

# SOUTHWEST RESEARCH INSTITUTE®

Fuels and Lubricants Research Division

## Sequence IIH Engine Test (ASTM D8111)

### Specifications

- API Category – SN, SN PLUS, SP
- ILSAC category – GF-5, GF-6

### Objective

Measure lubricant thickening and piston deposits under high-temperature conditions.

### Field Service Simulated

High-speed service under relatively high ambient conditions.

### Test Fixture

2014 Chrysler 3.6 L Pentastar port fuel-injected gasoline engine.

### Test Parameters

Using unleaded gasoline, the engine runs an 8-minute initial lubricant leveling procedure followed by a 15-minute slow ramp-up to speed and load conditions. It then operates at 137 bhp, 3900 rpm, and 151°C lubricant temperature for 90 hours, interrupted at 20-hour intervals for lubricant level checks.

### Test Parts Evaluation

- Inspect all six pistons for deposits, varnish, and stuck piston rings.

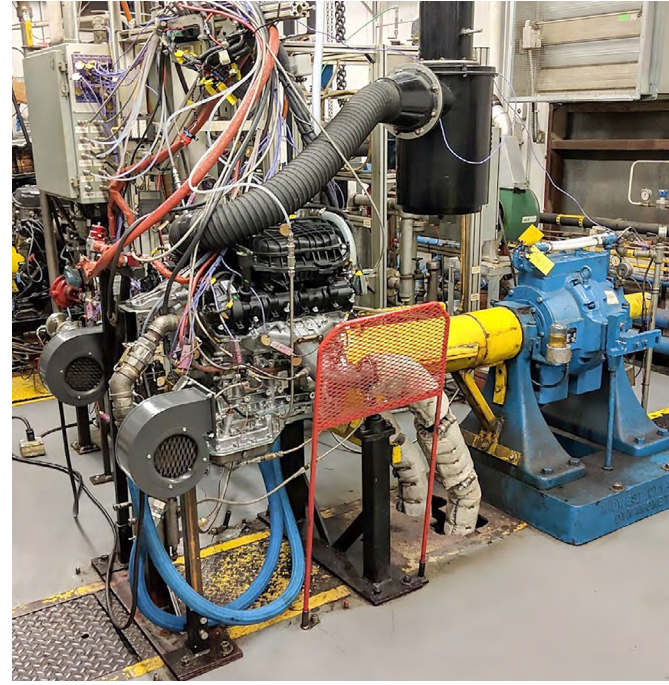
### Used Lubricant Analysis

- Using ASTM D445, compare kinematic viscosity increase at 40°C to a new lubricant baseline (% increase) every 20 hours.
- Wear metals (ASTM D5185)
- Total base number (ASTM D4739)
- Total acid number (ASTM D664)
- Oxidation and nitration by Infrared Spectra (IR 5.8\_6.1)

### Pass/Fail Criteria

GF-6 Pass Limit	
Parameter	Pass Limit
Viscosity increase	100 % maximum
Weighted piston deposits	4.2 minimum
Hot stuck rings	None

IIH to IIIG Equivalency SN/SN PLUS/GF-5	
Parameter	Pass Limit
Viscosity increase	150% maximum
Weighted piston deposits	3.7 minimum
Hot stuck rings	None



**We welcome your inquiries.**  
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