



Construction & Industrial

WORKING HARD.  
IN ALL CONDITIONS.



See page 38



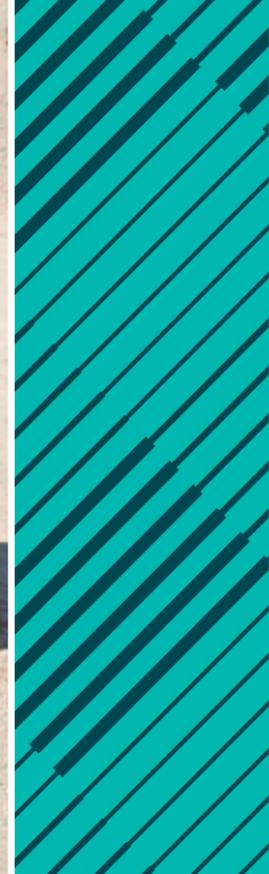
A Rolls-Royce  
solution



Mercedes-Benz,  
Engine production in Mannheim.

# CONTENTS

<b>01 Pioneering the power that matters.</b>	<b>05</b>	<b>07 Complete power system solutions</b>	<b>30</b>
		Energy for your construction site.	30
<b>02 System solutions</b>	<b>06</b>	Ready for every challenge.	32
It takes more than power to move mountains.	06	<b>mtu</b> EnergyPack – the flexible storage solution.	33
Reliable performance.	08		
<b>03 Applications overview</b>	<b>12</b>	<b>08 Service</b>	<b>34</b>
Engines for construction and industrial applications.	12	Smarter service. Built for you.	34
		Take care of your investment.	36
<b>04 Core competence</b>	<b>14</b>	Our global 24/7 promise.	38
Top performance in all conditions.	14		
<b>05 Core technology</b>	<b>16</b>	<b>09 Remanufactured products</b>	<b>39</b>
Unleash the beast.	16	Reman engine – exchange and save.	39
All engines at a glance.	18		
The full power range.	22		
<b>06 Green technology</b>	<b>24</b>		
Engineering today what you'll need tomorrow.	24		
Reduction in soot emissions.	26		
Emission forecast 2028.	26		
NRMM Emission legislation.	27		
Flexible solutions worldwide.	27		
Sustainable fuels.	28		



# PIONEERING THE POWER THAT MATTERS.

# 01

We at Rolls-Royce provide world-class power solutions and complete life-cycle support under our product and solution brand **mtu**. Fully utilizing the potential of digitalization and electrification, we strive to develop climate-neutral drive and power generation solutions that are even cleaner and smarter and thus provide answers to the challenges posed by climate change and the rapidly growing societal demands for energy and mobility. We deliver and service comprehensive, powerful and reliable systems, based on both gas and diesel engines, as well as electrified hybrid systems.



#### A solution provider

**mtu** systems power the most modern yachts, the strongest tugboats and the biggest land vehicles and provide energy for the world's most important mission-critical applications. With advanced solutions such as microgrids we integrate renewable energies and manage the power needs of our customers.

For over 110 years we have provided innovative solutions for our customers – meeting even the most demanding drive and power requirements. Our products and services span a wide range of applications and power needs, with both standard and customized options.

#### An expert in technology

**mtu** products are known for cutting-edge innovation and technological leadership. That same spirit of innovation inspires our sustainability efforts. Our focus is on developing and implementing system solutions that both maximize efficiency and reduce emissions – which in turn helps to reduce our impact on the environment.

#### A passionate and reliable partner

We at Rolls-Royce spend every day working together with our customers, to deliver engines, systems and complete life-cycle solutions that best fit their needs. We understand that each application is different and has its own specific demands. Our engineers embrace the challenge of finding the perfect solution for your unique power requirements. Every step of the way – from project planning, through design, delivery and commissioning; to the lifetime care of your equipment – we are dedicated to helping you get the most from your **mtu** investment.

#### Partnership with Mercedes-Benz

**mtu** Series 1000, 1100, 1300, and 1500 engines are based on Mercedes-Benz models customized for off-highway use. These engines range from 115–480 kW and have been specially designed for construction and industrial applications and further developed to meet EU Stage V regulations. In addition, you can still obtain our proven classic **mtu** Series 900 and 460 in the power range 75–375 kW for non- or low-regulated markets (EU IIIA compliant).



System solutions

# IT TAKES MORE THAN POWER TO MOVE MOUNTAINS.

As experienced drive specialists for the construction and industrial sectors, we offer solutions for the most complex requirements – from development to machine maintenance. Our motors deliver reliable, cost-effective and environmentally friendly performance in all areas, even under the most difficult conditions.



System solutions

# RELIABLE PERFORMANCE.

We offer a broad range of high-performance, economical diesel engines for a broad range of applications. Those applications span from construction equipment like excavators and dump trucks to the industrial segments like port handling, airport ground support, or waste compacting. Our engines have also proven themselves as drive systems for stationary applications and machines such as pumps and compressors.

Your benefits:

- Low life cycle costs due to low fuel and DEF consumption and long maintenance intervals
- Top performance, even under full load and with frequent load changes
- Highest quality standards for maximum availability and minimal downtime
- Global service network – customer support anywhere and anytime
- Optimized torque curve

\* Diesel Exhaust Fluid, aqueous urea solution for the reduction of nitrogen oxide emissions from diesel engine exhaust.

**Planning**

We deliver a complete engine concept. Our engineers provide extensive analysis, documentation, and risk mitigation services, as well as customer-focused support for integrated mechanical, electrical, and electronic interfaces.

**Integration**

We provide comprehensive engineering and technical support for the design and implementation of the engines. Our application engineering team helps reduce design costs.

**Power take off options**

Various power takeoff options for highly specialized applications offer even greater flexibility, making it easier to connect additional power trains and shaft drives, for example, for hydraulic pumps, air compressors, and other auxiliary devices.

