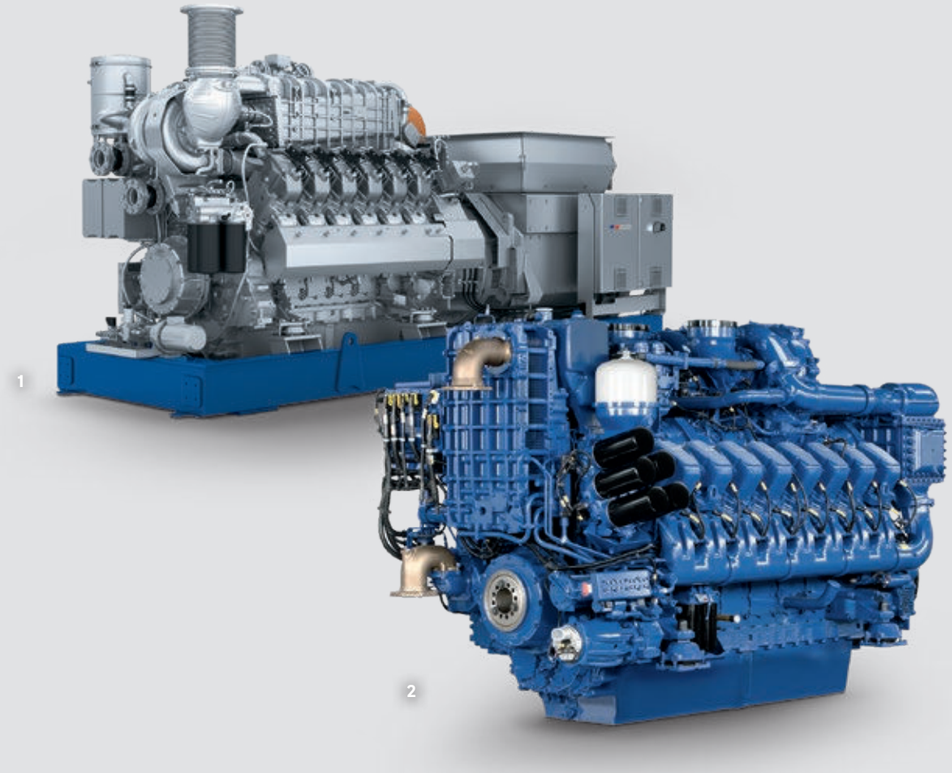
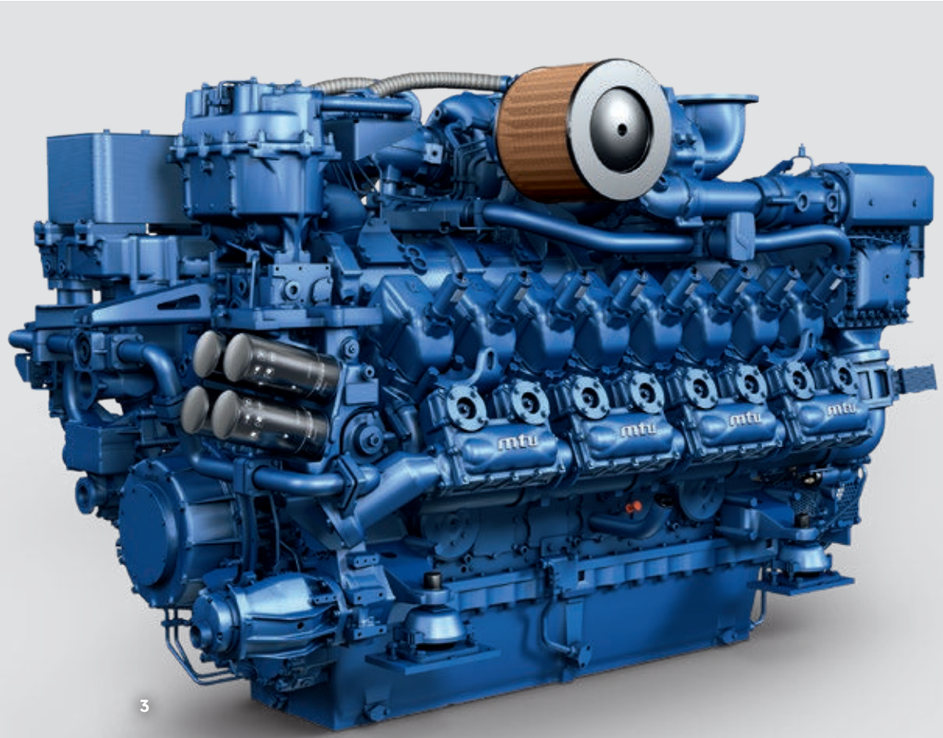
Marine Commercial

