

**Test Method D 6837 for Measurement of the Effects of Automotive Engine Oils on  
the Fuel Economy of Passenger Cars and Light Trucks in the Sequence VIB Spark  
Ignition Engine  
Report Cover Sheet**

Version:

Conducted For:

	<b>V = Valid</b>
	<b>I = Invalid</b>
	<b>N = Results cannot be interpreted (refer to comment section)</b>

	<b>NR = Non-reference Oil Test</b>
	<b>RO = Reference Oil Test</b>

Lab:		Date Completed:		Time Completed:	
<b>Test Number</b>					
Test Stand:	Runs On The Stand:	Engine No.	Runs on Engine:		
Oil Code:					
Formulation/Stand Code:					
Alternate Codes					

<p>In my opinion this test _____ been conducted in a valid manner in accordance with the Test Method D 6837 and the appropriate amendments through the Information Letter System. The remarks included in the report describe the anomalies associated with this test.</p>
--

Submitted By: \_\_\_\_\_

Testing Laboratory

\_\_\_\_\_  
Signature

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

\_\_\_\_\_  
Title

## Form 2

### Sequence VIB

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**Sequence VIB  
Form 3**

**Summary of Test Method**

The Sequence VIB is an engine dynamometer test that measures a lubricant's ability to improve the fuel economy of passenger cars and light-duty trucks. The method compares the performance of a test lubricant to the performance of a baseline lubricant over five different stages of operation.

A 1993 Ford 4.6L spark ignition, V-8 cylinder design, 4-cycle engine is used as the test apparatus. The engine incorporates overhead camshafts, a cross-flow, fast-burn cylinder head design, two valves per cylinder, and an electronic port fuel injection.

The Sequence VIB test incorporates a flush and run type procedure. Each test consists of two 5-stage fuel economy measurements on baseline oil (BC), one at the beginning of the test and one at the end. The test oil is evaluated in between the two baseline runs. The test oil is initially aged during 16 hours of engine operation at 1500 r/min and 125°C oil temperature. After the initial aging, a 5-stage fuel economy measurement is taken. The test oil is then aged an additional 80 hours at an engine speed of 2250 r/min and 135°C oil temperature. Following this final aging, the test oil once again goes through a 5-stage fuel economy measurement. The two fuel economy measurements taken on the baseline oil (BC) and a final value for Fuel Economy Improvement is calculated for the test oil.

Below is a summary of the operation conditions for the aging and 5-stage fuel economy portions of the test.

<b>Fuel Economy Measurement and Aging Condition</b>				
<b>FE Stage</b>	<b>Speed (r/min)</b>	<b>Torque (N-m)</b>	<b>Oil Temp. (°C)</b>	<b>Coolant Temp. (°C)</b>
1	1500	98	125	105
2	800	26	105	95
3	800	26	70	60
4	1500	98	70	60
5	1500	98	45	45

<b>Aging Stage</b>	<b>Speed (r/min)</b>	<b>Torque (N-m)</b>	<b>Oil Temp. (°C)</b>	<b>Coolant Temp. (°C)</b>
1	1500	98	125	105
2	2250	98	135	105

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

Lab:	Date Completed:	Time Completed:
Test Number		
Test Stand:	Runs On The Stand:	Engine No.
Oil Code:	Engine Serial Number:	
Formulation/Stand Code:		

Test Documentation			
	BC Before	Test Oil	BC After
Start Date			
Start Time			
End Date			
End Time			
Oil Test Length, hhh:mm			
Calibration Oil Batch			
Flush Oil Batch			
Laboratory Oil Code			
SAE Viscosity Grade			
TMC Oil Code (Reference Oil Tests Only)			
New Oil Viscosity @ 40 °C, cSt			
New Oil Viscosity @ 100°C, cSt			
Aged (80 h) Oil Viscosity @ 40 °C, cSt			
Aged (80 h) Oil Viscosity @ 100°C, cSt			
Total Test Length, hhh:mm			
Total Engine Hours @ EOT			
Most Recent Fuel Batch			

Overall Results				
	BC Oil		Test Oil	
	Before	After	Phase I	Phase II
Fuel Consumed, kg				
Shift Delta, %				
Fuel Economy Improvement, %				
FEI Industry Correction Factor, %				
FEI Severity Adjustment, % (non-reference tests only)				
<b>FEI Final Result, %</b>				
Total Oil Consumption, mL				

