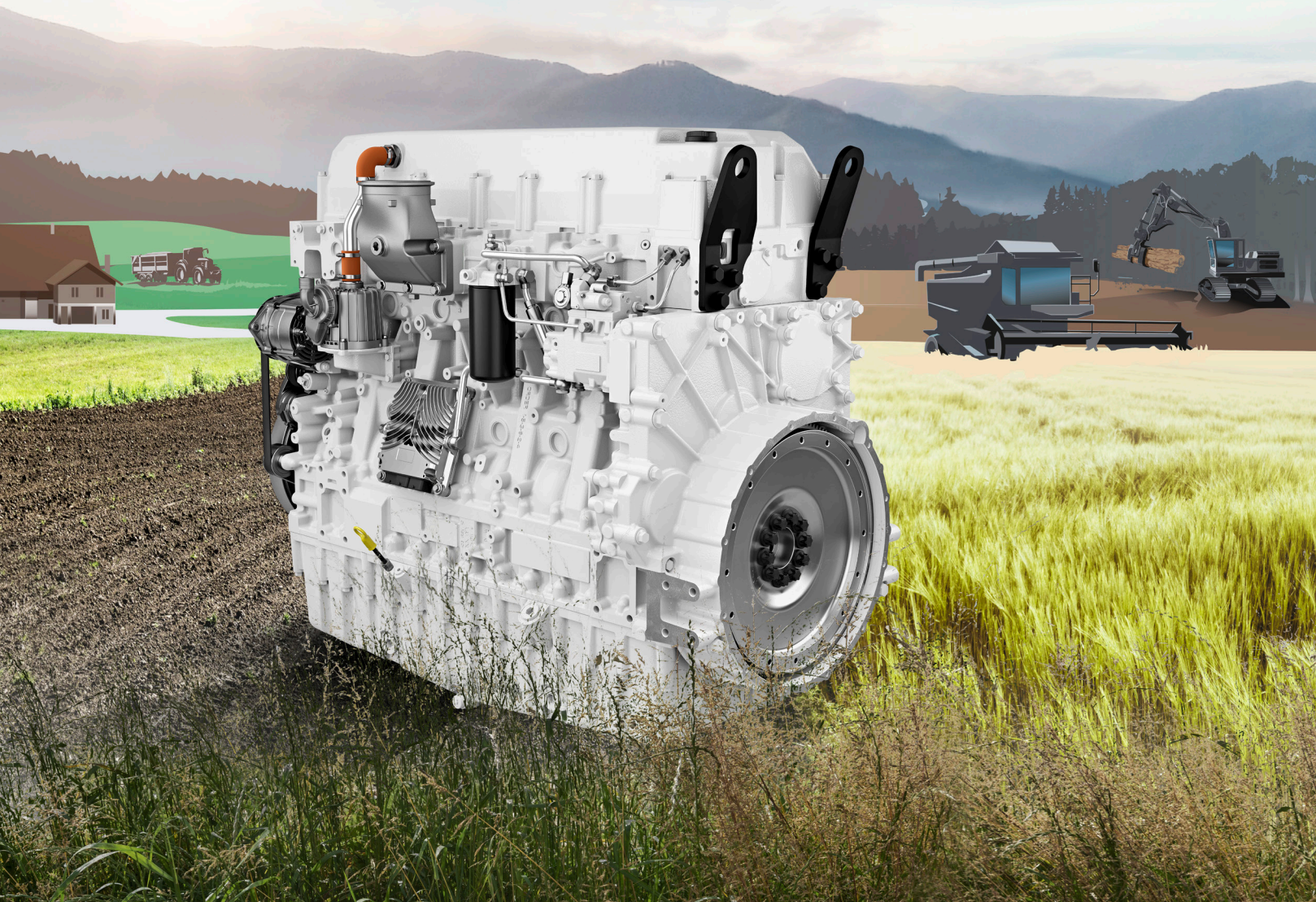
Combustion engines for the agriculture and foresty industry

