VG REPORT FORMS VERSION *VG VERSION 20001214*

REPORT ON SEQUENCE VG EVALUATION

CONDUCTED FOR

CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC

C	V = VALID
	I = INVALID
	N = RESULTS CAN NOT 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.

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

Test Number			
Test Stand: *CCCCC*	Runs Between Calibration Tests: *CCCC*	Total Runs on Test Stand: *CCCCC*	
Date Completed: *YYYYMMDD*		End of Test Time: *HH:MM*	
Oil Code: *CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC*			
Formulation/Stand Code: *CC-CCCCCCCCCC-C-C-CCCCCC-CC-CC-CCCCC*			
Alternate Codes:	*CCCCCCCCCC*	*CCCCCCCCCC*	*CCCCCCCCCC*

In my opinion this test *CCCCCCCC* been conducted in a valid manner in accordance with the VG Test Procedure (RR:) and the appropriate amendments through the Information Letter system. The remarks included in the report describe the anomalies associated with this test.

SUBMITTED BY: *CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC*

Testing Laboratory

Signature Image

Signature

CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC

Typed Name

CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC

Title

FIG A7.1 Title Page

SEQUENCE VG
FORM 4
TEST RESULT SUMMARY
NON-REFERENCE & REFERENCE OIL TESTS

Laboratory: *CC*	Stand: *CCCCC*	Stand Runs: *CCCC*	Oil Code: *CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC*
Date Started: *YYYYMMDD*	Time Started: *HH:MM*	Date Completed: *YYYYMMDD*	Time Completed: *HH:MM*
Formulation/Stand Code: *CC-CCCCCCCCCCC-C-C-CCCCCC-CC-CC-CCCCC*			

Lab Engine Number: *CCCCCC*	SAE Viscosity: *CCCCCCC*
Test Length: *S12*	Fuel Batch: *CCCCCCCC*
Industry Oil Code: *CCCCCC*	

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	*S12.12*	*S12.12*	*S12.12*	*S12.12*	*S123*	*S1*
Transformed Result					*S1.1234*	
Industry Correction Factor	*S12.12*	*S12.12*	*S12.12*	*S12.12*	*S1.1234*	*S1*
Corrected Transformed Result					*S1.1234*	
Severity Adjustment	*S12.12*	*S12.12*	*S12.12*	*S12.12*	*S1.1234*	*S1*
Final Transformed Result					*S1.1234*	
Final Original Unit Result	*S12.12*	*S12.12*	*S12.12*	*S12.12*	*S12.12*	*S12.12*

Clogging Information		**Additional Information**	
Oil Screen Debris, % Area	*S123*	Number of Cold Stuck Rings	*S1*
Oil Ring Clogging, % Area	*S123*	Average Blowby Stage II, L/min	*S12.12*
PCV Valve @ 25 kPa, %	*S12.12*	Oil Consumption, grams	*S123456*
PCV Valve @ 60 kPa, %	*S12.12*		

Last Reference Oil Test Calibrating Stand Information - Fill Out For Non-reference Oil Tests Only

Stand: *CCCCC*	Total Runs on Test Stand: *CCCCC*	Oilcode: *CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC*	
Industry Oil Code: *CCCCCC*	Engine Number: *CCCCCC*	SAE Viscosity: *CCCCCCC*	Date Completed: *YYYYMMDD*
Test Length: *S12*	Fuel Batch: *CCCCCCCC*	Calibration Expiration Date: *YYYYMMDD*	

Clogging Information		**Additional Information**	
Oil Screen Debris, % Area	*S123*	Number of Cold Stuck Rings	*S1*
Oil Ring Clogging, % Area	S123	Average Blowby Stage II, L/min	*S12.12*
PCV Valve @ 25 kPa, %	*S12.12*	Oil Consumption, grams	*S123456*
PCV Valve @ 60 kPa, %	*S12.12*		

	Average Engine Sludge, merits	Average Rocker Cover Sludge, merits	Average Engine Varnish, merits	Average Piston Skirt Varnish, merits	Oil Screen Sludge, % Area	Number of Hot Stuck Rings
Final Original Unit Result	*S12.12*	*S12.12*	*S12.12*	*S12.12*	*S123*	*S1*