**Digitalization**

For over 100 years, we've been known for technological innovation and leadership – driving efficiency and reliability to new heights. Today, we're applying that same spirit of innovation to digitalization. Our aim is to magnify the power of your investment.

**Combustion and aftertreatment**

Our optimized combustion and cooled exhaust gas recirculation system (EGR), supported by an efficient and well-balanced exhaust aftertreatment system consisting of SCR and DPF technology, allows our diesel engines to meet the widest range of exhaust emission requirements up to EU Stage V. It also enables compliance with worldwide emission standards including EPA, China, Japan, and Korea.

**mtu ValueCare**

mtu ValueCare ensures maximum performance and lasting value, with a complete portfolio of service and support solutions including analysis, spare parts, training, technical documentation, and full logistical support.



Applications overview

# ENGINES FOR CONSTRUCTION AND INDUSTRIAL APPLICATIONS.

# 03



Snow groomers

Underground Mining

Solutions for power generation and battery storage

Loaders, dozers and excavators

Dump trucks

Mobile cranes

Airport ground support

Road building equipment

Harbor equipment

Specialized and public service vehicles

## Core competence

# TOP PERFORMANCE IN ALL CONDITIONS.

# 04

Below sea level or thousands of meters high, hot or cold, wet or dusty – top performance is always called for, even in the harshest environments. Designed for the highest level of performance, our engines prove themselves everywhere at any time.

### Maximum availability – every day and everywhere

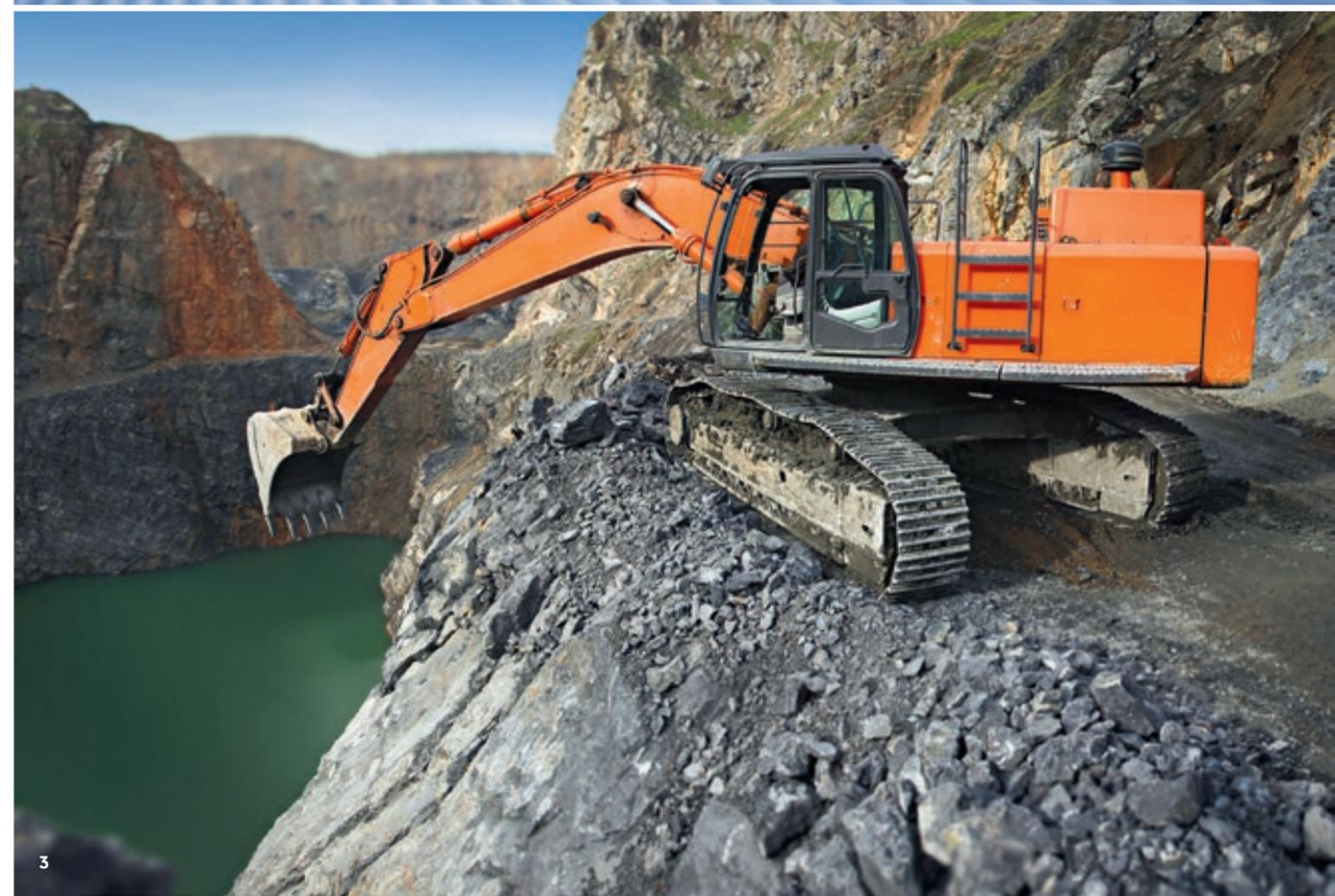
Our engines represent the best availability and reliability, low life cycle costs, and maximum economy for thousand-fold proven durability and an excellent power-to-weight ratio. With our integration of know-how and numerous years of experience we ensure that our extensive product range can consistently provide the right drive solution.

