

Romaszewski Oil Bench Oxidation (ROBO) Test

Before engine oils are made available in the global marketplace, they must pass a grueling set of specifications approved by the International Lubricant Standardization and Approval Committee (ILSAC), representing U.S. and Japanese automobile manufacturers. With assistance from Southwest Research Institute® (SwRI®), the Romaszewski Oil Bench Oxidation (ROBO) test was developed to be a part of the newest specification, GF-5, which targets three areas of improvement:

- Emission system compatibility
- Fuel economy and fuel economy retention
- Robustness of engine oils for increased engine durability

The ROBO test evaluates the effect of pour point depressants on the low-temperature properties of used oils. It simulates the ILSAC Sequence IIIGA engine test, but oils are more quickly and inexpensively oxidized than with a traditional multi-hour fired engine test.

In the ROBO test, a lubricant specimen is combined with a small amount of iron catalyst and placed into a one-liter reaction vessel. The sample is reacted with nitrogen dioxide and air for 40 hours at 170°C. After cooling, the oil is subjected to other pertinent testing.

Basic equipment for the ROBO apparatus at SwRI includes:

- Analytical balance with 200-g capacity, capable of 0.1 g accuracy
- Fume hood rated for use with hazardous gases
- Electric stirrer capable of sustained operation at 200 ±5 rpm
- Air supply system
- Temperature control system
- Vacuum system

The ROBO apparatus has a full range of safety-related features, including:

- IR-UV flame detector
- Hood draft sensor
- NO₂ sensors, in and outside the hood
- Audible and visual alarms
- Independent temperature control capabilities

The ROBO test provides a clear correlation to results normally obtained in full IIIGA engine tests for a fraction of the cost. The ROBO test is also now an approved ASTM test.



DO-17474



DO-17475



DO-17476

Quality Accomplishments

The Office of Automotive Engineering (OAE) at SwRI is certified to ISO 9001:2008, "Quality Management Systems – Requirements," accredited to ISO/IEC 17025:2005, "General Requirements for the Competence of Testing and Calibration Laboratories," and certified to ISO 14001:2004, "Environmental Management Systems." The OAE has also achieved Ford Tier 1 status for providing engineering services and the Engine, Emissions and Vehicle Research Division has received the Ford Q1 Quality Award. In addition, the Petroleum Products Research Department is a Nuclear Procurement Issues Committee (NUPIC)-approved laboratory and the Fuels and Lubricants Research Division has maintained its status as an American Chemistry Council (ACC)-approved laboratory.



Southwest Research Institute is an independent, nonprofit, applied engineering and physical sciences research and development organization using multidisciplinary approaches to problem solving. The Institute occupies 1,200 acres in San Antonio, Texas, and provides more than 2 million square feet of laboratories, test facilities, workshops and offices for more than 3,200 employees who perform contract work for industry and government clients.

We welcome your inquiries. For additional information, please contact:

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