FIG A7.4 Test Result Summary

SEQUENCE VG
FORM 5
TEST RESULT SUMMARY
NON-REFERENCE & REFERENCE OIL TESTS

Laboratory: *CC*	Stand: *CCCCC*	Stand Runs: *CCCC*	Oil Code: *CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC*
Date Started: *YYYYMMDD*	Time Started: *HH:MM*	Date Completed: *YYYYMMDD*	Time Completed: *HH:MM*
Formulation/Stand Code: *CC-CCCCCCCCCC-C-C-CCCCCC-CC-CC-CCCCC*			

Hardware Identification	Production Number *CCCCCCCCCCCCCCC*	Serial Number *CCCCCCCCCCCCCCC*	
Casting Numbers	Block *CCCCCCCCCCCCCCC*	Cam, Left *CCCCCCCCCCCCCCC*	Cam, Right *CCCCCCCCCCCCCCC*
Piston Part Number *CCCCCCCCCCCCCCC*		Piston Ring Casting Number *CCCCCCCCCCCCCCC*	
Cylinder Head Casting Number	Left *CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC*	Right *CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC*	

Sludge Deposits	
Area	**Merit**
Rocker Arm Cover, Left	*S1.12*
Rocker Arm Cover, Right	*S1.12*
Camshaft Baffle, Left	*S1.12*
Camshaft Baffle, Right	*S1.12*
Timing Chain Cover	*S1.12*
Oil Pan Baffle	*S1.12*
Oil Pan	*S1.12*
Valve Deck Area, Left	*S1.12*
Valve Deck Area, Right	*S1.12*
Average Engine Sludge	*S12.12*

Varnish Deposits	
Area	**Merit**
Piston Skirt, Thrust	*S12.12*
Rocker Arm Cover, Left	*S1.12*
Rocker Arm Cover, Right	*S1.12*
Average Engine Varnish	*S12.12*

Wear Measurements		
Ring Wear	**Units**	**Value**
Follower Pin Wear, cyl #8, Intake.	µm	*S123.1*
Follower Pin Wear, cyl #8, Exhaust.	µm	*S123.1*
Cylinder Bore Wear, cyl #1 & #8 Max.	µm	*S123.1*
Cylinder Bore Wear, cyl #1 & #8 Avg.	µm	*S123.1*
Ring Gap Increase, cyl #1 & #8, Max	µm	*S123.1*
Ring Gap Increase, cyl #1 & #8, Avg	µm	*S123.1*

Piston Varnish Deposits, Thrust Side	
Piston Number	**Merit**
1	*S1.12*
2	*S1.12*
3	*S1.12*
4	*S1.12*
5	*S1.12*
6	*S1.12*
7	*S1.12*
8	*S1.12*
Average	*S12.12*

FIG A7.5 Deposit Breakdown

SEQUENCE VG
FORM 6
OPERATIONAL SUMMARY

Laboratory: *CC*	Date Completed: *YYYYMMDD*	Time Completed: *HH:MM*
Stand: *CCCCC*	Stand Runs: *CCCC*	Total Runs on Stand: *CCCCC*	Oil Code: *CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC*
Formulation/Stand Code: *CC-CCCCCCCCCC-C-C-CCCCCC-CC-CC-CCCCC*		