Last Reference Oil Test on Stand/Engine History (Non-Reference Tests Only)			
Date Completed		Fuel Batch	
TMC Oil Code		SAE Viscosity Grade	
Oilcode		Calibration Oil Batch	
Runs on Stand		Runs on Engine	
		<b>Phase I</b>	<b>Phase II</b>
Final FEI Results			

**Sequence VIB  
Form 5  
Operational Data Analysis**

<b>Lab:</b>		<b>Date Completed:</b>		<b>Time Completed:</b>	
<b>Test Number</b>					
<b>Test Stand:</b>		<b>Runs On The Stand:</b>		<b>Engine No.</b>	
<b>Runs on Engine:</b>					
<b>Oil Code:</b>					
<b>Formulation/Stand Code:</b>					

<b>Computed Averages</b>						
<b>Oil</b>	<b>Stage</b>	<b>BSFC kg/kW-h</b>	<b>BSFC C.V.%</b>	<b>Nominal Power kW</b>	<b>Weight Factor</b>	<b>Weighted Fuel Consumed kg</b>
<b>BC Before Test Oil</b>	1			15.39	0.0802	
	2			2.18	0.0787	
	3			2.18	0.0848	
	4			15.39	0.0864	
	5			15.39	0.0699	
<b>Total Fuel Consumed</b>						

<b>Computed Averages</b>						
<b>Oil</b>	<b>Stage</b>	<b>BSFC kg/kW-h</b>	<b>BSFC C.V.%</b>	<b>Nominal Power kW</b>	<b>Weight Factor</b>	<b>Weighted Fuel Consumed kg</b>
<b>Test Oil Phase I</b>	1			15.39	0.0802	
	2			2.18	0.0787	
	3			2.18	0.0848	
	4			15.39	0.0864	
	5			15.39	0.0699	
<b>Total Fuel Consumed</b>						

**Sequence VIB  
Form 6  
Operational Data Analysis**

Lab:	Date Completed:	Time Completed:	
Test Number			
Test Stand:	Runs On The Stand:	Engine No.	Runs on Engine:
Oil Code:			
Formulation/Stand Code:			

<b>Computed Averages</b>						
<b>Oil</b>	<b>Stage</b>	<b>BSFC kg/kW-h</b>	<b>BSFC C.V.%</b>	<b>Nominal Power kW</b>	<b>Weight Factor</b>	<b>Weighted Fuel Consumed kg</b>
<b>Test Oil Phase II</b>	1			<b>15.39</b>	<b>0.0802</b>	
	2			<b>2.18</b>	<b>0.0787</b>	
	3			<b>2.18</b>	<b>0.0848</b>	
	4			<b>15.39</b>	<b>0.0864</b>	
	5			<b>15.39</b>	<b>0.0699</b>	
<b>Total Fuel Consumed</b>						

<b>Computed Averages</b>						
<b>Oil</b>	<b>Stage</b>	<b>BSFC kg/kW-h</b>	<b>BSFC C.V.%</b>	<b>Nominal Power kW</b>	<b>Weight Factor</b>	<b>Weighted Fuel Consumed kg</b>
<b>BC After Test Oil</b>	1			<b>15.39</b>	<b>0.0802</b>	
	2			<b>2.18</b>	<b>0.0787</b>	
	3			<b>2.18</b>	<b>0.0848</b>	
	4			<b>15.39</b>	<b>0.0864</b>	
	5			<b>15.39</b>	<b>0.0699</b>	
<b>Total Fuel Consumed</b>						

**Sequence VIB  
Form 7  
General Parameter Listing**

Lab:	Date Completed:	Time Completed:
Test Number		
Test Stand:	Runs On The Stand:	Engine No.
Oil Code:		
Formulation/Stand Code:		