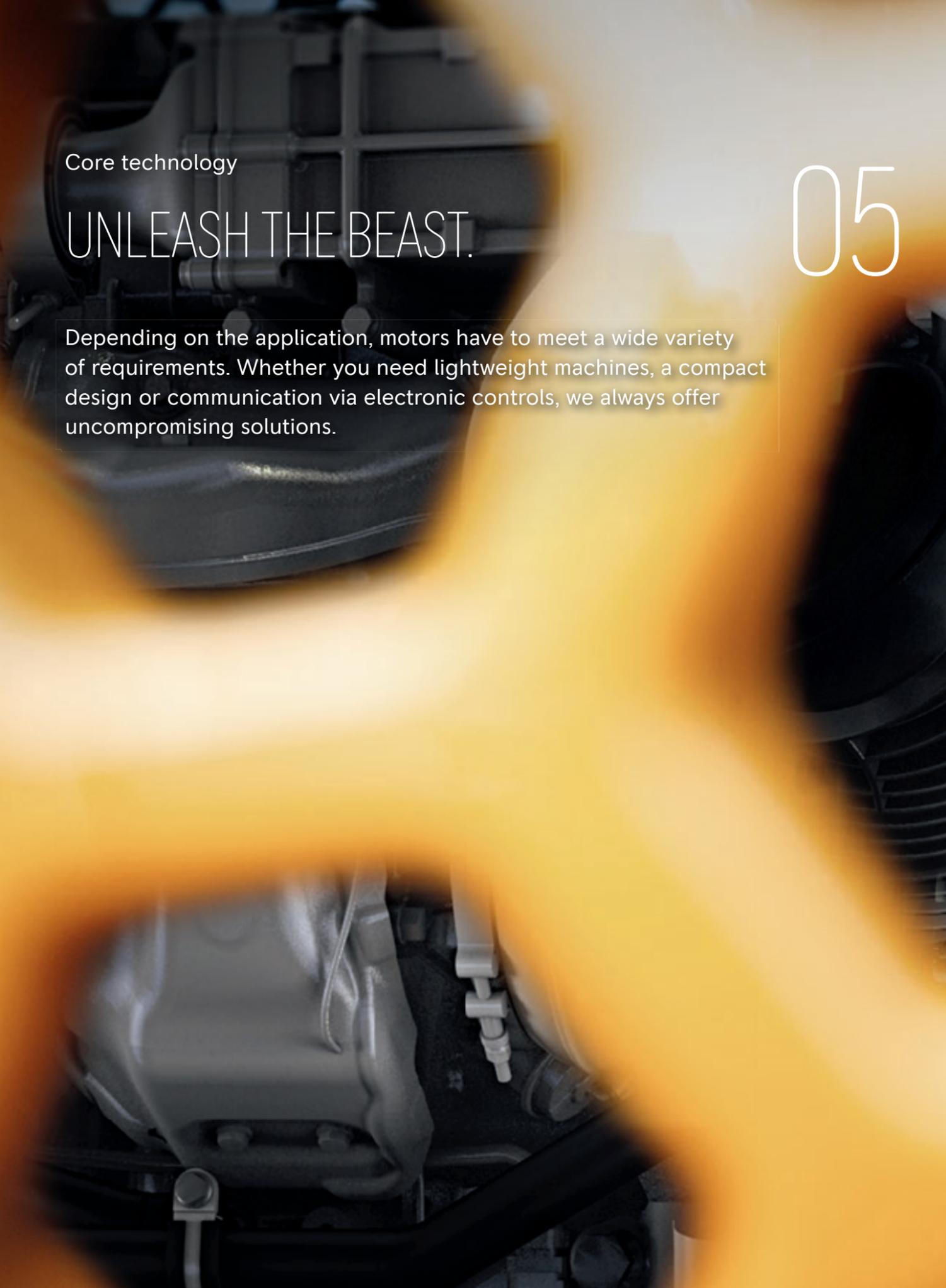
### Cost-effectiveness and low emissions

**mtu** engines are among the lowest-consumption engines on the market. Optimized, efficient combustion and exhaust aftertreatment mean that our diesel drives meet the widest range of emissions specifications up to EU Stage V as well as EPA Tier 4. In addition to their well-known longevity, low-maintenance construction and long service intervals also ensure their cost-effectiveness.



- 1 Telescopic handler
- 2 Snow groomer
- 3 Excavator



A close-up photograph of a motor's cooling fan and housing, showing the fan's blades and the surrounding structure. The image is partially obscured by a large, out-of-focus orange circular shape in the foreground.

Core technology

# UNLEASH THE BEAST.

Depending on the application, motors have to meet a wide variety of requirements. Whether you need lightweight machines, a compact design or communication via electronic controls, we always offer uncompromising solutions.

05



## Core technology

## ALL ENGINES AT A GLANCE.

The higher the requirements and the more specific the application, the greater the need for our **mtu**-engines. That's because we develop the optimum drive solutions for all individual tasks. The large range of engines contains the right answer for every application – a solution including the highest performance and greatest reliability, safety, environmental friendliness, and operating efficiency.

**mtu Series 900**

The proven, evolved engine.  
For heavy and medium duty operation.  
75–240 kW (101–322 bhp)

**mtu Series 460**

Maximum efficiency and availability.  
For heavy and medium duty operation.  
220–375 kW (295–503 bhp)

**mtu Series 4R 1000/OM 934\***

Increased rated power. One of the most successful engines ever.  
For heavy and medium duty operation.  
115–170 kW (154–228 bhp)  
Approved for HVO and GtL fuels.

**mtu Series 6R 1000/OM 936\***

Uncompromising availability.  
For heavy and medium duty operation.  
180–280 kW (134–375 bhp)  
Approved for HVO and GtL fuels.

**Planning security**

Our engines can be operated all over the world in compliance with local regulations. This is achieved without making changes to the engine's footprint, which means equipment manufacturers have planning security for their own designs. Optional parts make every engine adaptable to specific demands.

**Analytics**

We use the most diverse analysis and simulation tools to develop state-of-the-art engines. These include vibration analyses, component strength verification, and dynamic response simulations.

**Electronics**

The MCM engine control unit and the ACM aftertreatment control unit, control key systems such as fuel injection and turbocharging, as well as the emission management system – ensure high torque, full power, and the lowest fuel consumption. The CPC4 vehicle control unit provides an extensive set of functions to the vehicle and its operator.

