

# Sequence VG Report Forms

## Version

Conducted For

	V = Valid
	I = Invalid
	N = Results cannot be interpreted as representative of oil performance (Non-Reference Oil) and shall not be used in determining an average test result using multiple test acceptance criteria.

	NR = Non-reference Oil Test
	RO = Reference Oil Test

Test Number			
Stand:	Runs Between Calibration Tests:		Total Runs on Stand:
Date Completed:	End of Test Time:		
Oil Code:			
Formulation/Stand Code:			
Alternate Codes:			

In my opinion this test \_\_\_\_\_ been conducted in a valid manner in accordance with the VG Test Method D 6593 and the appropriate amendments through the Information Letter system. The remarks included in the report describe the anomalies associated with this test.

SUBMITTED BY \_\_\_\_\_

Testing Laboratory

Signature

Typed Name

Title

## Form 2

### Sequence VG

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<sup>A</sup> ACC Conformance Statement is required for only ACC registered tests

**Sequence VG Sludge and Varnish Deposit Test  
Form 3**

Summary of Test Method

The Sequence VG engine sludge and varnish deposit test is a fired engine-dynamometer test which evaluates the ability of a lubricant to minimize the formation of sludge and varnish deposits. This test method is a cyclic test, with a total running duration of 216 hours.

The test engine is a Ford 4.6L, spark ignition, four stroke, eight cylinder “V” configuration engine. Features of this engine include dual overhead camshafts, a cross-flow fast burn cylinder head design, two valves per cylinder and electronic port fuel injection. A 90 minute break-in schedule is conducted prior to each test, since a new engine build is used for each test.

The Sequence VG test requires a new engine for each test. Each test is run for 216 hours, consisting of 54 cycles of 4 hours each. Each cycle consists of 3 stages. The stages of the test cycle are set at the following conditions:

Condition	Stage I	Stage II	Stage III
Duration, minutes	120	75	45
Engine Speed, r/min	1200	2900	700
Engine Power, kW	Record	Record	1.10 - 1.50
Manifold Abs Press, kPa (abs)	69	66	Record
Engine Oil In, °C	68	100	45
Engine Coolant Out, °C	57	85	45
Engine Coolant Flow, L/min	48	Record	Record
Engine Coolant Pressure, kPa (gauge)	70	70	70
RAC Coolant In, °C	29	85	29
Rocker Cover Flow, L/min	15	15	15
Intake Air, °C	30	30	30
Intake Air, Press, kPa (gauge)	0.05	0.05	0.05
Exhaust Gas Analysis, Lambda	1.0	1.0	0.75
Blowby Flow Rate Avg, L/min	Record	60 - 70	-----
Air/Fuel Ratio	Stoichmetric	Stoichmetric	11.5:1
Intake Air Humidity, g/kg	11.4	11.4	11.4
Exhaust Back Pressure, kPa abs	104	107	Record
Fuel Flow, kg/h	Record	Record	Record

Upon test completion, the engine is disassembled and rated for sludge and varnish. Average Engine Sludge and Average Engine Varnish are calculated.

**Sequence VG  
Form 4  
Test Result Summary  
Non-Reference & Reference Oil Tests**

Laboratory:	Stand:	Stand Runs:	Total Runs on Stand:
Oilcode:			
Formulation/Stand Code:			

Date Started:	Time Started:	SAE Viscosity:
Date Complete:	Time Complete:	Lab Engine Number:
Test Length:	Fuel Batch:	
Industry Oil Code:	Nominal Piston Oversize:	

<b>Critical Parameters</b>						
	Average Engine Sludge, Merits	Rocker Cover Sludge, Merits	Average Engine Varnish, Merits	Average Piston Skirt Varnish, Merits	Oil Screen Sludge, % Area	Number of Hot Stuck Rings
Original Result						
Transformed Result						
Industry Correction Factor <sup>A</sup>						
Corrected Transformed Result						
Severity Adjustment						
Final Transformed Result						
<b>Final Original Unit Result</b>						

<sup>A</sup>Industry correction factor for Average Engine and Rocker Cover Sludge are fixed correction factors of 0.42 and 0.23, respectively. Average Engine and Piston Varnish are fixed correction factors of 0.12 and 0.39 merits, respectively.

<b>Clogging Information</b>		<b>Additional Information</b>	
Oil Screen Debris, % Area		Number of Cold Stuck Rings	
Oil Ring Clogging, % Area		Average Blowby Stage II, L/min	
PCV Valve @ 25 kPa, %		Oil Consumption, grams	
PCV Valve @ 60 kPa, %		Avg. Follower Pin Wear, Cylinder 8	

**Sequence VG  
Form 5  
Test Result Summary  
Non-Reference & Reference Oil Tests**

Laboratory:	Stand:	Stand Runs:	Total Runs on Stand:
Oilcode:			
Formulation/Stand Code:			

Date Completed:		Time Completed :	
Camshaft Serial Numbers		Cam, Left:	Cam, Right:
Cylinder Head Serial Numbers		Head, Left:	Head, Right:
Number of Runs	Block:	Left Head:	Right Head:

<b>Sludge Deposits</b>	
<b>Area</b>	<b>Merit</b>
Rocker Arm Cover, Left	
Rocker Arm Cover, Right	
Camshaft Baffle, Left	
Camshaft Baffle, Right	
Timing Chain Cover	
Oil Pan Baffle	
Oil Pan	
Valve Deck Area, Left	
Valve Deck Area, Right	
<b>Average Engine Sludge</b>	