LIEBHERR

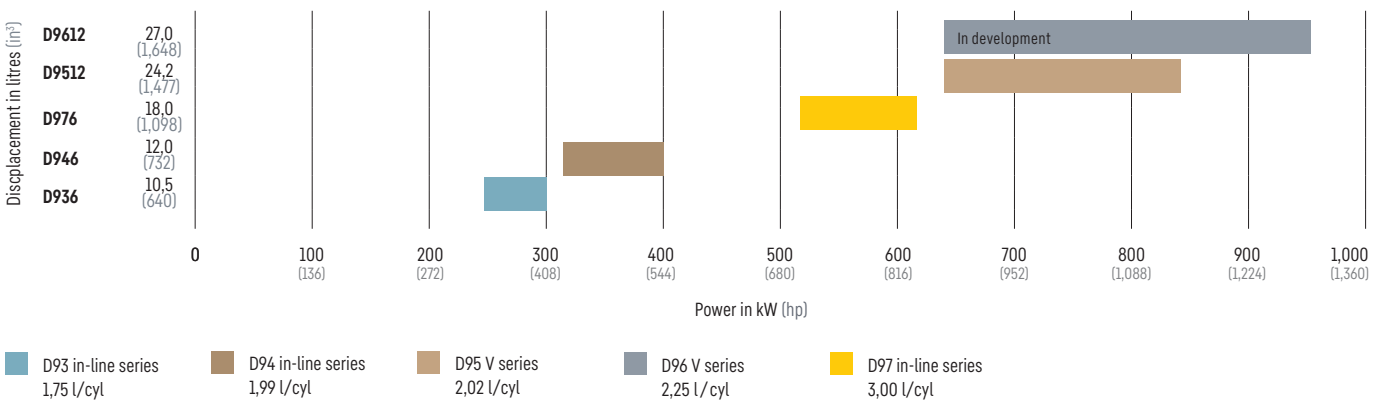
Components
Combustion engines



Combustion engines for the agriculture and forestry industry

Agriculture and construction share many similarities in their requirements for tough, efficient and torque producing power solutions. Our engines comply with worldwide emission standards and are able to cover the entire industry cycle from seeding to harvesting. Liebherr engines are particularly appreciated for their increased efficiency, long engine lifetime, and low total cost of ownership.

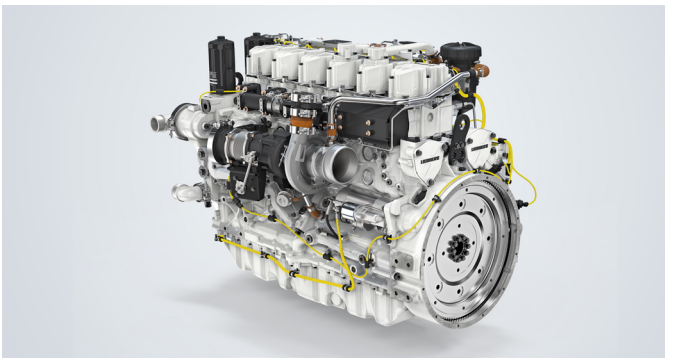
Power range

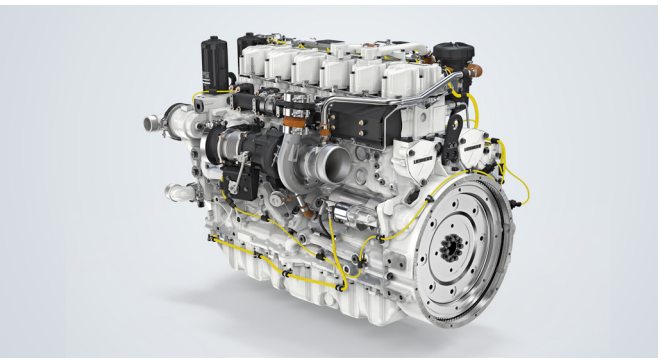


Low total cost of ownership (TCO)
Long maintenance intervals and short service operations ensure the high availability of Liebherr engines. Furthermore, thanks to low fuel consumption and longer oil change intervals, our engines contribute substantially to an increased efficiency of our customers' machinery. The option of a general overhaul or remanufacturing of the engines to an as new condition enables the service life of the engines to be significantly extended, thus reducing the total cost of ownership.