**16 Hour Aging**

	Spec	Average <sup>A</sup>	Max <sup>A</sup>	Min <sup>A</sup>
1. Speed, r/min	<b>1500 ±5</b>			
2. Torque, N-m	<b>98 ±0.10</b>			
3. Oil Gallery Temperature, °C	<b>125 ±2</b>			
4. Coolant Inlet Temperature, °C	<b>105 ±2</b>			
5. Oil Circulation Temperature, °C	<b>Record</b>			
6. Coolant Out Temperature, °C	<b>Record</b>			
7. Intake Air Temperature, °C	<b>27 ±2</b>			
8. Fuel to Flowmeter Temperature, °C	<b>20-32</b>			
9. Fuel to Fuel Rail Temperature, °C	<b>20 ±2</b>			
10. Load Cell Temperature, °C	<b>Record</b>			
11. Oil Heater Temperature, °C	<b>205 max</b>			
12. Intake Air Pressure, kPa	<b>0.05 ±0.02</b>			
13. Fuel to Flowmeter Pressure, kPa	<b>100 min</b>			
14. Fuel to Fuel Rail Pressure, kPa	<b>205-310</b>			
15. Intake Manifold Pressure, kPa abs.	<b>Record</b>			
16. Exhaust Back Pressure, kPa abs.	<b>104 ±0.20</b>			
17. Engine Oil Pressure, kPa	<b>Record</b>			
18. Coolant Flow, L/min	<b>130 ±4</b>			
19. Fuel Flow, kg/h	<b>Record</b>			
20. Intake Air Humidity, grains/kg	<b>11.4±0.8</b>			
21. Air/Fuel Ratio	<b>Record</b>			
22. Crankcase Pressure, kPa	<b>0.00 ±0.25</b>			

<sup>A</sup> Based on a minimum of one determination per hour

**Sequence VIB  
Form 8  
General Parameter Listing**

Lab:	Date Completed:	Time Completed:	
Test Number			
Test Stand:	Runs On The Stand:	Engine No.	Runs on Engine:
Oil Code:			
Formulation/Stand Code:			

**80 Hour Aging**

	Spec	Average <sup>A</sup>	Max <sup>A</sup>	Min <sup>A</sup>
1. Speed, r/min	<b>2250 ± 5</b>			
2. Torque, N-m	<b>98 ±0.10</b>			
3. Oil Gallery Temperature, °C	<b>135±2</b>			
4. Coolant Inlet Temperature, °C	<b>105 ±2</b>			
5. Oil Circulation Temperature, °C	<b>Record</b>			
6. Coolant Out Temperature, °C	<b>Record</b>			
7. Intake Air Temperature, °C	<b>27 ±2</b>			
8. Fuel to Flowmeter Temperature, °C	<b>20-32</b>			
9. Fuel to Fuel Rail Temperature, °C	<b>20 ±2</b>			
10. Load Cell Temperature, °C	<b>Record</b>			
11. Oil Heater Temperature, °C	<b>205 max</b>			
12. Intake Air Pressure, kPa	<b>0.05 ±0.02</b>			
13. Fuel to Flowmeter Pressure, kPa	<b>100 min</b>			
14. Fuel to Fuel Rail Pressure, kPa	<b>205-310</b>			
15. Intake Manifold Pressure, kPa abs.	<b>Record</b>			
16. Exhaust Back Pressure, kPa abs.	<b>104 ± 0.20</b>			
17. Engine Oil Pressure, kPa	<b>Record</b>			
18. Coolant Flow, L/min	<b>130±4</b>			
19. Fuel Flow, kg/h	<b>Record</b>			
20. Intake Air Humidity, grains/kg	<b>11.4 ±0.8</b>			
21. Air/Fuel Ratio	<b>Record</b>			
22. Crankcase Pressure, kPa	<b>0.00 ±0.25</b>			

<sup>A</sup> Based on a minimum of one determination per hour



**Sequence VIB  
Form 9  
General Parameter Summary**

Lab:	Date Completed:	Time Completed:
Test Number		
Test Stand:	Runs On The Stand:	Engine No.
Runs on Engine:		
Oil Code:		
Formulation/Stand Code:		

**BC Before Test Oil**

**General Parameters**

	Spec	Stage				
		1	2	3	4	5
1. Oil Circulation Temperature, °C	<b>Record</b>					
2. Coolant Out Temperature, °C	<b>Record</b>					
3. Fuel to Flowmeter Temperature,	<b>20-32</b>					
4. Delta Fuel to Flowmeter Temp.,	<b>≤4</b>					
5. Test Cell Temperature, °C	<b>Record</b>					
6. Load Cell Temperature, °C	<b>Record</b>					
7. Delta Load Cell Temperature,	<b>≤12</b>					
8. Oil Heater Temperature, °C	<b>205 max</b>					
9. Intake Air Pressure, kPa	<b>0.05 ± .02</b>					
10. Fuel to Flowmeter Pressure,	<b>100 min</b>					
11. Fuel to Fuel Rail Pressure, kPa	<b>205-310</b>					
12. Intake Manifold Pressure, kPa	<b>Record</b>					
13. Engine Oil Pressure, kPa	<b>Record</b>					
14. Coolant Flow, L/min	<b>130 ±4</b>					
15. Intake Air Humidity, grains/kg	<b>11.4 ±0.8</b>					
16. Crankcase Pressure, kPa	<b>0.00 ±0.25</b>					
17. Blowby, L/min <sup>B</sup>	<b>Record</b>					
18. Barometric Pressure, kPa	<b>Record</b>					