<b>Varnish Deposits</b>	
<b>Area</b>	<b>Merit</b>
Piston Skirt, Thrust	
Cam Baffle, Left	
Cam Baffle, Right	
<b>Average Engine Varnish</b>	

<b>Wear Measurements</b>		
<b>Ring Wear</b>	<b>Units</b>	<b>Value</b>
Follower Pin Wear, Cyl #8, Intake	µm	
Follower Pin Wear, Cyl #8, Exhaust.	µm	
Ring Gap Increase, Cyl #1 & #8, Max	µm	
Ring Gap Increase, Cyl #1 & #8, Avg	µm	

<b>Piston Varnish Deposits, Thrust Side</b>	
<b>Piston Number</b>	<b>Merit</b>
1	
2	
3	
4	
5	
6	
7	
8	
<b>Average</b>	

**Sequence VG  
Form 6  
Operational Summary**

Laboratory:	Stand:	Stand Runs:	Total Runs on Stand:
Oilcode:			
Formulation/Stand Code:			

Controlled Parameters	Parameter	Units	QI Threshold	EOT QI	Target			Average			Samples	BQD	Over/Under Range	
					Stage 1	Stage 2	Stage 3	Stage 1	Stage 2	Stage 3				
	Speed	r/min	0.000		1200	2900	700							
	Manifold Abs Press	kPa	0.000		69	66	Record							
	Engine Oil, In	°C	0.000		68	100	45							
	Engine Coolant, Out	°C	0.000		57	85	45							
	Engine Coolant Flow	L/min	0.000		48	Record	Record							
	Engine Coolant Pressure	kPa	0.000		70	70	70							
	RAC Coolant, In	°C	0.000		29	85	29							
	RAC Flow	L/min	0.000		15	15	15							
	Intake Air	°C	0.000		30	30	30							
	Intake Air Pressure	kPa	0.000		0.05	0.05	0.05							
	Intake Air Humidity	g/kg	0.000		11.4	11.4	11.4							
	Exhaust Backpressure	kPa	0.000		104	107	Record							
Non-controlled	Parameter	Units			Specifications									
	Fuel Flow	kg/h			Record	Record	Record							
	Blowby	L/min			Record	60-70								
	Power	kW			Record	Record	1.3 ± 0.2							
	Exhaust Gas													
	Lambda, Left Bank	AFR				1.0	1.0	0.75						
Lambda, Right Bank	AFR				1.0	1.0	0.75							

**Sequence VG**  
**Form 7**  
**Oil Addition Record & Blowby Rates**  
**Non-Reference & Reference Oil Tests**

Laboratory:	Stand:	Stand Runs:	Total Runs on Stand:
Oilcode:			
Formulation/Stand Code:			

Cycle	Test Hour	Oil Added, g	Oil Consumed, g
<b>Total, g</b>			

Stage II	
Test Hours	Blowby, L/min
<b>Maximum</b>	
<b>Minimum</b>	
<b>Average Blowby, Hours 23 - 119</b>	
<b>Average</b>	

**Sequence VG  
Form 8  
Analysis of Oil**

Laboratory:	Stand:	Stand Runs:	Total Runs on Stand:
Oilcode:			
Formulation/Stand Code:			

Test Hours	Ag, ppm	Al, ppm	Cr, ppm	Cu, ppm	Fe, ppm	Pb, Ppm	Si, ppm	Sn, ppm	Fuel Dilution by GC, Wt.% D3525	Pentane Insolubles, Wt.% D893B <sup>A</sup>	TBN D4739 <sup>A</sup>	Vis. @ 40°C, cSt D445	Vis. @ 100°C, cSt D445 <sup>A</sup>

<sup>A</sup> Analyses not required by Test Method









**Sequence VG  
Form 10  
American Chemistry Council Code Of Practice  
Test Laboratory Conformance Statement**

Test Laboratory					
Test Sponsor					
Formulation / Stand Code					
Test Number					
Start Date		Start Time		Time Zone	

No. 1 All requirements of the ACC Code of Practice for which the test laboratory is responsible were met in the conduct of this test. Yes \_\_\_\_\_ No \_\_\_\_\_\*

No. 2 The laboratory ran this test for the full duration following all procedural requirements; and all operational validity requirements of the latest version of the applicable test procedure (ASTM or other), including all updates issued by the organization responsible for the test, were met.  
Yes \_\_\_\_\_ No \_\_\_\_\_\*

If the response to this Declaration is “No”, does the test engineer consider the deviations from operational validity requirements that occurred to be beyond the control of the laboratory? Yes \_\_\_\_\_\* No \_\_\_\_\_

No 3. A deviation occurred for one of the test parameters identified by the organization responsible for the test as being a special case. Yes \_\_\_\_\_\* No \_\_\_\_\_ (*This currently applies only to specific deviations identified in the ASTM Information Letter System*)

***Check the Appropriate Conclusion***

	Operational review of this test indicates that the results should be included in the Multiple Test Acceptance Criteria calculations.
	*Operational review of this test indicates that the results should not be included in the Multiple Test Acceptance Criteria calculations.

**Note: Supporting comments are required for all responses identified with an asterisk.**

Comments

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Typed Name

\_\_\_\_\_  
Title