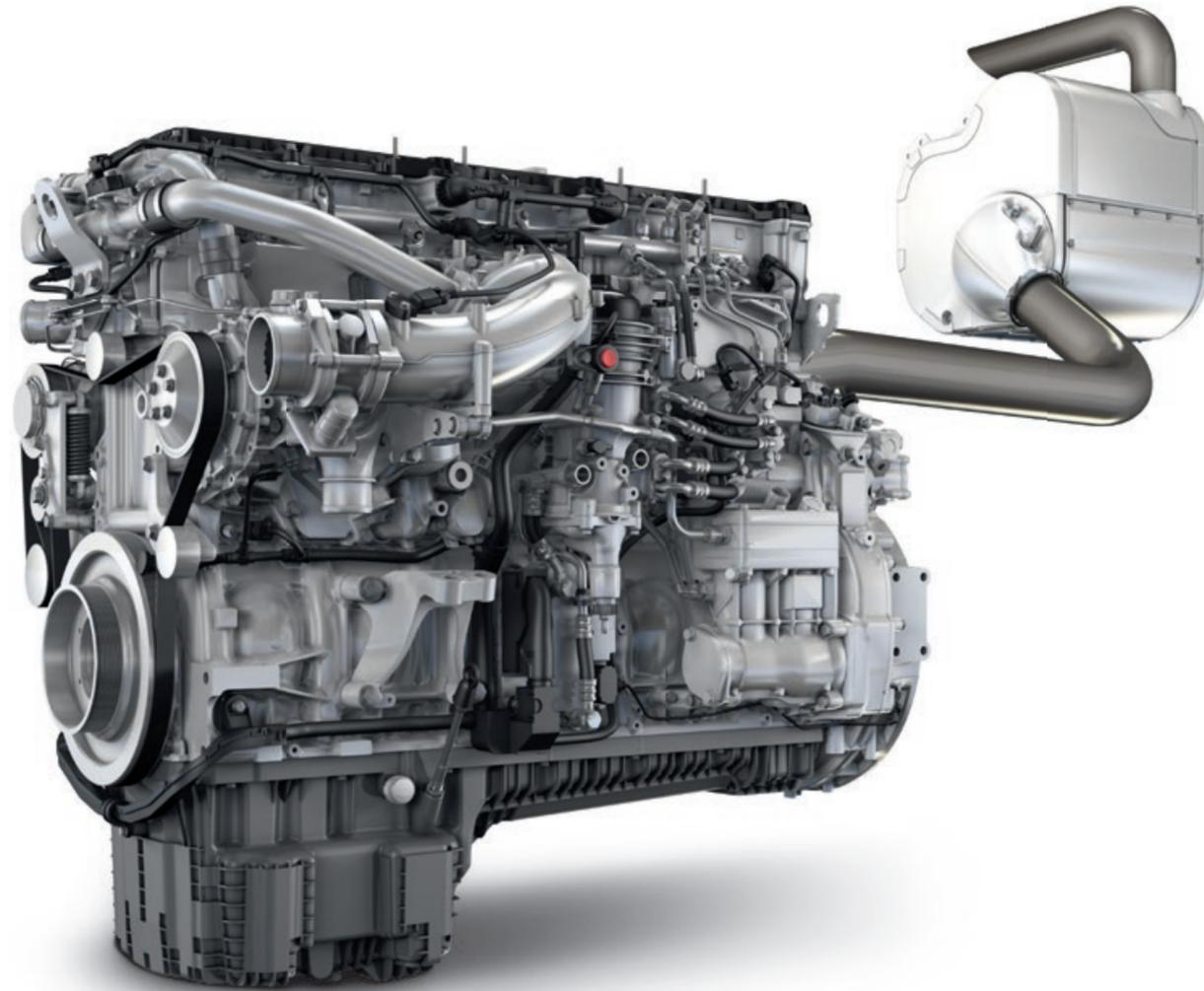
manufactured by



customized by

**Optional parts**

We provide optional parts for your engine such as oil pans, starters/generators, flywheel housings, and much more. Genuine parts maximize performance, prolong engine life, and meet today's strict requirements, making them the best possible match for your engine.

**Renewable and synthetic fuels**

In addition to meeting highest standards in fuel efficiency, most of our **mtu** engines can now also be operated with synthetic fuels such as hydrotreated vegetable oil (HVO) and gas-to-liquid (GTL) in accordance with the EN15940 standard. Using renewable fuels such as HVO can lead to a reduction in CO<sub>2</sub> emissions of up to 90% depending on the fuel manufacturer.

**Fuel injection**

We optimize fuel combustion in the cylinder by means of its electronically controlled common rail fuel injection system in combination with other technologies such as turbocharging.

**One-box solution for exhaust gas aftertreatment**

Combined "all-in-one" box with selective catalytic reduction (SCR), diesel particulate filter (DPF), and integrated dosing unit provides proven product features for profitable use while meeting the emission limits for EU Stage V. The decrease in harmful emissions is achieved along with a reduction in fuel consumption.

**Internal emission reduction**

With exhaust gas recirculation (EGR), the amount of nitrogen oxide can be significantly reduced using internal emission technology alone, resulting in a positive impact on the overall system consumption (fuel and urea). Combustion can be further optimized to lower emissions and consumption by the use of common rail fuel injection. Single-stage and two-stage turbocharging also increase engine efficiency.

\* On-highway engines also available.  
See page 22 for more details.

**Turbocharging**

Single-stage turbochargers compress the air so that more oxygen flows into the combustion chamber. In this way, more fuel is burned and the power output of the engine increases accordingly. Two-stage controlled turbocharging ensures low fuel consumption across a wide speed range, exceptionally high torque at low speeds, and clean combustion. On our **mtu** Series 1500 engines, a turbo compound unit recovers energy from the exhaust gases and increases efficiency even further – with a 5% fuel saving over similar engines.