<sup>A</sup> Difference between the maximum stage average reading of the entire test and the individual stage average readings

<sup>B</sup> Not required by test procedure

**Sequence VIB  
Form 10  
General Parameter Summary**

Lab:	Date Completed:	Time Completed:
Test Number		
Test Stand:	Runs On The Stand:	Engine No.
Runs on Engine:		
Oil Code:		
Formulation/Stand Code:		

**Test Oil Phase I  
General Parameters**

	Spec	Stage				
		1	2	3	4	5
1. Oil Circulation Temperature, °C	<b>Record</b>					
2. Coolant Out Temperature, °C	<b>Record</b>					
3. Fuel to Flowmeter Temperature, °C	<b>20-32</b>					
4. Delta Fuel to Flowmeter Temp., °C <sup>A</sup>	<b>≤ 4</b>					
5. Test Cell Temperature, °C	<b>Record</b>					
6. Load Cell Temperature, °C	<b>Record</b>					
7. Delta Load Cell Temperature, °C <sup>A</sup>	<b>≤ 12</b>					
8. Oil Heater Temperature, °C	<b>205 max</b>					
9. Intake Air Pressure, kPa	<b>0.05 ± .02</b>					
10. Fuel to Flowmeter Pressure, kPa	<b>100 min</b>					
11. Fuel to Fuel Rail Pressure, kPa	<b>205 – 310</b>					
12. Intake Manifold Pressure, kPa abs.	<b>Record</b>					
13. Engine Oil Pressure, kPa	<b>Record</b>					
14. Coolant Flow, L/min	<b>130 ± 4</b>					
15. Intake Air Humidity, grains/kg	<b>11.4 ± 0.8</b>					
16. Crankcase Pressure, kPa	<b>0.00 ± 0.25</b>					
17. Barometric Pressure, kPa	<b>Record</b>					

<sup>A</sup> Difference between the maximum stage average reading of the entire test and the individual stage average readings

**Sequence VIB  
Form 11  
General Parameter Summary**

Lab:	Date Completed:	Time Completed:
Test Number		
Test Stand:	Runs On The Stand:	Engine No.
Oil Code:		
Formulation/Stand Code:		

**Test Oil Phase II  
General Parameters**

	Spec	Stage				
		1	2	3	4	5
1. Oil Circulation Temperature, °C	<b>Record</b>					
2. Coolant Out Temperature, °C	<b>Record</b>					
3. Fuel to Flowmeter Temperature, °C	<b>20-32</b>					
4. Delta Fuel to Flowmeter Temp., °C <sup>A</sup>	<b>≤ 4</b>					
5. Test Cell Temperature, °C	<b>Record</b>					
6. Load Cell Temperature, °C	<b>Record</b>					
7. Delta Load Cell Temperature, °C <sup>A</sup>	<b>≤ 12</b>					
8. Oil Heater Temperature, °C	<b>205 max</b>					
9. Intake Air Pressure, kPa	<b>0.05 ± .02</b>					
10. Fuel to Flowmeter Pressure, kPa	<b>100 min</b>					
11. Fuel to Fuel Rail Pressure, kPa	<b>205 – 310</b>					
12. Intake Manifold Pressure, kPa abs.	<b>Record</b>					
13. Engine Oil Pressure, kPa	<b>Record</b>					
14. Coolant Flow, L/min	<b>130 ± 4</b>					
15. Intake Air Humidity, grains/kg	<b>11.4 ± 0.8</b>					
16. Crankcase Pressure, kPa	<b>0.00 ± 0.25</b>					
17. Barometric Pressure, kPa	<b>Record</b>					

<sup>A</sup> Difference between the maximum stage average reading of the entire test and the individual stage average readings

**Sequence VIB  
Form 12  
General Parameter Summary**

<b>Lab:</b>	<b>Date Completed:</b>	<b>Time Completed:</b>	
<b>Test Number</b>			
<b>Test Stand:</b>	<b>Runs On The Stand:</b>	<b>Engine No.</b>	<b>Runs on Engine:</b>
<b>Oil Code:</b>			
<b>Formulation/Stand Code:</b>			