Your engineering partner
Our engineers are continuously working on further engine developments and improvements to achieve greater performance. Thanks to our engineering expertise, many OEMs became our partners to get an engine that suits their needs.

From 250 – 400 kW





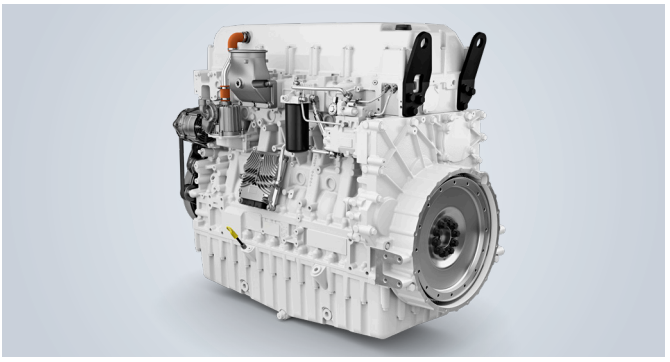
D936

Bore	mm (in)	122	4.8
Stroke	mm (in)	150	5.9
Displacement	l (in3)	10.5	640.7
Power rating STD	kW (hp)	250 - 300	335 - 402
Power rating EVO	kW (hp)	250 - 270	335 - 362
Rated speed	rpm (rpm)	1,900	1,900

D946

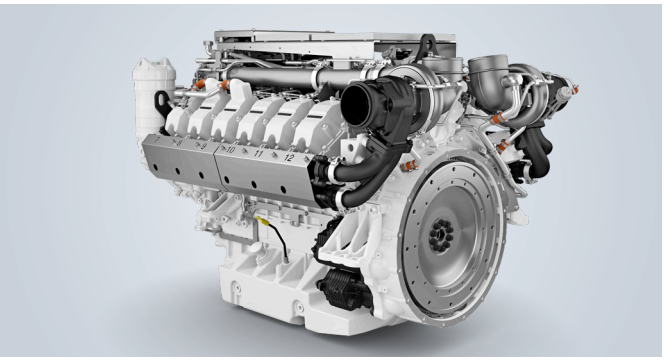
Bore	mm (in)	130	5.1
Stroke	mm (in)	150	5.9
Displacement	l (in3)	12	732
Power rating STD	kW (hp)	320 - 400	429 - 536
Power rating EVO	kW (hp)	320 - 330	429 - 442
Rated speed	rpm (rpm)	1,900	1,900

From 510 – 950 kW



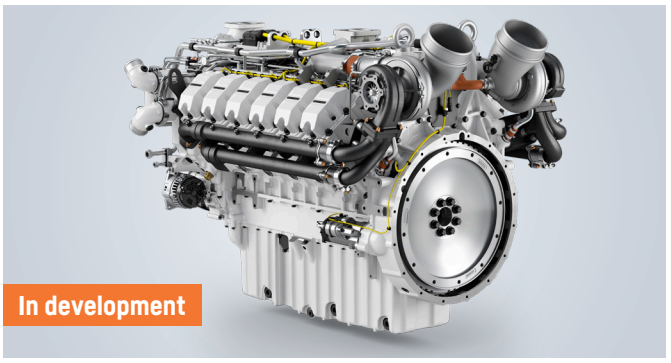
D976

Bore	mm (in)	148	5.8
Stroke	mm (in)	174	6.9
Displacement	l (in3)	18.0	1,098.4
Power rating	kW (hp)	510–620	684 – 831
Rated speed	rpm (rpm)	1,900	1,900