SERIES 4000 M05-N PURE GAS ENGINE

A Rolls-Royce solution

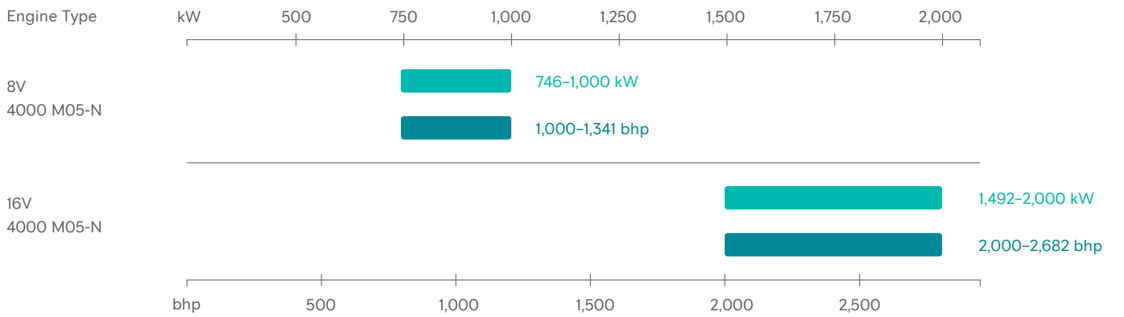




A TOUGH ENGINE FOR A GREEN TOMORROW - THE NEW SERIES 4000 M05-N.

More than 20 years ago, in 1996 the first Series 4000 marine engine was presented at SMM exhibition in Hamburg. Since then, the Series 4000 is trusted in numerous applications.

With more than 40,000 Series 4000 engines sold worldwide we gained experience from more than 180,000,000 operating hours which were directly fed into the development of our brand new pure gas engine. As an expert for tough applications like mining, oil&gas, rail and marine, we were always ready to go the next step - ahead of everyone else. This is just as true today, as it was in 1996 when we introduced the first high-speed diesel engine with common rail fuel injection. In 2016 we presented the only high-speed pure gas engine from 746 - 2000 kW (1000 - 2682 bhp).



1 12V4000 GS L64 gas generator set for distributed energy systems - year 2014

2 4000 M03 IRONMAN marine engine - year 2007

3 16V 4000 M05-N - the combination of a well proven marine engine and decades of gas system expertise - year 2016

DIESEL PERFORMANCE. GAS BENEFITS.

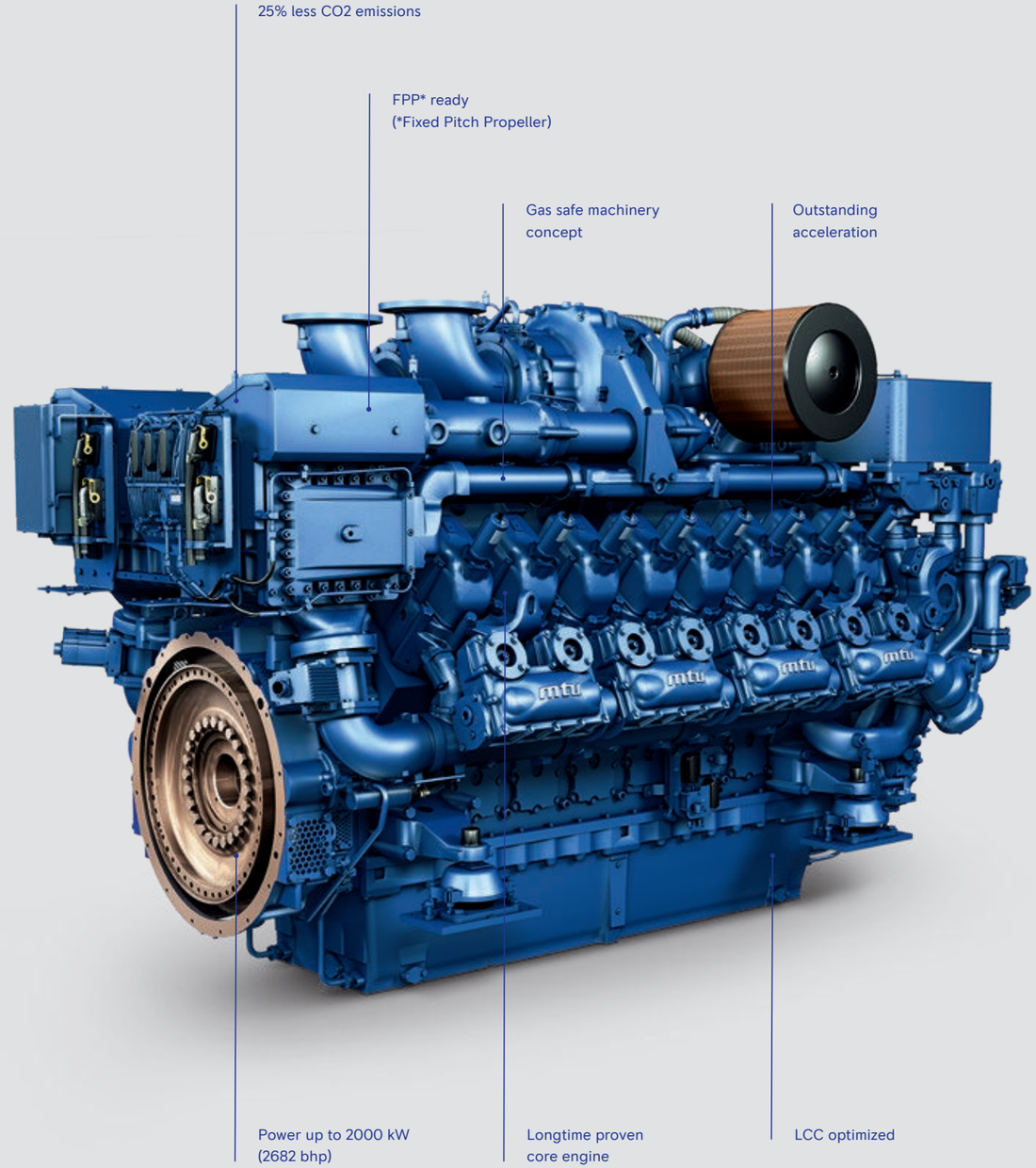
The new Series 4000 M05-N
Our Series 4000 M05-N for commercial marine applications is the latest marine engine of the powerful Series 4000 family. When designing the Series 4000 M05-N we kept three topics always in our mind: Life-cycle-costs, perfomance and environmental friendlyness.

