

# SOUTHWEST RESEARCH INSTITUTE®

Fuels and Lubricants Research Division

## Sequence VIE Engine Test (ASTM D8114)

### Specifications

- ILSAC GF-6A

### Objective

- Provide a comparative fuel economy index (FEI) of the fuel-saving capabilities of automotive engine oils under repeatable laboratory conditions.

### Field Service Simulated

- Passenger cars and light-duty trucks.

### Test Fixture

- 2012 3.6 L V6 General Motors gasoline engine with external lubricant heating/cooling system and “flying flush” system for changing lubricants without engine shutdown.

### Test Parameters

- The test duration is 196 hours.
- Fuel consumption is measured for six speed/load/temperature test conditions compared to an SAE 20W-30 baseline (BL) lubricant to ensure consistent engine response.
- FEI 1, FEI 2 and FEI Sum (FEI 1 plus FEI 2) are calculated from those comparisons.
- The candidate lubricant is introduced and aged for 16 hours at aging conditions and then fuel consumption is measured for six test conditions for FEI 1.
- The candidate lubricant is left in the engine and aged for 109 hours at aging conditions for FEI 2.
- Fuel consumption for each of the six test conditions for BL after.
- Operating targets are as follows:

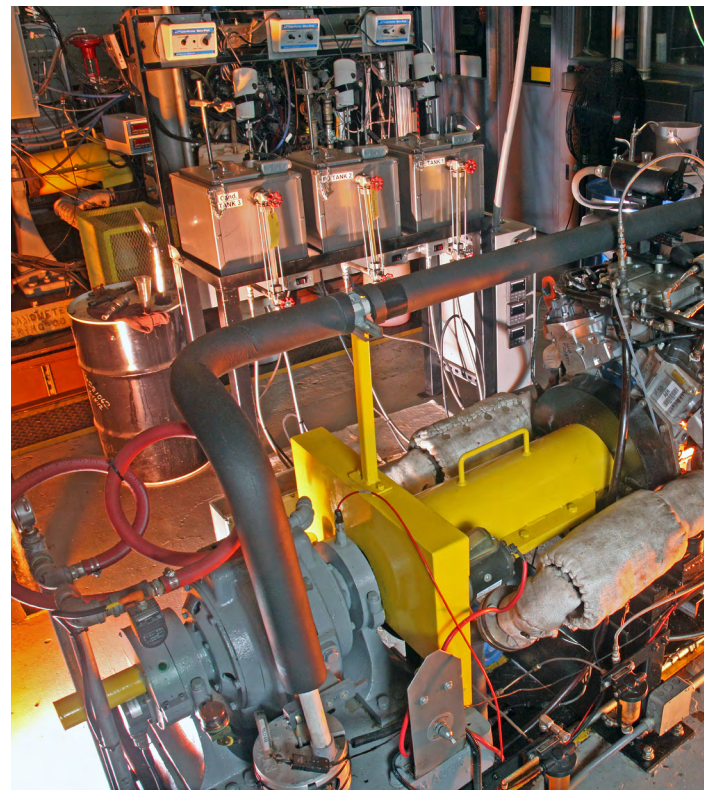
Test Condition	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6
Speed, rpm	2000	2000	1500	695	695	695
Torque, Nm	105	105	105	20	20	40
Lubricant temp, °C	115	65	115	115	35	115
Coolant-in temp, °C	109	65	109	109	35	109

### Test Parts Evaluation

- None.
- Test results are expressed as a percent change of fuel consumed for the candidate lubricant after Aging Phase I (FEI 1) and after Aging Phase II (FEI 2) relative to the baseline lubricant before and after the candidate lubricant.

### Used Lubricant Analysis

Viscosity @ 40°C & 100°C (ASTM D445)



Fuel Efficiency	Test Limit
SEQUENCE VIE XW-20 FEI2 XW-20 FEI SUM	D8114 1.8 3.8
SEQUENCE VIE XW-30 FEI2 XW-30 FEI SUM	D8114 1.5 3.1
SEQUENCE VIE 10W-30 FEI2 10W-30 FEI SUM	D8114 1.3 2.8

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

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