



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

SOUTHWEST RESEARCH INSTITUTE
Office of Automotive Engineering
Fuels and Lubricants Research Division
6220 Culebra Road, P.O. Drawer 28510
San Antonio, TX 78228-0510
Paul Nemeth Phone: 210 522 5891

CHEMICAL

Valid To: August 31, 2018

Certificate Number: 0702.04

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following types of tests on fuels, lubricants, and petroleum products:

- Spectroscopy:** Atomic absorption, Emission, Inductively Coupled Plasma, UV/Visible, Magnetic, X-ray Fluorescence
- Physical Properties:** Appearance, Combustion, Conductivity, Density, Flash Point, Foaming Characteristics, Freezing Point, Gum Formation, Particle Size, Vapor Pressure, Viscosity, Volatility
- Chromatography:** Gas Chromatography, Column Chromatography, Supercritical Fluid Chromatography, Mass Spectrometry
- Wet Chemistry Measurements:** Titrametric, Volumetric, Gravimetric
- Thermal Analysis:** DSC (Differential Scanning Calorimetry), Heat of Combustion, TGA (Thermogravimetric Analysis)
- Miscellaneous:** Compatibility, Filter Testing, Oxidation, Wear Testing, Elastomer Testing

Method

Method Name

Chromatography

Column

ASTM D 2007
ASTM D 1319

Clay Gel
FIA

Gas Chromatography

ASTM D 5580
ASTM D 5769
ASTM D 3606
ASTM D 5501
ASTM D 3524
ASTM D 3525
ASTM D 6417
ASTM D 4815
ASTM D 5599

Aromatics
Aromatics by GC/MS
Benzene
Ethanol Content
Fuel Dilution
Fuel Dilution by GC
Oil Volatility by GC
Oxygenates
Oxygenates by OFID

Method
Chromatography (cont'd)

ASTM D 2887

Supercritical Fluid Chromatography

ASTM D 5186

Miscellaneous

Compatibility

ASTM D 611
ASTM D 2711
ASTM D 1401
ASTM D 4682
ASTM D 1094

Oxidation

ASTM D 130
ASTM D 4340
ASTM D 1384
ASTM D 873
ASTM D 2272
ASTM D 665
ASTM D 1748
ASTM D 4742
CEC L-48

CEC L-85
CEC L-105
CEC L-109

Wear Testing

ASTM D 2783
ASTM D 3233
ASTM D 6079
ASTM D 4172

Elastomer Testing

CEC L-39
CEC L-112
ASTM D471

Physical Properties

Appearance

ASTM D 156
ASTM D 1500

Engine Testing

ASTM D 613
ASTM D 2700
ASTM D 2699

Method Name

Simulated Distillation

Aromatics by SFC

Aniline Point
Demusibility of Oils
Emulsion Characteristics
Miscibility
Water Reaction

Copper Corrosion
Corrosion of Aluminum Alloy
Corrosion Test
Oxidation Stability of Jet Fuels
RBOT
Rust Prevention
Rust Protection
TFOUT
Stability of Lubricating Oils used in Automotive
Transmission by Artificial Aging
Hot Surface Oxidation
Low Temperature Pumpability
Oxidation Test for Engine Oils Operating in the
Presence of Biodiesel Fuels

Extreme Pressure Properties
Falex
HFRR
Wear Preventative

The Evaluation of Oil – Elastomer Compatibility
The Evaluation of Oil – Elastomer Compatibility
Rubber Property – Effect of Liquids