**mtu Series 1100/OM 470**

More efficient than ever. Save up to 3% in fuel in comparison to EU Stage IV/EPA Tier 4 final.  
For heavy and medium duty operation.  
240–340 kW (322–456 bhp)  
Approved for HVO and GtL fuels.

**mtu Series 1300/OM 471\***

The toughest ever. With improved peak torque.  
For heavy and medium duty operation.  
320–390 kW (429–523 bhp)  
Approved for HVO and GtL fuels.

**mtu Series 1500/OM 473\***

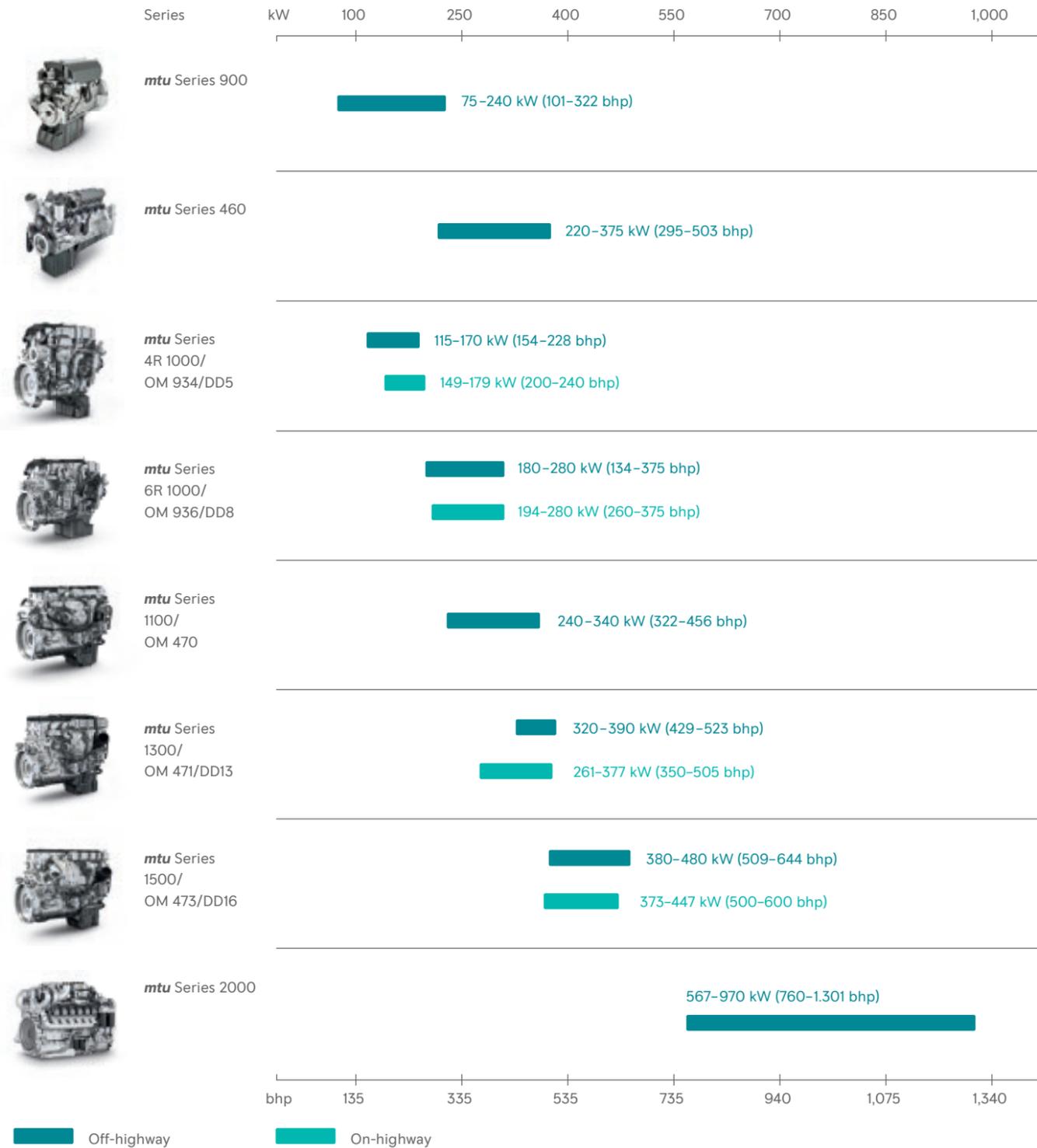
Low life cycle costs. Quick and easy maintenance.  
For heavy and medium duty operation.  
380–480 kW (509–644 bhp)  
Approved for HVO and GtL fuels.

**mtu Series 2000**

A powerful heart for maximum agility.  
For heavy and medium duty operation.  
567–970 kW (760–1301 bhp)

Core technology

# THE FULL POWER RANGE.



A yellow excavator is the central focus, positioned on a concrete structure. The background features a lush green mountain range under a blue sky with scattered white clouds. The excavator's arm and bucket are visible, extending towards the left. The overall scene is bright and clear, suggesting a sunny day.

Green technology

ENGINEERING TODAY  
WHAT YOU'LL NEED  
TOMORROW.