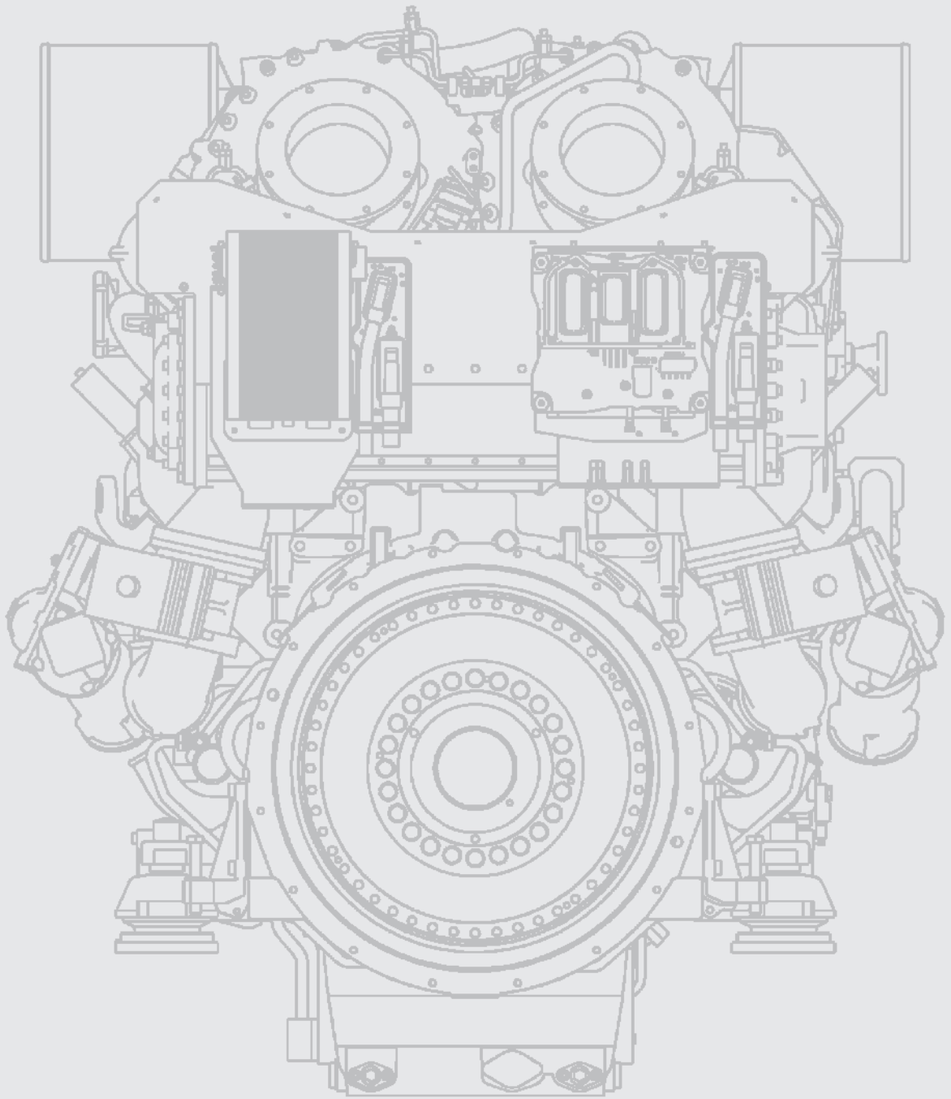
We used our legendary IRONMEN engines as a basis for the development of our pure gas engine. The engine will be equipped with a multipoint gas injection system, a dynamic motor management system and an advanced turbocharger design. The multipoint gas injection system is designed to enhance the engine's dynamic acceleration behaviour to match the performance of modern diesel engines. The wide rpm range and engine map ensures that fixed pitch propellers can be used in the propulsion design. The result is a cost efficient and less complex overall propulsion system compared to controllable pitch propellers or electrical propulsion systems. The safety concept, which has been optimized for gas operation, includes double-walled gas fuel lines, which means that no additional complex safety precautions are required in the engine room. On the test bench, it was possible to simulate real-life manoeuvres, which represented the dynamic acceleration behaviour of a diesel engine. The pure gas engine successfully completed more than 3,600 hours on the test bench already - proving its reliability.

