

## Sequence VH 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 VH Test Method D 8256 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 VH

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

## Sequence VH Sludge and Varnish Deposit Test Form 3

### Summary of Test Method

The Sequence VH 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 180 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 VH 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 AVH, 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 VH**  
**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:
Number of Valid Tests Since Stand Calibration <sup>A</sup>		
Industry Oil Code:		Nominal Piston Oversize:

Critical Parameters						
	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>B</sup>						
Corrected Transformed Result						
Severity Adjustment						
Final Transformed Result						
<b>Final Original Unit Result</b>						

Clogging Information		Additional Information	
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, %			

<sup>A</sup> Non-Reference Tests Only, includes current test if valid.

<sup>B</sup> Industry correction factors can be found in Section 13 of Test Method D8256

**Sequence VH**  
**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 :
-----------------	------------------

Sludge Deposits	
Area	Merit
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	
Average Engine Sludge	

Varnish Deposits	
Area	Merit
Piston Skirt, Thrust	
Cam Baffle, Left	
Cam Baffle, Right	
Average Engine Varnish	

Piston Varnish Deposits, Thrust Side	
50% Rating Method	
Piston Number	Merit
1	
2	
3	
4	
5	
6	
7	
8	
Average	

**Sequence VH**  
**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 Parameters	Parameter		Units		Specifications								
	Fuel Flow		kg/h		Record	Record	Record						
	Fuel Rail		°C		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 VH**  
**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
Total, g			

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

**Sequence VH**  
**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 VH**  
**Form 9**  
**Build Data Information**

Lab		Oil Code	
Stand		Test No.	
Formulation Stand Code			

Hardware Information	
Engine Build Date	
Block Serial Number	
Left Cam Serial Number	
Right Cam Serial Number	
Cylinder Head Serial Number, Left	
Cylinder Head Serial Number, Right	
Runs on Block	
Runs on Left Head	
Runs on Right Head	
Runs on Left Cam	
Runs on Right Cam	

Cylinder Bore Measurements (mm)								
Cylinder	Transverse				Longitudinal			
	Top	Middle	Bottom	Taper	Top	Middle	Bottom	Taper
1								
2								
3								
4								
5								
6								
7								
8								

Cylinder Surface Finish Measurements							
Cylinder	Ra (µin)	Rk (µin)	Rpk (µin)	Rvk (µin)	Rz (µin)	Mr2 (%)	Crev Vol. (µin <sup>3</sup> )
1							
2							
3							
4							
5							
6							
7							
8							

Piston Ring End Gap (inches)								
	1	2	3	4	5	6	7	8
Top Ring Pre-Test								
2 <sup>nd</sup> Ring Pre-Test								





# Sequence VH

## Form 10B

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

Number of Downtime Occurrences				
Test Hours	Date	Downtime	Reasons	
			Total Downtime	

[illegible]

**Sequence VH  
Form 11  
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