

Liebherr's H2 direct injection solutions for heavy-duty engines

- Liebherr offers H2 direct injection as a drive solution for on- and off-highway applications.
- Liebherr presents combustion concepts for H2 engines in the range of 6 - 16 litres displacement and 200 - 450 kW.
- Liebherr injector for H2 direct injection is designed for system pressures of up to 60 bar.

The mobility industry is currently focusing heavily on reducing CO₂ emissions. For on-highway vehicles, from passenger cars all the way to heavy trucks, clear objectives have already been defined internationally. For off-highway applications, on the other hand, no binding plans have yet been set forth. However, the global decarbonisation strategy is showing increased interest in hydrogen as a fuel among OEMs and engine manufacturers in the on- and off-highway sectors. As a development partner and system supplier for climate-friendly injection technology, Liebherr offers solutions for hydrogen combustion engines that can be used in on- and off-highway applications.

Nussbaumen (Switzerland), November 2, 2021 - The mobility industry is currently focusing heavily on reducing CO₂ emissions. For on-highway vehicles, from passenger cars all the way to heavy trucks, clear objectives have already been defined internationally. For off-highway applications, on the other hand, no binding plans have yet been set forth. However, the global decarbonisation strategy is showing increased interest in hydrogen as a fuel among OEMs and engine manufacturers in the off-highway sector. As a development partner and system supplier for climate-friendly injection technology, Liebherr offers solutions for hydrogen combustion engines that can be used in on- and off-highway applications. In Deggendorf (Germany), Liebherr-Components has been developing climate-friendly injection concepts for heavy-duty engines in the range of 6 - 16 litres displacement at 200 - 450 kW power rate for some time now. Upon development, the Liebherr team on site keeps close contact with leading OEMs.

Focusing on low-pressure direct injection

Development work in the injection systems product area focuses on low-pressure direct injection (LPDI). "The greatest challenges represent different combustion processes and the behaviour of the hydrogen as a medium," explains Richard Pirkl, technical managing director at Liebherr-Components Deggendorf

GmbH. "The concept of the H2 injector must ensure stable, precise and leak-free injection. To achieve this, our experts in Deggendorf place particular emphasis on maximum hydrogen tightness," Pirkl continues. A 2-valve concept ensures that H2 leakage is kept as low as possible. Depending on the particular configuration, the LPDI injector is designed for system pressures of up to 60 bar. Typical applications usually lie in the range of 30 bar. Initial test results show promising behaviour of the injector in terms of injection rate and small-volume capability. The component thus covers a wide range of applications. Today's prototypes allow customer-specific screw inserts to interface with the hydrogen connection. They are geared towards most common connection types and offer the greatest possible flexibility in engine development. The blow cap also promises flexible handling. It is easy to replace, and its asymmetrical geometry makes an individual injection angle in the combustion chamber possible. This ensures integration into different engines with sometimes widely differing installation situations. With its flexible design, Liebherr's LPDI hydrogen injector supports a wide range of customer-specific requirements and modular installation - centrally, laterally and at different angles.

Continuing a systems approach

Discussions lead with OEMs along with current market developments show, that many engine manufacturers prefer fully integrated H2 injection systems to a single-component solution. The Liebherr team in the injection systems product area pursues this approach with its common-rail solutions for diesel fuels and continues to do so with alternative fuels. Thereby, Liebherr focuses on the sizing and design of a fully comprehensive H2 injection system, including system pressure control. This means that customers continue to enjoy the benefits of an integrated solution. In addition to the injector, the experts in Deggendorf are currently working on the development and integration of further components for system solutions.

Usage characteristics correspond diesel drive

The goal of Liebherr's hydrogen injection technology is to ensure that the suitability of the gas injection system (GIS) meets the transient requirements of the engine. This system-oriented approach combines various components to control pressure and flow. It does so in such a way, that the usage characteristics come close to a diesel engine, while maintaining a robust system design.

About Liebherr-Components AG

In this segment, the Liebherr Group specialises in the development, design, manufacturing of high-performance components in the field of mechanical, hydraulic and electric drive and control technology. Liebherr-Component Technologies AG, based in Bulle (Switzerland), coordinates all activities in the Components product segment.

The extensive product range includes diesel and gas engines, injection systems, engine control units, axial piston pumps and motors, hydraulic cylinders, slewing bearings, gearboxes and winches, switchgear, electronic and power electronics components, and software. The high-quality components are used in cranes and earthmoving machinery, in the mining industry, maritime applications, wind turbines, automotive engineering or in aviation and transport technology. Synergy effects in other product segments of the Liebherr Group are used to drive continuous technological development.

About the Liebherr Group

The Liebherr Group is a family-run technology company with a highly diversified product portfolio. The company is one of the largest construction equipment manufacturers in the world. It also provides high-quality and user-oriented products and services in a wide range of other areas. The Liebherr Group includes over 140 companies across all continents. In 2020, it employed around 48,000 staff and achieved combined revenues of over 10.3 billion euros. Liebherr was founded in Kirchdorf an der Iller in Southern Germany in 1949. Since then, the employees have been pursuing the goal of achieving continuous technological innovation, and bringing industry-leading solutions to its customers.

Images



liebherr-injection-concepts-for-alternative-fuels.jpg

reThink&reFuel: Liebherr develops injection concepts for H2 combustion engines.



liebherr-LPDI-hydrogen-injector.jpg

The LPDI hydrogen injector is designed for system pressures of up to 60 bar.



liebherr-hydrogen-direct-injection-system.jpg

Hydrogen direct injection system is designed for heavy duty ICE in transient on- & off-highway operation.

Contact

Alexandra Nolde

Senior Communication & Media Specialist

Phone: +41 56 296 43 26

E-mail: alexandra.nolde@liebherr.com

Published / released by

Liebherr-Components AG

Nussbaumen/ Switzerland

www.liebherr.com/components

www.liebherr.com/injection-systems