06

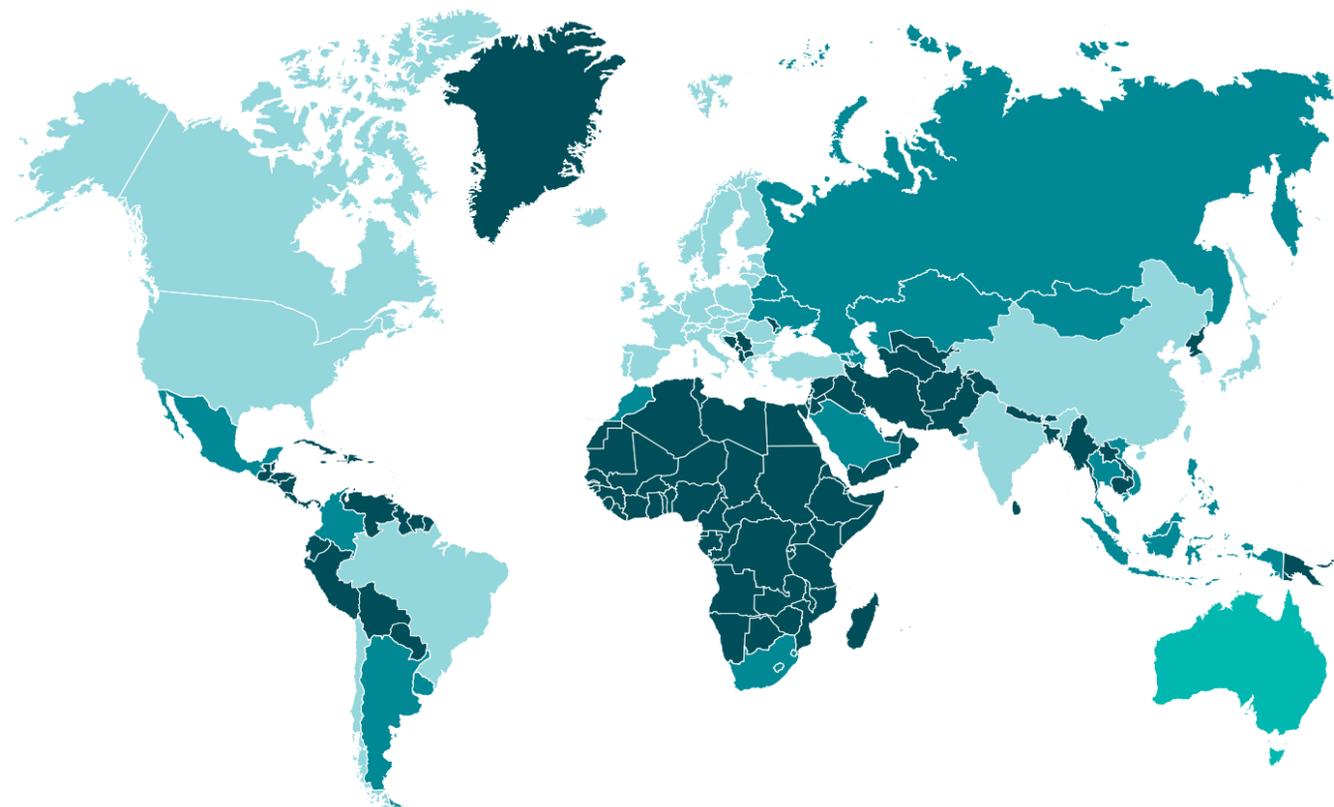
Green technology

# 97.8% REDUCTION IN SOOT EMISSIONS SINCE 1996.

The increasingly stringent emissions limits are fast approaching the ideal “zero emissions” target for diesel engines. The statistics speak for themselves: since 1996, EU emissions stages have been tightened four times and EPA Tier regulations have been created to govern

industrial engines. With EU Stage V, emission limits have been tightened for the fifth time since Stage I (1996), representing a cut of more than 94% in nitrogen oxides. At 97.8%, reductions in soot particulate emissions have been even greater.

## EMISSION FORECAST 2028.



- Emission legislation with a high-technology approach.
- Emission legislation with a medium nationwide and high-technology approach in emission hotspots.
- Emission legislation with a medium technology approach.
- No emission legislation, standard technology approach.

# NRMM EMISSION LEGISLATION 56-560 KW.

	2022	2023	2024	2025	2026	2027	2028
EU (+CH, +NI*)	EU V / R96-05						EU VI / R96-06
GB	EU V R96-05	Temporary GBTA	Full type approval (GBTA) R96-05				GB VI / R96-06
USA & Canada	EPA 4						CARB/(EPA) 5
China	China III	China IV 12/2022 (Beijing 12/2021)					China V *
Japan	Japan IV				Japan V (01/2026)		
Korea	VI	Korea V 03/2022 transition construction and industry 12/2020 / transition agriculture and forestry 07/2024					
India	Bharat IV / R96-04 / 04/2021		Bharat V / r96-05 / 04/2024				
Turkey	FAZ III / EU III A R96-02	FAZ V / EU V / R96-05 (engine 10/2022 / machine 01/2023)					
Brazil	MAR I (similar EU III A)						
South Africa	EU II / R96-01						

Level Stage II w/o aftertreatment	Level Stage III A w/o aftertreatment	Level Stage IIIB Level Stage VI w/ aftertreatment	Level Stage V w/ aftertreatment, w/PN limit, w/ ISM	Level Stage VI w/ aftertreatment, w/PN limit, w/ ISC
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\*Northern Ireland

## FLEXIBLE SOLUTIONS WORLDWIDE.

Wherever in the world you want to market your construction and industrial machines, you need a drive package that delivers the required power at the right emission level, every time.

We offer you two solutions for this purpose:

**- Emission Flex Package**  
With our Emission Flex Package you increase your flexibility in highly regulated markets as well as in countries where no or only low emission regulations apply. With our software, the exhaust gas aftertreatment system and SCR system can be deactivated without

hardware modification, so no time-consuming modifications are required. With our **mtu** Series 1000, 1100, 1300 and 1500 within the power range from 115 kW to 480 kW, we can always offer you the solution that fits best to your individual requirements.

**- Classic engines**  
With our proven **mtu** Series 900 and Series 460 (level stage IIIA compliant) within the power range from 75 to 375 kW, you can use your machines and vehicles in countries where no or low emission regulations apply.

## Sustainable fuels

UP TO 90% CO<sub>2</sub>-REDUCTION THROUGH  
THE USE OF SUSTAINABLE FUELS.

Helping clients to achieve ambitious emissions targets requires solutions that are both innovative and individually adaptable. The **mtu** engines already addresses emission reductions by meeting the highest standards in fuel efficiency. On top of that, we optimize our systems to support your path to net zero by enabling the use of sustainable fuels.