D9512

Bore	mm (in)	128	5.0
Stroke	mm (in)	157	6.2
Displacement	l (in3)	24.2	1,476.8
Power rating	kW (hp)	640–850	858 – 1,140
Rated speed	rpm (rpm)	1,900	1900



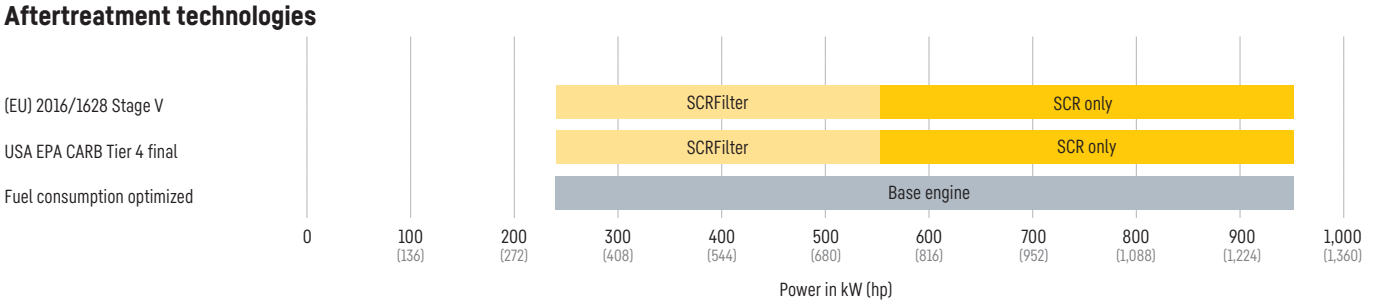
D9612

Bore	mm (in)	135	5.3
Stroke	mm (in)	157	6,2
Displacement	l (in3)	27.0	1,647.6
Power rating	kW (hp)	750 - 950	1,006 - 1,274
Rated speed	rpm (rpm)	1,800	1,800

Emission standards

With reduced fuel consumption and low emissions, Liebherr's combustion engines are suited to contain environmental impacts and optimize costs. Our exhaust gas aftertreatment systems are adapted to the application and legislative requirements applicable in each region.

Aftertreatment technologies



Model	D936	D946	D976	D9512	D9612
(EU) 2016/1628 Stage V	■	■	■	■	■
USA EPA CARB Tier 4 final	■	■	■	■	■
Fuel consumption optimised			■	■	■

Modular system

Modularity is at the core of Liebherr's combustion engines development: our base engines can be equipped with different exhaust gas aftertreatment systems to meet the required emission standards, including the most stringent global requirements. Keywords being: compactness and a low TCO for the end customer. This means that OEMs only require one machine design to comply with all relevant industry standards and norms.

Vision 2030

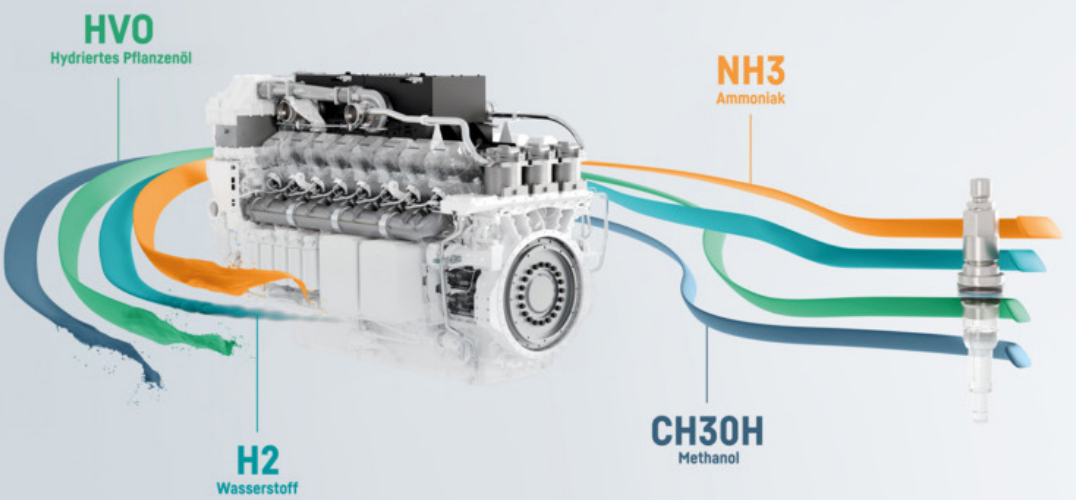
In a world where the reduction of global greenhouse gases is one of the most pressing challenges, we stand at the forefront of innovation, working tirelessly to develop alternative and climate-friendly powertrain concepts. With a wide array of products that serve industries around the globe, the company knows that there is no one-size-fits-all solution, when it comes to achieving net-zero emissions. That is why we are committed to an open approach to powertrain technology, exploring a diverse range of fuels that can meet your varying demands, operational environments and markets specifications. Liebherr group is constantly analysing emerging technologies and market needs, ensuring it rises to new challenges with cutting-edge solutions. This approach has led us to explore advanced alternatives, such as ammonia, methanol and ethanol – fuels that hold immense potential for reducing emissions in industries that rely heavily on powerful machinery and engines.