**BC After Test Oil  
General Parameters**

	Spec	Stage				
		1	2	3	4	5
1. Oil Circulation Temperature, °C	<b>Record</b>					
2. Coolant Out Temperature, °C	<b>Record</b>					
3. Fuel to Flowmeter Temperature, °C	<b>20-32</b>					
4. Delta Fuel to Flowmeter Temp., °C <sup>A</sup>	<b>≤ 4</b>					
5. Test Cell Temperature, °C	<b>Record</b>					
6. Load Cell Temperature, °C	<b>Record</b>					
7. Delta Load Cell Temperature, °C <sup>A</sup>	<b>≤ 12</b>					
8. Oil Heater Temperature, °C	<b>205 max</b>					
9. Intake Air Pressure, kPa	<b>0.05 ± .02</b>					
10. Fuel to Flowmeter Pressure, kPa	<b>100 min</b>					
11. Fuel to Fuel Rail Pressure, kPa	<b>205 - 310</b>					
12. Intake Manifold Pressure, kPa abs.	<b>Record</b>					
13. Engine Oil Pressure, kPa	<b>Record</b>					
14. Coolant Flow, L/min	<b>130 ± 4</b>					
15. Intake Air Humidity, grains/kg	<b>11.4 ± 0.8</b>					
16. Crankcase Pressure, kPa	<b>0.00 ± 0.25</b>					
17. Barometric Pressure, kPa	<b>Record</b>					

<sup>A</sup> Difference between the maximum stage average reading of the entire test and the individual stage average readings

**Sequence VIB  
Form 13  
Critical Parameter Summary - Stage 1**

Lab:	Date Completed:	Time Completed:
Test Number		
Test Stand:	Runs On The Stand:	Engine No.
Runs on Engine:		
Oil Code:		
Formulation/Stand Code:		

**BC Before Test Oil**

Step	BSFC	Speed	Torque	Oil	Coolant	Intake	Fuel Rail	EBP	Fuel	AFR	Delta <sup>A</sup>
SPEC	kg/kW-h	r/min	N-m	Gallery	In	Air	Temp, °C	kPa	Flow	14.00-	AFR
		1500 ± 2	98 ± .07	Temp. °C	Temp, °C	Temp, °C	Temp, °C	104 ±	kg/h	15.00	≤ .50
1				125 ± 1	105 ± 1	27 ± 2	20 ± 2	.17	Record		
2											
3											
4											
5											
6											
AVG.											
SD											
C.V.											

**Test Oil Phase I**

Step	BSFC	Speed	Torque	Oil	Coolant	Intake	Fuel Rail	EBP	Fuel	AFR	Delta <sup>A</sup>
SPEC	kg/Kw-h	r/min	N-m	Gallery	In	Air	Temp, °C	kPa	Flow	14.00-	AFR
		1500 ± 2	98 ± .07	Temp. °C	Temp, °C	Temp, °C	Temp, °C	104 ±	kg/h	15.00	≤ .50
1				125 ± 1	105 ± 1	27 ± 2	20 ± 2	.17	Record		
2											
3											
4											
5											
6											
AVG.											
SD											
C.V.											

<sup>A</sup> Difference between the maximum stage average reading of the entire test and the individual stage average readings.

**Sequence VIB  
Form 13A  
Critical Parameter Summary - Stage 1**

Lab:	Date Completed:	Time Completed:
Test Number		
Test Stand:	Runs On The Stand:	Engine No.
Runs on Engine:		
Oil Code:		
Formulation/Stand Code:		

**Test Oil Phase II**

Step SPEC	BSFC kg/kW-h	Speed r/min 1500 ± 2	Torque N-m 98 ± .07	Oil Gallery Temp. °C 125 ± 1	Coolant In Temp, °C 105 ± 1	Intake Air Temp, °C 27 ± 2	Fuel Rail Temp, °C 20 ± 2	EBP kPa 104 ± .17	Fuel Flow kg/h Record	AFR 14.00- 15.00	Delta <sup>A</sup> AFR ≤ .50
1											
2											
3											
4											
5											
6											
AVG.											
SD											
C.V.											

**BC After Test Oil**

Step SPEC	BSFC kg/Kw-h	Speed r/min 1500 ± 2	Torque N-m 98 ± .07	Oil Gallery Temp. °C 125 ± 1	Coolant In Temp, °C 105 ± 1	Intake Air Temp, °C 27 ± 2	Fuel Rail Temp, °C 20 ± 2	EBP kPa 104 ± .17	Fuel Flow kg/h Record	AFR 14.00- 15.00	Delta <sup>A</sup> AFR ≤ .50
1											
2											
3											
4											
5											
6											
AVG.											
D											
C.V.											