Even today, our **mtu** engines are approved to run on synthetic paraffinic diesel fuels in accordance with EN 15940, which includes the biofuel HVO. In 2023, approval for **mtu** Series 2000 engines in key applications is expected as well. HVO is one of the first commercially available fuels that can be used to power internal combustion engines in a significantly more climate-friendly way. When the fuel is burned

in **mtu** engines, up to 90% fewer greenhouse gas emissions are produced than when fossil diesel is burned. By leveraging the emission-reducing possibilities of synthetic fuels in our existing and future engines, we will be well on our way to achieving our 2030 target of reducing total emissions.

## Further benefits of renewable fuels (e.g. HVO)

**Significant reduction of greenhouse gas emissions (CO<sub>2</sub>) with HVO:**

Improved ecological footprint & corporate image.

**Simple drop-in fuel:**

No engine hard- or software adaptations necessary. Blends are possible.

**No effect on service & maintenance intervals:**

Standard warranty conditions apply.

**Approved for our diesel engines of the mtu Series 1000, 1100, 1300 and 1500:**

All emission optimizations & power ratings.

**Reduction of harmful pollutants:**

Up to -80% particulate matter (PM) & up to -8% nitrous oxides (NO<sub>x</sub>).

**Same performances:**

Same maximum power, load acceptance and fuel consumption.

**Positive chemical properties:**

Higher cetane-number and better water separation (hydrophobic).

**Long storage capability:**

High reliability under cold conditions and high oxidation stability (no FAME), depending on fuel supplier.



Complete power system solutions

# ENERGY FOR YOUR CONSTRUCTION SITE.

# 07

Providing construction sites with temporary power can be challenging, especially when working in densely populated residential locations. We offer you different smart solutions for this challenge, like the **mtu** Series 1600 Genset or our **mtu** EnergyPack.



## Complete power system solutions

READY FOR EVERY  
CHALLENGE.

Customers around the world trust us to provide reliable power for a wide range of applications, in all types of conditions. Our gensets are compact, powerful, robust, and easy to integrate just where you need them.

**Full flexibility**

The full *mtu* Series 1600 portfolio offers the best solution for all kinds of applications and requirements.

**Highest and fastest availability**

The *mtu* Series 1600 are capable of delivering their full power output within a few seconds with industry-leading load factors, offering more available power.

**Maximum resiliency**

*mtu* Series 1600 generator sets offer the highest power quality and resiliency, even under hot ambient conditions and high-altitude environments.

**Low life cycle cost**

Digital connectivity solutions and optimized maintenance schedules keep the life cycle costs of the *mtu* Series 1600 generator sets at a minimum.

**Scalable plug-and-play solution**

- Compact weatherproof IP23 enclosure design
- Integrated design including radiator, fuel tank, circuit breaker, genset controller, and control panel
- Maximum sound attenuation down to 70 db(A)
- Prepared for easy transport with crane mounts and forklift pockets
- Fits inside 20 ft ISO standard container for shipping (silencers integrated into the enclosure)

1 Our new, open *mtu* power system unit of the *mtu* Series 1600.

2 Our new *mtu* power system unit of the *mtu* Series 1600 with case.

**mtu** ENERGYPACK –  
THE FLEXIBLE STORAGE SOLUTION.**Improves the reliability and profitability of your power supply**

The new *mtu* EnergyPack is a valuable addition for any power generation. It stores electricity from distributed power sources – such as the national grid, gas gensets, wind turbines, or solar panels – and delivers it when you need it. The *mtu* EnergyPack is an all-in-one solution that can be easily scaled to your needs. You can use the stored power to cover your construction site's requirements, for example, to compensate for compensation of weak grid connections and supply fluctuations without recurring to the public grid. The *mtu* EnergyPack offers storage capacities up to 2,600 kWh and different power strings from 40 to 2,000 kVA/kWe.





mtu A Rolls-Royce solution

Service

SMARTER SERVICE.  
BUILT FOR YOU.

08

## Service solutions

TAKE CARE  
OF YOUR INVESTMENT.

Our engines and systems are built to deliver robust, reliable performance. But our commitment to your success doesn't end there. For maximum uptime, longer life, and optimized costs, rely on **mtu** ValueCare – the only service portfolio designed specifically with your equipment in mind.