Hydrotreated vegetable oil (HVO): a simple alternative to diesel
Hydrotreated vegetable oil (HVO) are particularly of interest being an already available, interim technology. All our combustion engines and fuel injection systems are validated and approved for use with HVO fuels, offering a simple and efficient alternative to diesel with a significant impact on CO^2 emissions.

Hydrogen: a viable alternative for construction machinery
For machines with high-energy requirements, hydrogen-based powertrains are a promising option for nearly greenhouse gas-neutral performance. We in Liebherr's components product segment have recently made a significant investment in the development of our hydrogen engine and test facilities. Prototype engines have undergone testing since 2020. Meanwhile, the prototypes have shown encouraging results in terms of performance and emissions, both on test benches and in the field. Different injection and combustion technologies, such as port fuel injection (PFI) and direct injection (DI), have also been assessed in the process. The first prototype construction machines equipped with these engines have been running since 2021 and we will be ready with serial product by the end of the decade.

Ammonia: a powerful alternative for heavy industries
Ammonia has emerged as a particularly promising alternative fuel due to its high energy density, ease of transportation and excellent storage capabilities. As global industries look for cleaner alternatives to traditional fossil fuels, ammonia is gaining attention as a viable substitute for diesel in controlled, professional environments.
The appeal of ammonia does not only lie in its energy efficiency, but also in its versatility as a fuel for various high power applications. Its ability to replace diesel in sectors that require large-scale, continuous power makes it a serious contender in the race towards greener energy solutions. Our commitment to exploring ammonia as a diesel alternative ensures that we will continue offering sustainable solutions to industries, where emission reductions are both challenging and critical.

Methanol and ethanol : future-proof fuels for industrial and mining applications with interesting potential
As an engine manufacturer our two main pillars in alternative fuels are hydrogen and ammonia. However we follow with a great interest the evolution methanol and ethanol in different markets. We stay on track on these fuel investigating potential injections systems and pre-development activities.



Digitalisation

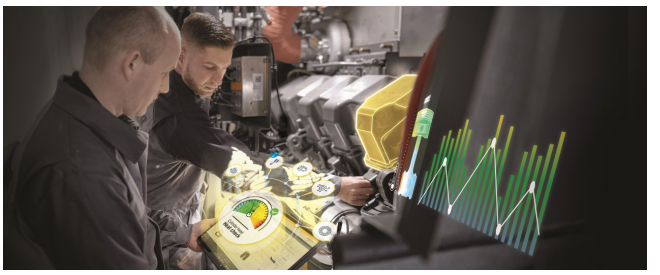
Liebherr is committed to delivering innovative digital solutions designed to enhance engine performance and streamline maintenance. Based on decades of experience, LiDIA was developed - an advanced engine diagnostics solution that provides a comprehensive overview of the condition of the engine system.