<sup>A</sup> Difference between the maximum stage average reading of the entire test and the individual stage average readings.

**Sequence VIB**  
**Form 14**  
**Critical Parameter Summary - Stage 2**

Lab:	Date Completed:	Time Completed:
Test Number		
Test Stand:	Runs On The Stand:	Engine No.
Runs on Engine:		
Oil Code:		
Formulation/Stand Code:		

**BC Before Test Oil**

Step	BSFC	Speed	Torque	Oil	Coolant	Intake	Fuel Rail	EBP	Fuel	AFR	Delta <sup>A</sup>
SPEC	kg/kW-h	r/min	N-m	Gallery	In	Air	Temp, °C	kPa	Flow	14.00-	AFR
		800 ± 2	26 ± .07	Temp. °C	Temp, °C	Temp, °C	Temp, °C	104 ±	kg/h	15.00	≤ .50
1				105 ± 1	95 ± 1	27 ± 2	20 ± 2	.17	Record		
2											
3											
4											
5											
6											
AVG.											
SD											
C.V.											

**Test Oil Phase I**

Step	BSFC	Speed	Torque	Oil	Coolant	Intake	Fuel Rail	EBP	Fuel	AFR	Delta <sup>A</sup>
SPEC	kg/Kw-h	r/min	N-m	Gallery	In	Air	Temp, °C	kPa	Flow	14.00-	AFR
		800 ± 2	26 ± .07	Temp. °C	Temp, °C	Temp, °C	Temp, °C	104 ±	kg/h	15.00	≤ .50
1				105 ± 1	95 ± 1	27 ± 2	20 ± 2	.17	Record		
2											
3											
4											
5											
6											
AVG.											
SD											
C.V.											

<sup>A</sup> Difference between the maximum stage average reading of the entire test and the individual stage average readings.

**Sequence VIB  
Form 14A  
Critical Parameter Summary - Stage 2**

Lab:	Date Completed:	Time Completed:
Test Number		
Test Stand:	Runs On The Stand:	Engine No.
Runs on Engine:		
Oil Code:		
Formulation/Stand Code:		

**Test Oil Phase II**

Step SPEC	BSFC kg/kW-h	Speed r/min 800 ± 2	Torque N-m 26 ± .07	Oil Gallery Temp. °C 105 ± 1	Coolant In Temp, °C 95 ± 1	Intake Air Temp, °C 27 ± 2	Fuel Rail Temp, °C 20 ± 2	EBP kPa 104 ± .17	Fuel Flow kg/h Record	AFR 14.00- 15.00	Delta <sup>A</sup> AFR ≤ .50
1											
2											
3											
4											
5											
6											
AVG.											
SD											
C.V.											

**BC After Test Oil**

Step SPEC	BSFC kg/Kw-h	Speed r/min 800 ± 2	Torque N-m 26 ± .07	Oil Gallery Temp. °C 105 ± 1	Coolant In Temp, °C 95 ± 1	Intake Air Temp, °C 27 ± 2	Fuel Rail Temp, °C 20 ± 2	EBP kPa 104 ± .17	Fuel Flow kg/h Record	AFR 14.00- 15.00	Delta <sup>A</sup> AFR ≤ .50
1											
2											
3											
4											
5											
6											
AVG.											
SD											
C.V.											

<sup>A</sup> Difference between the maximum stage average reading of the entire test and the individual stage average readings.



**Sequence VIB**  
**Form 15**  
**Critical Parameter Summary - Stage 3**

Lab:	Date Completed:	Time Completed:
Test Number		
Test Stand:	Runs On The Stand:	Engine No.      Runs on Engine:
Oil Code:		
Formulation/Stand Code:		

**BC Before Test Oil**

Step SPEC	BSFC kg/kW-h	Speed r/min 800 ± 2	Torque N-m 26 ± .07	Oil Gallery Temp. °C 70 ± 1	Coolant In Temp, °C 60 ± 1	Intake Air Temp, °C 27 ± 2	Fuel Rail Temp, °C 20 ± 2	EBP kPa 104 ± .17	Fuel Flow kg/h Record	AFR 14.00- 15.00	Delta <sup>A</sup> AFR ≤ .50
1											
2											
3											
4											
5											
6											
AVG.											
SD											
C.V.											

