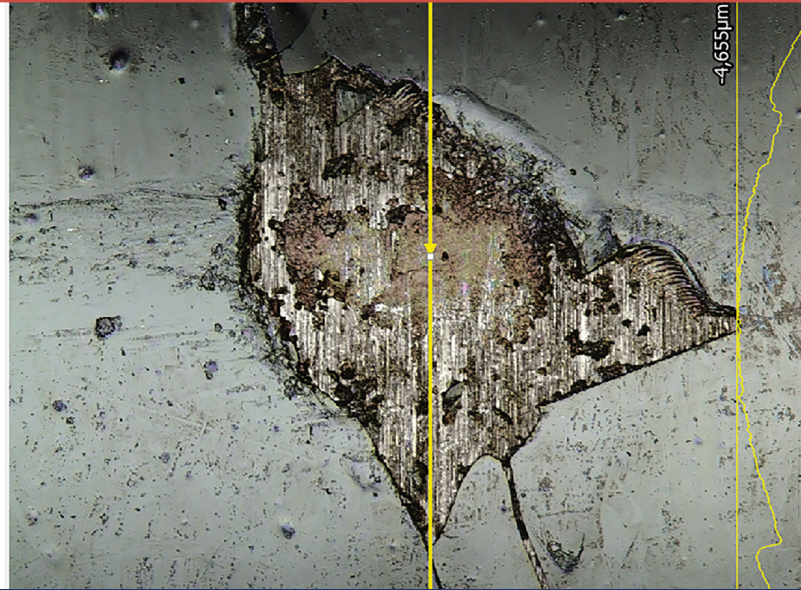


Internal Diesel Injector Deposits



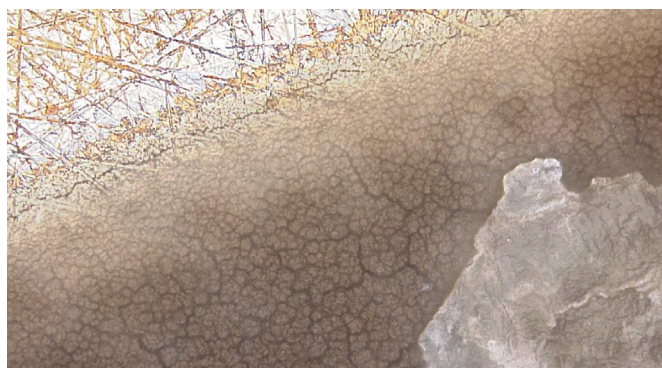
The recent development of highly efficient injection systems for rising rail pressures worsens the generation of deposits inside injectors. OEMs and suppliers alike face problems with injector internal deposits, leading to costly warranty cases that reduce the overall company revenue. Building on several years of research, Germany based FVTR offers extensive services in this field using a specialized internal diesel injector deposit bench and state-of-the-art microscopy equipment.

Causes for Deposit Formation

Warranty cases caused by failed injection systems can be a deal breaker for introducing new technologies. Increasing injection pressures and tighter tolerances are the way to face the challenges of intensified emission and CO₂ legislation for diesel engine manufacturers and suppliers.

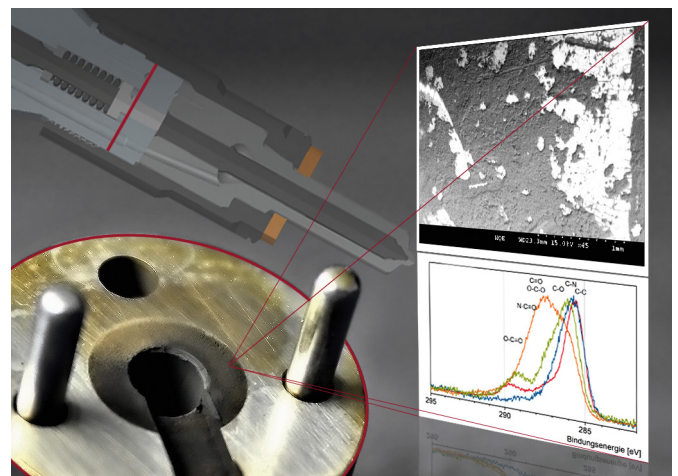


These measures however increase the likelihood of diesel injector failures due to deposits. FVTR has identified a large number of fuel components and additives as well as gap geometry responsible for aggravating the challenge of designing robust injection systems and compliant additives.



▲ Microscopic view of internal injector deposits showing manufacturing marks, fuel-oxidation related and soap-like deposits

Analysis of Fuel Deposits



The three-dimensional analysis of surfaces and deposits using confocal and laser scanning microscopy allows an excellent assessment of deposit structure and chemical composition.

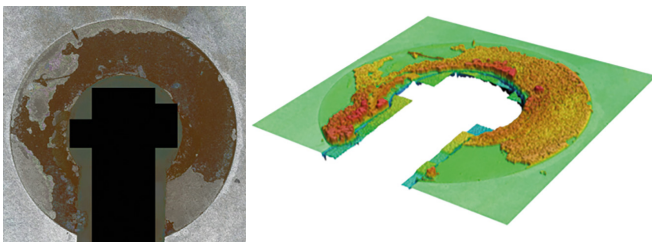
The technique furthermore offers highly accurate measurements of:

- Surface roughness,
- Layer thickness,
- Thickness of transparent layers > 1 μm,
- Rotation-symmetric components,
- Counting of particles,
- 3D-imprints.

IDID Test Bench

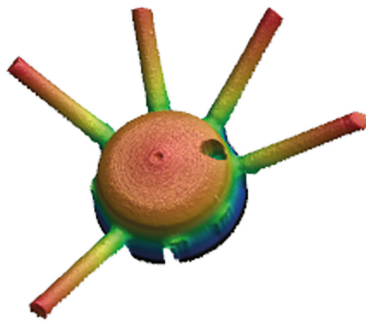
In order to support your development processes and to ensure your products to be the right solution for your customers we offer our expertise and state-of-the-art equipment in the field of injector internal deposits.

Together with Rostock University the FVTR-team developed an IDID test bench that reliably simulates the conditions a modern injection system has to endure during life-time. With this technique all temperatures and boundary conditions as well as chemical fuel properties can be precisely defined. This in turn enables us to generate deposits on diesel injector components with remarkable reliability.



▲ 2D and 3D view of deposits on an internal injector part

Our experts measure by confocal and laser scanning microscopes and assess the results using proven evaluation methods.



▲ 3D view of an injector nozzle cast

Key Benefits for Your Project

- Reduction of costly engine experiments by shorter set-up times and lower operational costs
- Cooperation with the leading experts in the field of internal diesel injector deposit analysis
- Analysis of deposits by proven evaluation methods
- One-stop solution for experimental setup and realization as well as component and chemical analysis
- Tailor-made consulting and detailed reports

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



Technical Data

- System pressures up to 2500 bar
- Fuels: EN 590 diesel fuel, low quality diesel fuel, HVO, RME, SME, HFO
- Diesel injectors with 5-200 mm³/stroke
- System temperatures up to 250°C
- Online monitoring of injector performance
- Stationary / instationary operation
- Start / Stop operation
- Open loop – real fuel flow
- Closed loop – recirculation of injected fuel
- Operation of solenoid and piezo injectors
- Automated long duration tests > 500 h



FUEL INJECTION ANALYSIS

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