stroke/ceas to use MAN Diesel & Turbo's engine calculation tool.



The Emission Project Guide will give you further details of system, space and capacity planning.

Based on this EGR Tier III preparation concept paper, MAN Diesel & Turbo is offering the full services required for converting the engine to comply with Tier III requirements for EGR operation.

MAN Diesel & Turbo retrofit project implementation are offered on request to include:

- Delivery of required components for retrofitting
- Installation of components
- Control system update
- Commissioning of EGR system and EGR aux. systems
- Sea trial attendance and required performance and emission measurements
- Re-certification and/ or amendment of original technical file, coordination with class-society

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