**Test Oil Phase I**

Step SPEC	BSFC kg/Kw-h	Speed r/min 800 ± 2	Torque N-m 26 ± .07	Oil Gallery Temp. °C 70 ± 1	Coolant In Temp, °C 60 ± 1	Intake Air Temp, °C 27 ± 2	Fuel Rail Temp, °C 20 ± 2	EBP kPa 104 ± .17	Fuel Flow kg/h Record	AFR 14.00- 15.00	Delta <sup>A</sup> AFR ≤ .50
1											
2											
3											
4											
5											
6											
AVG.											
SD											
C.V.											

<sup>A</sup> Difference between the maximum stage average reading of the entire test and the individual stage average readings.

**Sequence VIB  
Form 15A  
Critical Parameter Summary - Stage 3**

Lab:	Date Completed:	Time Completed:
Test Number		
Test Stand:	Runs On The Stand:	Engine No.
Runs on Engine:		
Oil Code:		
Formulation/Stand Code:		

**Test Oil Phase II**

Step	BSFC	Speed	Torque	Oil	Coolant	Intake	Fuel Rail	EBP	Fuel	AFR	Delta <sup>A</sup>
SPEC	kg/kW-h	r/min	N-m	Gallery	In	Air	Temp, °C	kPa	Flow	14.00-	AFR
		800 ± 2	26 ± .07	Temp. °C	Temp, °C	Temp, °C	27 ± 2	104 ± .17	kg/h	15.00	≤ .50
1				70 ± 1	60 ± 1	20 ± 2					
2											
3											
4											
5											
6											
AVG.											
SD											
C.V.											

**BC After Test Oil**

Step	BSFC	Speed	Torque	Oil	Coolant	Intake	Fuel Rail	EBP	Fuel	AFR	Delta <sup>A</sup>
SPEC	kg/Kw-h	r/min	N-m	Gallery	In	Air	Temp, °C	kPa	Flow	14.00-	AFR
		800 ± 2	26 ± .07	Temp. °C	Temp, °C	Temp, °C	27 ± 2	104 ± .17	kg/h	15.00	≤ .50
1				70 ± 1	60 ± 1	20 ± 2					
2											
3											
4											
5											
6											
AVG.											
SD											
C.V.											

<sup>A</sup> Difference between the maximum stage average reading of the entire test and the individual stage average readings.

**Sequence VIB**  
**Form 16**  
**Critical Parameter Summary - Stage 4**

<b>Lab:</b>	<b>Date Completed:</b>	<b>Time Completed:</b>
<b>Test Number</b>		
<b>Test Stand:</b>	<b>Runs On The Stand:</b>	<b>Engine No.</b>
<b>Oil Code:</b>		
<b>Formulation/Stand Code:</b>		

**BC Before Test Oil**

Step	BSFC	Speed	Torque	Oil	Coolant	Intake	Fuel Rail	EBP	Fuel	AFR	Delta <sup>A</sup>
SPEC	kg/kW-h	r/min	N-m	Gallery	In	Air	Temp, °C	kPa	Flow	14.00-	AFR
		1500 ± 2	98 ± .07	Temp. °C	Temp, °C	Temp, °C	Temp, °C	104 ±	kg/h	15.00	≤ .50
1				70 ± 1	60 ± 1	27 ± 2	20 ± 2	.17	Record		
2											
3											
4											
5											
6											
AVG.											
SD											
C.V.											

**Test Oil Phase I**

Step	BSFC	Speed	Torque	Oil	Coolant	Intake	Fuel Rail	EBP	Fuel	AFR	Delta <sup>A</sup>
SPEC	kg/Kw-h	r/min	N-m	Gallery	In	Air	Temp, °C	kPa	Flow	14.00-	AFR
		1500 ± 2	98 ± .07	Temp. °C	Temp, °C	Temp, °C	Temp, °C	104 ±	kg/h	15.00	≤ .50
1				70 ± 1	60 ± 1	27 ± 2	20 ± 2	.17	Record		
2											
3											
4											
5											
6											
AVG.											
SD											
C.V.											

<sup>A</sup> Difference between the maximum stage average reading of the entire test and the individual stage average readings.

**Sequence VIB  
Form 16A  
Critical Parameter Summary - Stage 4**

Lab:	Date Completed:	Time Completed:
Test Number		
Test Stand:	Runs On The Stand:	Engine No.
Runs on Engine:		
Oil Code:		
Formulation/Stand Code:		

**Test Oil Phase II**

Step	BSFC	Speed	Torque	Oil	Coolant	Intake	Fuel Rail	EBP	Fuel	AFR	Delta <sup>A</sup>
SPEC	kg/kW-h	r/min	N-m	Gallery Temp. °C	In Temp, °C	Air Temp, °C	Temp, °C	kPa	Flow kg/h	14.00- 15.00	AFR ≤ .50
1		1500 ± 2	98 ± .07	70 ± 1	60 ± 1	27 ± 2	20 ± 2	104 ± .17	Record		
2											
3											
4											
5											
6											
AVG.											
SD											
C.V.											