Color Saybolt
Color-ASTM

Cetane
MON
RON



| <u>Method</u> | <u>Method Name</u> |
|--|---|
| <u>Physical Properties (cont'd)</u> | |
| Combustion | |
| ASTM D 1322 | Smoke Point |
| Conductivity | |
| ASTM D 2624 | Conductivity |
| Density | |
| ASTM D 1298 | Density |
| ASTM D 287 | Density |
| ASTM D 4052 | Density |
| Flash Point | |
| ASTM D 92 | Fire Point |
| ASTM D 93 | Pensky Martens Flash |
| ASTM D 56 | Tag Flash Point |
| Foaming Characteristics | |
| ASTM D 892 | Foam |
| Freezing Point | |
| ASTM D 2500 | Cloud Point |
| ASTM D 2386 | Freeze Point |
| ASTM D 97 | Pour Point |
| ASTM D 1177 | Freezing Point of Antifreeze |
| Gum Formation | |
| ASTM D 381 | Gum Content |
| Particulate Contamination | |
| ASTM D 2276-89 | Particulate Contamination |
| Vapor Pressure | |
| ASTM D 5191 | RVP |
| ASTM D 5188 | V/L |
| Viscosity | |
| ASTM D 4684 | Apparent Viscosity |
| ASTM D 2983 | Brookfield |
| ASTM D 5293 | Cold Crank |
| ASTM D 6371 | Cold Filter Plugging Point |
| ASTM D 4683 | TBS |
| ASTM D 445, VIT8 | Viscosity |
| CEC L-36 | High Shear High Temperature Viscosity Measurement |



Method**Physical Properties (cont'd)****Shear**

ASTM D 6278
ASTM D 2603 / 5621
CEC L-14

CEC L-45

Method Name

Shear Stability
Sonic Shear
Evaluation of Mechanical Shear Stability of
Lubricating Oils
Shear Stability of Transmission Lubricants

Volatility

ASTM D 86
ASTM D 972
ASTM D 5800
CEC L-40

Distillation
Evaporation Loss
NOACK
Evaporating Loss of Lubricating Oils

Spectroscopy**Emission**

ASTM D 4629
ASTM D 5453

Nitrogen Chem.
Sulfur by Antek

ICP

ASTM D 5185

Wear Metals

Magnetic

ASTM D 3701
ASTM D 4808

Hydrogen by NMR
Hydrogen by NMR

UV/Visible

ASTM D 1840
CEC L-82

Naphthalene
Spectrophotometric Detection of Soot in Used Engine
Oil Samples

X-Ray Fluorescence

ASTM D 2622
ASTM D 4294

Sulfur
Sulfur

Thermal Analysis**Heat of Combustion**

ASTM D 240
ASTM D 4809

Heat of Combustion
Heat of Combustion

TGA

ASTM D 5967 Annex A4

TGA Soot in Oils



Method**Wet Chemistry (cont'd)****Gravimetric**

ASTM D 482
ASTM D 874
ASTM D 129
ASTM D 189
ASTM D 4530
ASTM D 524
ASTM D 808

Titrametric

ASTM D 974
ASTM D 3339
ASTM D 664
ASTM D 2896
ASTM D 4739
ASTM D 3228
ASTM D 6304

Volumetric

ASTM D 4176
ASTM D 893
ASTM D 1796
ASTM D 2709

Miscellaneous

TIP 07C-002
TIP 07C-003

TIP 07C-006

TIP 07C-009
TIP 07C-012

TIP 07C-020

TIP 07C-022

API/IP Specification 1581

API/IP Specification 1583

Method Name

Ash
Ash Sulfated
Bomb Sulfur
Carbon Residue
Carbon Residue
Carbon Residue
Chlorine

Acid Base Number
Acid Number
Acid Number
Base Number
Base Number
Nitrogen
Water by Karl Fisher

Free Water
Insolubles
Water and Sediment
Water and Sediment

Methane Quantitative Analysis
Analysis of Sulfate in Exhaust by Ion
Chromatography
Analysis of Aldehydes and Ketones in Exhaust by
High Performance Liquid Chromatography
Organic Solvent Extractions of Particulate Filters
Methanol and Ethanol Analysis by Capillary Column
GC
N₂O Measurement by Gas Chromatography – Electron
Capture Detector
N₂O Measurement by Fourier Transform Infrared
(FTIR) Spectroscopy in Accordance with Part 1065
Specifications and Qualification Procedures for
Aviation Jet Fuel Filter/Separators
Specifications and Qualification Procedures for
Aviation Fuel Filter Monitors with Absorbent Type
Elements





Accredited Laboratory

A2LA has accredited

SOUTHWEST RESEARCH INSTITUTE

San Antonio, TX

for technical competence in the field of

Chemical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).



Presented this 11th day of July 2016.

A handwritten signature in black ink, appearing to read "L. Sen", written over a horizontal line.

President and CEO
For the Accreditation Council
Certificate Number 0702.04
Valid to August 31, 2018
Revised May 18, 2018

For the tests to which this accreditation applies, please refer to the laboratory's Chemical Scope of Accreditation.