	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			
Controlled Parameters	Speed	r/min	0.000	*S12.123*	1200	2900	700	*S1234*	*S1234*	*S1234*	*S12345*	*S12345*	*S12345*
	Manifold Abs Press	kPa	0.000	*S12.123*	69	66	Record	*S12.1*	*S12.1*	*S12.1*	*S12345*	*S12345*	*S12345*
	Engine Oil, In	˚C	0.000	*S12.123*	68	100	45	*S123.1*	*S123.1*	*S123.1*	*S12345*	*S12345*	*S12345*
	Engine Coolant,Out	˚C	0.000	*S12.123*	57	85	45	*S12.1*	*S12.1*	*S12.1*	*S12345*	*S12345*	*S12345*
	Engine Coolant Flow	L/min	0.000	*S12.123*	48	Record	Record	*S123.1*	*S123.1*	*S123.1*	*S12345*	*S12345*	*S12345*
	Engine Coolant Pressure	kPa	0.000	*S12.123*	70	70	70	*S123.1*	*S123.1*	*S123.1*	*S12345*	*S12345*	*S12345*
	RAC Coolant, In	˚C	0.000	*S12.123*	29	85	29	*S12.1*	*S12.1*	*S12.1*	*S12345*	*S12345*	*S12345*
	RAC Flow	L/min	0.000	*S12.123*	15	15	15	*S12.1*	*S12.1*	*S12.1*	*S12345*	*S12345*	*S12345*
	Intake Air	˚C	0.000	*S12.123*	30	30	30	*S12.1*	*S12.1*	*S12.1*	*S12345*	*S12345*	*S12345*
	Intake Air Pressure	kPa	0.000	*S12.123*	0.05	0.05	0.05	*S1.123*	*S1.123*	*S1.123*	*S12345*	*S12345*	*S12345*
	Intake Air Humidity	g/kg	0.000	*S12.123*	11.4	11.4	11.4	*S12.1*	*S12.1*	*S12.1*	*S12345*	*S12345*	*S12345*
	Exhaust Backpressure	kPa	0.000	*S12.123*	104	107	Record	*S123.1*	*S123.1*	*S123.1*	*S12345*	*S12345*	*S12345*

	Parameter	Units		Specifications							
Non-controlled Parameters	Fuel Flow	kg/h		Record	Record	Record	*S12.1*	*S12.1*	*S12.1*		
	Blowby	L/min		Record	60-70			*S12.12*			
	Power	kW		Record	Record	1.3 ± 0.2	*S12.12*	*S12.12*	*S12.12*		
	Exhaust Gas										
	Left Manifold O_2	% Vol		1.0 Max	1.0 Max	3.0 Max	*S12345*	*S12345*	*S12345*		
	Right Manifold O_2	% Vol		1.0 Max	1.0 Max	3.0 Max	*S1.12*	*S1.12*	*S1.12*		
	Left Manifold CO	% Vol		1.0 Max	2.0 Max	8.5±1.5	*S12.12*	*S12.12*	*S12.12*		
	Right Manifold CO	% Vol		1.0 Max	2.0 Max	8.5±1.5	*S12.12*	*S12.12*	*S12.12*		
	Left Manifold CO_2	% Vol		13.5-15.5	13.5-15.5	Record	*S12.12*	*S12.12*	*S12.12*		
	Right Manifold CO_2	% Vol		13.5-15.5	13.5-15.5	Record	*S12.12*	*S12.12*	*S12.12*		
	Lambda	AFR		1.0	1.0	0.75	*S1234*	*S1234*	*S1234*		

FIG A7.6 Operational Summary

SEQUENCE VG
FORM 6
OPERATIONAL SUMMARY

Laboratory: *CC*	Date Completed: *YYYYMMDD*	Time Completed: *HH:MM*	
Stand: *CCCCC*	Stand Runs: *CCCC*	Total Runs on Stand: *CCCCC*	Oil Code: *CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC*
Formulation/Stand Code: *CC-CCCCCCCCCC-C-C-CCCCCC-CC-CC-CCCCC*			

	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			
Controlled Parameters	Speed	r/min	0.000	*S1234*	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						

	Parameter	Units		Specifications							
Non-controlled Parameters	Fuel Flow	kg/h		Record	Record	Record					
	Blowby	L/min		Record	60-70			*S12.12*			
	Power	kW		Record	Record	1.3 ± 0.2					
	Exhaust Gas										
	Left Manifold O_2	% Vol		1.0 Max	1.0 Max	3.0 Max					
	Right Manifold O_2	% Vol		1.0 Max	1.0 Max	3.0 Max					
	Left Manifold CO	% Vol		1.0 Max	2.0 Max	8.5±1.5					
	Right Manifold CO	% Vol		1.0 Max	2.0 Max	8.5±1.5					
	Left Manifold CO_2	% Vol		13.5-15.5	13.5-15.5	Record					
	Right Manifold CO_2	% Vol		13.5-15.5	13.5-15.5	Record					
	Lambda	AFR		1.0	1.0	0.75					