**BC After Test Oil**

Step	BSFC	Speed	Torque	Oil	Coolant	Intake	Fuel Rail	EBP	Fuel	AFR	Delta <sup>A</sup>
SPEC	kg/Kw-h	r/min	N-m	Gallery Temp. °C	In Temp, °C	Air Temp, °C	Temp, °C	kPa	Flow kg/h	14.00- 15.00	AFR ≤ .50
1		1500 ± 2	98 ± .07	70 ± 1	60 ± 1	27 ± 2	20 ± 2	104 ± .17	Record		
2											
3											
4											
5											
6											
AVG.											
SD											
C.V.											

<sup>A</sup> Difference between the maximum stage average reading of the entire test and the individual stage average readings.

**Sequence VIB**  
**Form 17**  
**Critical Parameter Summary – Stage 5**

Lab:	Date Completed:	Time Completed:
Test Number		
Test Stand:	Runs On The Stand:	Engine No.
Runs on Engine:		
Oil Code:		
Formulation/Stand Code:		

**BC Before Test Oil**

Step	BSFC	Speed	Torque	Oil	Coolant	Intake	Fuel Rail	EBP	Fuel	AFR	Delta <sup>A</sup>
SPEC	kg/kW-h	r/min	N-m	Gallery	In	Air	Temp, °C	kPa	Flow	14.00-	AFR
		1500 ± 2	98 ± .07	Temp. °C	Temp, °C	Temp, °C	Temp, °C	104 ±	kg/h	15.00	≤ .50
1				45 ± 1	45 ± 1	27 ± 2	20 ± 2	.17	Record		
2											
3											
4											
5											
6											
AVG.											
SD											
C.V.											

**Test Oil Phase I**

Step	BSFC	Speed	Torque	Oil	Coolant	Intake	Fuel Rail	EBP	Fuel	AFR	Delta <sup>A</sup>
SPEC	kg/Kw-h	r/min	N-m	Gallery	In	Air	Temp, °C	kPa	Flow	14.00-	AFR
		1500 ± 2	98 ± .07	Temp. °C	Temp, °C	Temp, °C	Temp, °C	104 ±	kg/h	15.00	≤ .50
1				45 ± 1	45 ± 1	27 ± 2	20 ± 2	.17	Record		
2											
3											
4											
5											
6											
AVG.											
SD											
C.V.											

<sup>A</sup> Difference between the maximum stage average reading of the entire test and the individual stage average readings.

**Sequence VIB**  
**Form 17A**  
**Critical Parameter Summary - Stage 5**

Lab:	Date Completed:	Time Completed:
Test Number		
Test Stand:	Runs On The Stand:	Engine No.
Runs on Engine:		
Oil Code:		
Formulation/Stand Code:		

**Test Oil Phase II**

Step	BSFC	Speed	Torque	Oil	Coolant	Intake	Fuel Rail	EBP	Fuel	AFR	Delta <sup>A</sup>
SPEC	kg/kW-h	r/min	N-m	Gallery	In	Air	Temp, °C	kPa	Flow	14.00-	AFR
		1500 ± 2	98 ± .07	Temp. °C	Temp, °C	Temp, °C	Temp, °C	104 ± .17	kg/h	15.00	≤ .50
1				45 ± 1	45 ± 1	27 ± 2	20 ± 2				
2											
3											
4											
5											
6											
AVG.											
SD											
C.V.											

**BC After Test Oil**

Step	BSFC	Speed	Torque	Oil	Coolant	Intake	Fuel Rail	EBP	Fuel	AFR	Delta <sup>A</sup>
SPEC	kg/Kw-h	r/min	N-m	Gallery	In	Air	Temp, °C	kPa	Flow	14.00-	AFR
		1500 ± 2	98 ± .07	Temp. °C	Temp, °C	Temp, °C	Temp, °C	104 ± .17	kg/h	15.00	≤ .50
1				45 ± 1	45 ± 1	27 ± 2	20 ± 2				
2											
3											
4											
5											
6											
AVG.											
SD											
C.V.											

<sup>A</sup> Difference between the maximum stage average reading of the entire test and the individual stage average readings.









**Sequence VIB  
Form 19  
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	

Declarations

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