EXPERIMENTAL ENGINE RESEARCH

Gas Engine Testing

As part of the energy transition and an increasing customer demand for environmentally friendly power trains and propulsion solutions, gaseous fuels are attracting particular attention in the field of personal mobility, but also for industrial and marine applications. FVTR contributes to this energy transition with its work in the research area of gas and alternative fuel engines. A comprehensive gas infrastructure and three test benches with a wide power range are currently available for your project ideas.

Challenges in Gas Engine Development

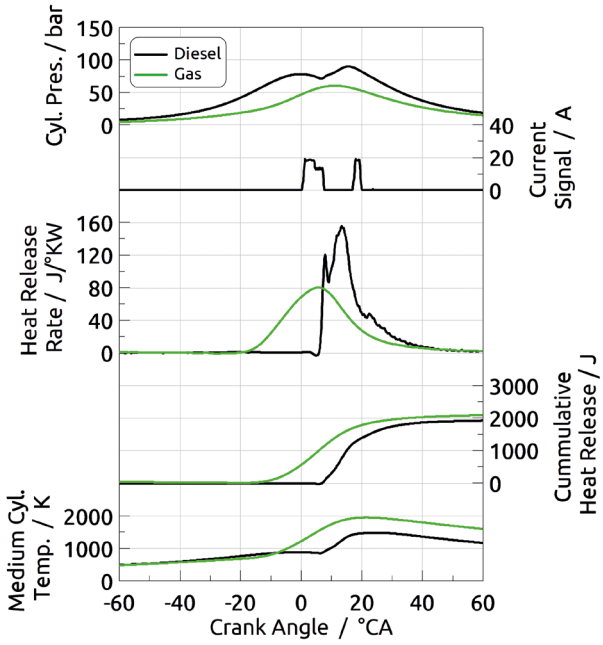
Natural gas resp. methane has a huge potential to address the pressing issues of CO_2 reduction either via inherent lower carbon content than liquid fossile fuels or in future via a synthesis pathway out of renewable energies.
Several combustion technologies are possible: lean-gas for stationary application, dual-fuel for shipping, stoichiometric w/ EGR or even diffusion controlled for car and truck applications.

Some of the main challenges are:

- High specific power
- Methane slip
- Knocking and misfiring with homogeneous combustion processes
- Cryogenic components for high-pressure gas systems

We are looking forward to support you with your development projects regarding gas existing engines and related components as well as completely new concepts.

Our Development Services



- Development of gas powered light and medium duty engines
- Analyzation of CNG and LNG combustion processes at our test benches
- Test of exhaust gas treatment components under combustion gas operation
- Simulation based development of combustion chamber designs and components
- Investigation of the influences of gaseous fuels on lubricants
- Development of operating strategies for gas engines
- Component testing

FVTR GmbH • Joachim-Jungius-Str. 9 • D-18059 Rostock • CEOs: Dr.-Ing. Martin Theile, Dipl.-Ing. Martin Drescher

Gas Infrastructure

Our available gas infrastructure is based upon natural gas from the public grid. Three different pressure levels are achieved by a 20 bar screw compressor, a 250 bar piston compressor and a 600 bar pressure transducer. With these systems a maximum mass flow of 150 kg/h can be supplied.

Furthermore, we have the opportunity to add CO_2 and LPG to the base natural gas in order to control the relevant properties like methane number and heating value in wide ranges. This state of the art gas mixing facility is already prepared to be upgraded with another gaseous component – like for example H_2.

▲ *Gas storage tanks for gas mixing facility*

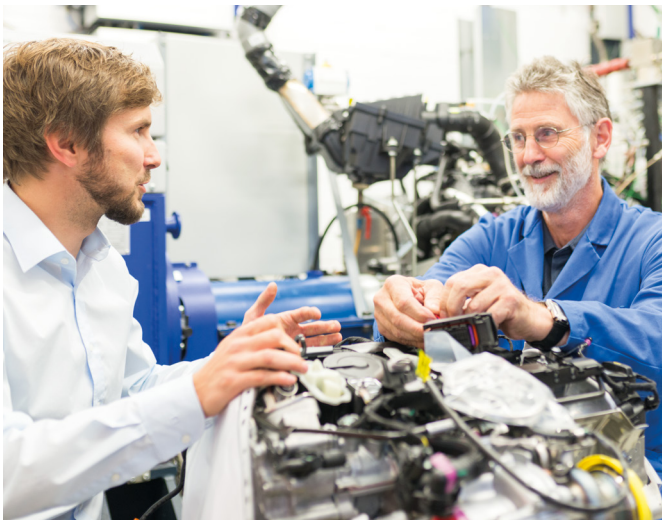
The LPG used for the gas mixing can also be provided at various test benches in liquid or gaseous form. For the analysation of the incoming gas quality as well as for the control of the gas mixing process our gas infrastructure is equipped with an in-situ gas chromatograph. This allows us to analyse up to 11 species in the fuel gas flow directly upstream of the test engines.

Key Benefits for Your Project

- Modern engine test benches
- Expert knowledge in pilot spray and spark plug ignited gas combustion processes
- Natural gas infrastructure for three different pressure stages: 20, 250 and 600 bar
- LPG supply in liquid and gaseous form
- Gas mixing facility (CO_2 & LPG) for adaption of methane number and heating value
- State of the art gas chromatograph for analyzation of gas qualities
- Compliance to highest safety standards

Are you interested in further information?
Feel free to contact our friendly experts. Together we will find a solution for your challenges.

▲ *20 bar natural gas compressor*



Through the cooperation with other working groups in the company, engine issues can be dealt with holistically:

- Investigation of injection and mixture formation processes at own and specialized injection test benches
- Chemical analysis of customer fuels and lubricant samples
- Simulation of mixture and combustion processes by our experienced and well-equipped CFD team

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CEO
Dipl.-Ing. Martin Drescher

+49 381 4059 656
martin.drescher@fvtr.de