FIG A7.6 Operational Summary

SEQUENCE VG
FORM 7
OIL ADDITION RECORD & BLOWBY RATES
NON-REFERENCE & REFERENCE OIL TESTS

Laboratory: *CC*	Stand: *CCCCC*	Stand Runs: *CCCC*	Oil Code: *CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC*
Date Started: *YYYYMMDD*	Time Started: *HH:MM*	Date Completed: *YYYYMMDD*	Time Completed: *HH:MM*
Formulation/Stand Code: *CC-CCCCCCCCCC-C-C-CCCCCC-CC-CC-CCCCC*			

Cycle	Test Hour	Oil Added, g	Oil Consumed, g
6	23 h, 25 min	*S1234*	*S1234*
12	47 h, 25 min	*S1234*	*S1234*
18	71 h, 25 min	*S1234*	*S1234*
24	95 h, 25 min	*S1234*	*S1234*
30	119 h, 25 min	*S1234*	*S1234*
36	143 h, 25 min	*S1234*	*S1234*
42	167 h, 25 min	*S1234*	*S1234*
48	191 h, 25 min	*S1234*	*S1234*
54	215 h, 25 min		*S1234*
Total, g		*S123456*	*S123456*

Stage II	
Test Hours	Blowby, L/min
Break-in	*S12.12*
23	*S12.12*
47	*S12.12*
71	*S12.12*
95	*S12.12*
119	*S12.12*
143	*S12.12*
167	*S12.12*
191	*S12.12*
215	*S12.12*
Maximum	*S12.12*
Minimum	*S12.12*
Average Blowby, Hours 23 - 119	*S12.12*
Average	*S12.12*

FIG A7.7 Blowby and Oil Additions

SEQUENCE VG
FORM 8
ANALYSIS OF OIL

Laboratory: *CC*	Stand: *CCCCC*	Stand Runs: *CCCC*	Oil Code: *CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC*
Date Started: *YYYYMMDD*	Time Started: *HH:MM*	Date Completed: *YYYYMMDD*	Time Completed: *HH:MM*
Formulation/Stand Code: *CC-CCCCCCCCCC-C-C-CCCCCC-CC-CC-CCCCC*			

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 [A]	TBN D4739[A]	Vis. @ 40˚C, cSt D445	Vis. @ 100˚C, cSt D445 [A]
CCC	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*			*S12.12*	*S123.12*	*S123.12*
CCC	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12.1*		*S12.12*	*S123.12*	*S123.12*
CCC	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12.1*	*S1.12*	*S12.12*	*S123.12*	*S123.12*
CCC	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12.1*		*S12.12*	*S123.12*	*S123.12*
CCC	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12.1*	*S1.12*	*S12.12*	*S123.12*	*S123.12*
CCC	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12.1*		*S12.12*	*S123.12*	*S123.12*
CCC	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12.1*	*S1.12*	*S12.12*	*S123.12*	*S123.12*
CCC	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12.1*		*S12.12*	*S123.12*	*S123.12*
CCC	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12.1*	*S1.12*	*S12.12*	*S123.12*	*S123.12*
CCC	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12345*	*S12.1*	*S1.12*	*S12.12*	*S123.12*	*S123.12*

[A] Analyses not required by Test Method

FIG A7.8 Oil Analysis

SEQUENCE VG
FORM 9
DOWNTIME OCCURRENCES AND
OTHER COMMENTS

Laboratory: *CC*	Stand: *CCCCC*	Stand Runs: *CCCC*	Oil Code: *CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC*
Date Started: *YYYYMMDD*	Time Started: *HH:MM*	Date Completed: *YYYYMMDD*	Time Completed: *HH:MM*
Formulation/Stand Code: *CC-CCCCCCCCCC-C-C-CCCCCC-CC-CC-CCCCC*			

Number of Downtime Occurrences			*S1*
Test Hours	Date	Downtime	Reasons
HHH:MM	*YYYYMMDD*	*HHH:MM*	*CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC*
		HHH:MM	Total Downtime

Other Comments	
Number of Comment Lines	*S1*
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC	

FIG A7.9 Downtime