**Save time**

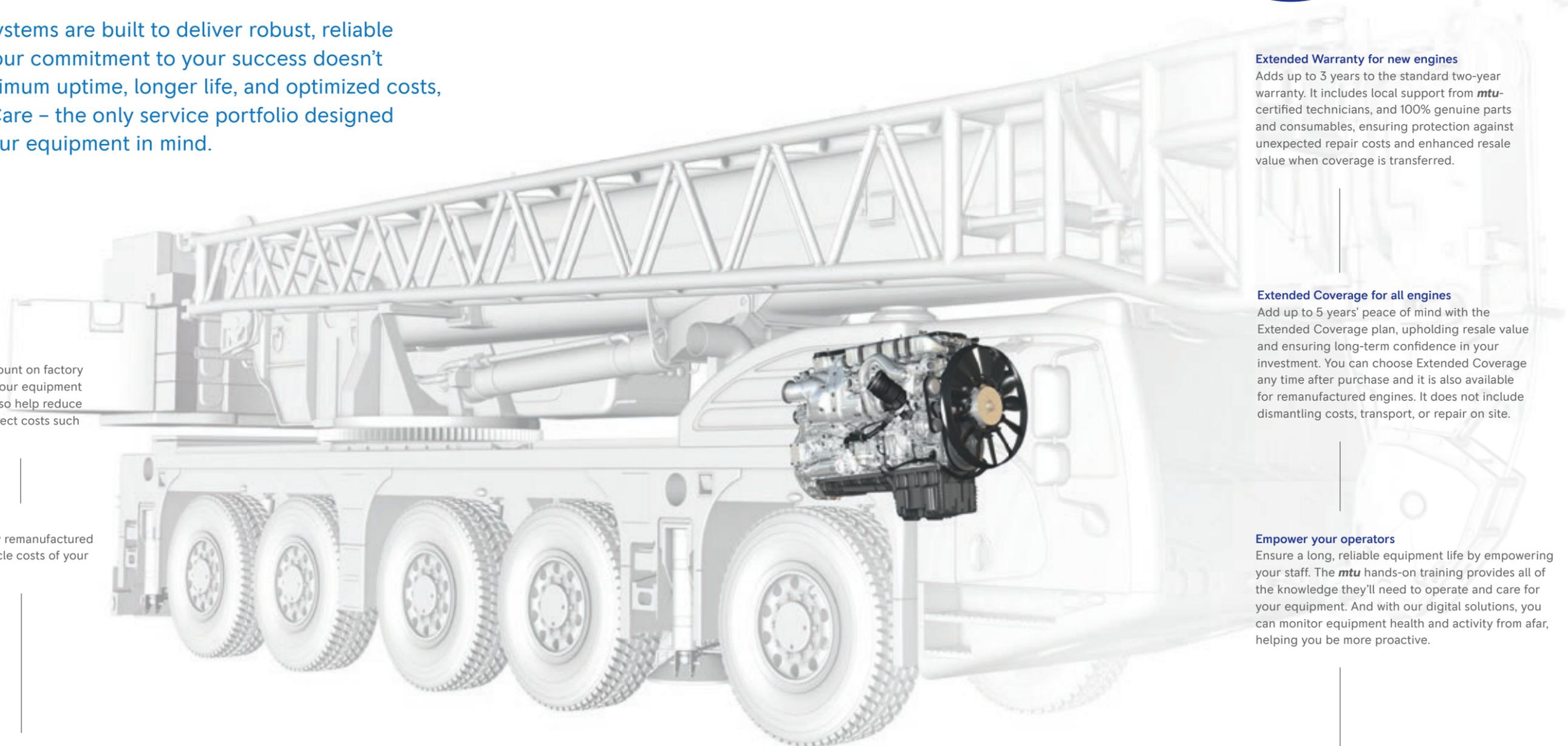
When it's time for an overhaul, count on factory remanufactured engines to put your equipment back to work even faster. They also help reduce downtime, service time, and indirect costs such as storage.

**Reduce life cycle costs**

Count on a wide range of factory remanufactured parts to help optimize the life cycle costs of your equipment.

**Keep everything running smoothly**

Original parts, filters, oils, and coolants work in perfect harmony with your equipment to maximize its performance, prolong its life, and protect it – making them an essential part of your preventive maintenance program.

**Extended Warranty for new engines**

Adds up to 3 years to the standard two-year warranty. It includes local support from **mtu**-certified technicians, and 100% genuine parts and consumables, ensuring protection against unexpected repair costs and enhanced resale value when coverage is transferred.

**Extended Coverage for all engines**

Add up to 5 years' peace of mind with the Extended Coverage plan, upholding resale value and ensuring long-term confidence in your investment. You can choose Extended Coverage any time after purchase and it is also available for remanufactured engines. It does not include dismantling costs, transport, or repair on site.

**Empower your operators**

Ensure a long, reliable equipment life by empowering your staff. The **mtu** hands-on training provides all of the knowledge they'll need to operate and care for your equipment. And with our digital solutions, you can monitor equipment health and activity from afar, helping you be more proactive.

**Maximize uptime**

Avoid the unexpected with professional service from **mtu**-certified technicians. Preventive maintenance services can be planned around your schedule, so your equipment is available when you need it most.

## Service solutions

## OUR GLOBAL 24/7 PROMISE.

Whenever and wherever you need expert support, our specialists are available. Our global service network of more than 1,200 locations – backed by our cutting-edge Parts Logistics and Customer Care Center – provides you this assurance.

To find your local **mtu** distributor, visit [www.mtu-solutions.com](http://www.mtu-solutions.com).

**Always on call, 24/7**

Whether it's connecting you with a local service partner or assigning an urgent problem to a dedicated team of **mtu** experts, we're ready to assist you – wherever you are, whatever you need.

Europe, Middle East, Africa	+49 7541 90 7777
Asia/Pacific	+65 6860 9669
North and Latin America	+1 248 560 8888

[info@ps.rolls-royce.com](mailto:info@ps.rolls-royce.com)

Always on call  
**24/7**



## Remanufactured products

REMAN ENGINE –  
EXCHANGE AND SAVE.

09

## The factory rebuild process

**1. Disassembly**

The engine is taken apart completely and recyclable materials are separated.

**2. Cleaning**

Paint and rust are removed from all parts and components.

**3. Inspection**

All parts are examined against factory-specified tolerance and wear limits.

**4. Reworking**

All reusable parts are reworked and machined using series production processes to meet tolerance requirements.

**5. Reassembly**

Engines are assembled using reworked/rebuilt parts and components and new wear parts.

**6. Quality control**

Test run using series production criteria to replicate difficult field conditions (e.g. extreme temperatures).

**Complete remanufactured engines – for rapid availability**

- Plug-and-play solution reduces downtimes
- A worthwhile investment if the vehicle is to deliver maximum availability for a long time to come
- For maximum and longest vehicle availability

**A completely remanufactured engine includes:**

- Air compressor
- Control unit with updated software
- Engine wiring harness
- Exhaust manifold
- Flywheel
- Power steering pump
- Starter (for **mtu** Series 500)
- Turbocharger
- Vibration damper
- Water pump

**Factory engine overhaul – the economical alternative**

A factory overhaul is the economical alternative to a remanufactured engine, and is especially worthwhile for older vehicles. Your engine will come back from the factory fully overhauled and renewed.



Stay posted with more powerful information  
and follow **mtusolutions** under:



Rolls-Royce Group  
[www.mtu-solutions.com](http://www.mtu-solutions.com)

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