Our experience and understanding of systems:
We help our customers to integrate the engine and gas regulating unit (GRU) into their vessel design. During the design phase of any given individual propulsion system, our engineers provide you with expertise and support that is unique anywhere in the world. No other company can match our reliable track record of offering complete propulsion solutions, spanning everything that's needed. It's this expertise that we gladly make available to you.

Engine model		8V 4000 M05-N		16V 4000 M05-N		
Power Range	kW	746	1000*	1492	1840*	2000
	bhp	1000	1341	2000	2467	2682
Rated Speed	rpm	1600	1800	1600	1800	1800
Dry Weight (engine only)	kg (lbs)**	6100 (13448)		9555 (21065)		
Displacement	l (cu in)	38.2 (2331.1)		76.3 (4656.1)		
Emissions Legislation		IMO III / EPA 4* / EU Stage V*				

* on request
** without coupling



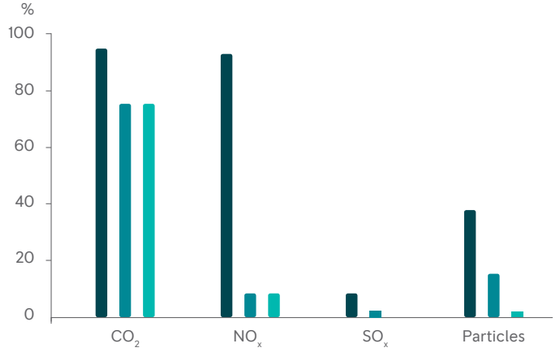


LOW EMISSIONS. GREEN SOLUTIONS.

The eco balance of our pure gas engine
The climate footprint of the MTU pure gas engine is better overall than that of a comparable diesel unit. Whenever fossil fuels are burned, water vapour (H_2O) and carbon dioxide (CO_2) are produced. Carbon dioxide is the most commonly mentioned climate damaging gas produced in an engine combustion process. Compared with diesel, the gas engine emits as much as 25% less CO_2. If biogas is used as the fuel for the gas engine, the CO_2 footprint can be improved even further.

Since the natural gas is not burned completely in the engine, small amounts of methane (CH_4) enter the exhaust gas. Experts refer to this effect as methane slip. CH_4 is also regarded as a climate damaging gas. Our gas engine will be significantly lower than the emission limits specified in EU Stage V (valid as of 2020) for hydrocarbon emissions (incl. methane).

Emissions of gas engine compared to IMO II diesel engine



- Diesel engine MDO (technological level according to current IMO2 emission legislation). Dual fuel engines in diesel mode have comparable or higher emissions.
- Dual fuel engine in gas mode
- Gas engine (spark ignited)

Emissions of gas engine compared to IMO II diesel engine Emissions of gas engines are significantly lower compared to conventional diesel engines without exhaust gas aftertreatment or exhaust gas recirculation.

Health-threatening substances in the exhaust gas, such as nitrogen oxides, sulphur oxides and fine particulate matter have been reduced by 80 – 100% in the case of the gas engine.

Pure gas propulsion system for tugboat with 2x 16V 4000 M05-N with 2000 kW (2682 bhp)

1 Gas engine

2 Gas regulating unit (GRU)

3 LNG tank

Subject to change. | 16120731 | Edition 01/19 | ESM 2019-10 | Printed in Germany on chlorine-free bleached paper.

Rolls Royce Group
www.mtu-solutions.com