LiDIA engine diagnostics
LiDIA goes beyond standard diagnostics, offering powerful monitoring capabilities for key engine parameters such as oil pressure, fuel consumption, cooling temperature and load profiles. The solution also provides live notifications of engine faults, allowing users to respond quickly to issues. Liebherr offers different software licenses, enabling customers to select the level of detail and functionality that best meets their needs.

Simplifying engine data access
LiDIA offers an intuitive, user-friendly interface that simplifies day-to-day engine diagnostics. The software is designed to offer easy access to essential engine data.

With the integrated Snapshot function, users can capture diagnostic data and effortlessly share it with colleagues. This feature improves collaboration and speeds up issue resolution.

Remote diagnostics and expert support
LiDIA provides 24/7 remote access, enabling real-time troubleshooting and remote diagnostics. Liebherr's experts can assist or resolve engine issues directly through a secure connection.
By leveraging LiDIA's intelligent diagnostic solution, customers not only maximize engine uptime but also ensure that maintenance is performed efficiently and cost-effectively, adding real value to their operations.



Service

Providing our customers with high quality product support and tailored assistance is what we strive for. Whether it is connecting you with a local service partner or assigning an urgent problem to a dedicated team of Liebherr experts, we are ready to assist you.

Our combustion engines are designed to support the highest level of serviceability.

Customer service and Training academy
Professional maintenance and repair make a significant contribution towards maximum exploitation of Liebherr components' lasting character. Comprehensive training courses prepare our customers' technicians to provide efficient customer support. Liebherr consequently offers hands-on basic and advanced training. In our training center the experienced trainers can also simulate extreme repair operations.

Maintenance and spare parts
Practically orientated maintenance and repair kits, such as packs of seals, facilitate combined ordering of parts that need to be replaced together and ensure a high level of repair quality.

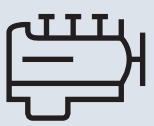
Remanufacturing and repowering
As your engine needs to be replaced several times during the overall lifetime of your machine, we are helping you to reduce your costs by offering you an alternative to a new engine. With our Reman program, we will transform your used engine by equipping it with new parts in accordance with industry standards. The program offers a financial benefit by helping businesses to cut costs whilst reducing environmental impacts through the various product's life cycle stages. Our second alternative is the repowering of your machine regardless of its brand and make. To improve reliability and fuel consumption, we can offer a complete repowering service and kit. Overall, we are focusing on saving your time, increasing your equipment availability and optimising your total operating costs so that your total costs of ownership meets or exceeds your expectations and forecasts.

Components

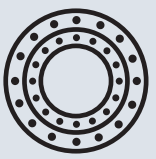
As a provider of a vast variety of products, the components product segment offers solutions in the area of mechanical, hydraulic, electric and electronic drive system and control technology. Our state-of-the-art components and systems of the highest quality are designed and manufactured at ten production sites worldwide. Representatives from each of our product segments are available to our customers at Liebherr-Components AG and the regional sales and distribution branches.

Liebherr is your partner for a joint success: from product idea to development, manufacture and commissioning right through to customer service solutions, such as remanufacturing.

components.liebherr.com

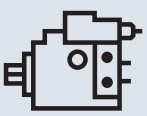

Engines


Fuel injection systems

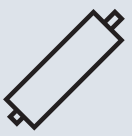

Slewing bearings


Gearboxes

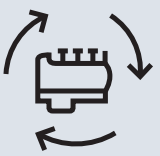

Winches

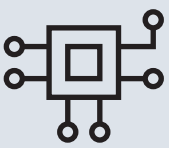

Hydraulic pumps and motors


Hydraulic cylinders


Piston accumulators


Electric machines


Remanufacturing


Industrial electronics


Electrical drive and control technology


Drive systems


Aerospace electronics


Fibre composite

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PP VM 11.03.2025
Subject to technical modifications