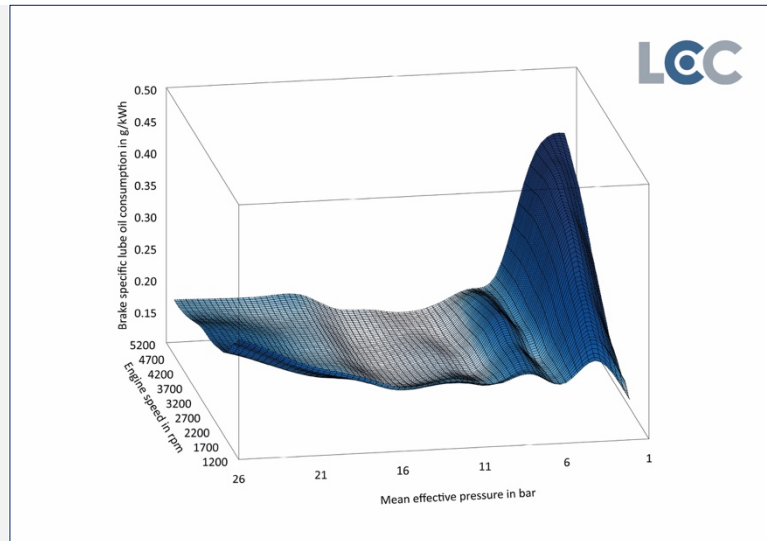


**LEC EvoLET
LEC Accurate Online Lube Oil
Consumption Measurement**

Programme: COMET – Competence
Centers for Excellent Technologies

Programme line: COMET Center K1

Project type: strategic
Short title: LEC OilTracer
Duration: 2015-2020



LEC OILTRACER: HIGH PRECISION ONLINE LUBE OIL CONSUMPTION MEASUREMENT AS THE NEW STANDARD

LEC OILTRACER IS A UNIQUE TOOL AND PROCEDURE PATENTED BY THE LEC THAT PERFORMS HIGH PRECISION OIL CONSUMPTION MEASUREMENT. THE CONCEPT PERMITS ONLINE MEASUREMENT OF ANY TYPE OF ENGINE AND FUEL. A SPECIAL TRACER MAKES IT POSSIBLE TO OBTAIN RESULTS THAT ARE CLEARLY MORE RELIABLE THAN PREVIOUS METHODS. LEC OILTRACER HAS TREMENDOUS POTENTIAL TO BECOME THE NEW STANDARD IN ENGINE DEVELOPMENT.

Reduced oil consumption means reduced emissions

The oil consumption of an internal combustion engine has a significant influence on its emissions and lifecycle costs. Thus the exact measurement of oil consumption is key to research and development on engines—and especially with regard to their environmental impact. Important to its application

are not only the highest accuracy but also online capability, independence from the fuel and engine concept used and the least possible influence on the tribological system.

Previously very different methods have been used for oil consumption measurement—for example, radioactive tracer methods or measurement of the

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sulfur dioxide content in the exhaust. What these methods all have in common is that they cannot simultaneously meet every requirement. In addition, the situation with several of these methods is made more difficult by the fact that development of lubricants is ongoing so that certain procedures can no longer be used or have come up against their limits. That is why the LEC has been making an effort to develop a universally applicable method for some time.

Patented procedure with the ultimate tracer

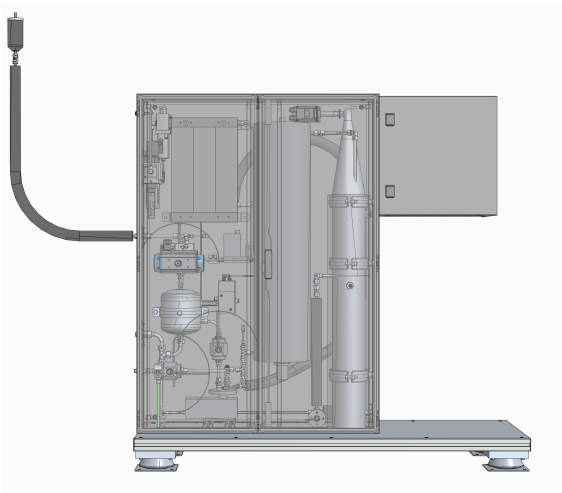


Fig. 1: LEC OilTracer measuring instrument prototype © LEC

The ultimate tracer was found for LEC OilTracer: deuterium, a stable and non-radioactive isotope. The engine oil is first enriched with deuterium. Then the deuterium is detected in steam from the exhaust

during engine operation. This allows a very reliable statement to be made on oil consumption since deuterium is clearly attributable to the lubricant. The patented procedure was developed by the LEC team with industrial and research partners.

Universally applicable multitalent from automobiles to large engines

The features of LEC OilTracer make the measurement system a unique tool for high precision online measurement of lube oil consumption that can be used by OEMs and suppliers of test bed systems in all engine categories from small engines to passenger car engines to large engines.

The LEC OilTracer prototype (see Fig. 1) was first used on an engine test bed in December 2020. It has high sensitivity and good reproducibility and is easy to operate. Related publications are currently in preparation and should be published in the third quarter of 2021. An onboard system (installed in a passenger car or a truck) is also in development. One current challenge is the efficient production of large amounts of deuterated lubricants. Extensive testing is being conducted to optimize this process.

New standard in engine development

The tool demonstrates once again the great innovative power of the LEC team, underlining its ability to find answers to previously unsolvable problems. LEC OilTracer fills a market niche and has tremendous potential to become the new standard in engine development.

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Project coordination (story)

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