

Report Forms  
**SEQUENCE VIBSJ**

**VERSION: 20020410 BETA**

CONDUCTED FOR:

*TSTSPON1*

*TSTSPON2*

<i>LABVALID</i>	V = VALID
	I = INVALID
	N = RESULTS CANNOT BE INTERPRETED (REFER TO COMMENT SECTION)

Lab: <i>LAB</i>	Date Completed: <i>DTCOMP</i>	Time Completed: <i>EOTIME</i>	
Test Number			
Test Stand: <i>STAND</i>	Runs On The Stand: <i>STRUN</i>	Engine No.: <i>ENGNO</i>	Runs on Engine: <i>ENRUN</i>
Oil Code: <i>OILCODE</i>			
Formulation/Stand Code: <i>FORM</i>			
Alternate Codes	<i>ALTCODE1</i>	<i>ALTCODE2</i>	<i>ALTCODE3</i>

In my opinion this test *OPVALID* been conducted in a valid manner in accordance with the VIB Test Procedure (RR: D02-1469) and the appropriate amendments through the Information Letter System. The remarks included in the report describe the anomalies associated with this test.

SUBMITTED BY: \_\_\_\_\_ *SUBLAB*  
 Testing Laboratory

\_\_\_\_\_ *SUBSIGIM*  
 Signature

\_\_\_\_\_ *SUBNAME*  
 Typed Name

\_\_\_\_\_ *SUBTITLE*  
 Title

Fig. A7.1 Test Report Cover

## Form 2

### Sequence VIBSJ

#### Table of Contents

1.	Title / Validity Declaration Page	Form 1
2.	Summary of Test Method	Form 3
3.	Test Result Summary	Form 4
4.	Operational Data Analysis	Form 5
5.	General Parameter Listing	Form 6
6.	General Parameter Summary	Form 7
7.	General Parameter Summary	Form 8
8.	Critical Parameter Summary - Stage 1	Form 9
9.	Critical Parameter Summary - Stage 2	Form 10
10.	Critical Parameter Summary - Stage 3	Form 11
11.	Critical Parameter Summary - Stage 4	Form 12
12.	Critical Parameter Summary - Stage 5	Form 13
13.	Downtime Occurrences & Outliers	Form 14

## Sequence VIBSJ 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 VIBSJ test incorporates a flush and run type procedure. Each test consists of 5-stage fuel economy measurements on baseline oil (BC) and test oil. The test oil is aged during 16 hours of engine operation at 1500 r/min and 125°C oil temperature. After the aging, a 5-stage fuel economy measurement is taken. The fuel economy measurement taken on the baseline oil (BC) and the test oil are used to calculate a final value for Fuel Economy Improvement.

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

FIG. A7.3 Summary of Test Method

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

Lab: <i>LAB</i>	Date Completed: <i>DTCOMP</i>	Time Completed: <i>EOTTIME</i>
Test Number		
Test Stand: <i>STAND</i>	Runs On The Stand: <i>STRUN</i>	Engine No.: <i>ENGNO</i>
Oil Code: <i>OILCODE</i>	Engine Serial Number: <i>ENGSN</i>	
Formulation/Stand Code: <i>FORM</i>		

TEST DOCUMENTATION		
	BC Before	Test Oil
Start Date	<i>BCBSDTE</i>	<i>DTSTRT</i>
Start Time	<i>BCBSTIM</i>	<i>STRTIME</i>
End Date	<i>BCBEDTE</i>	<i>TODTE</i>
End Time	<i>BCBETIM</i>	<i>TOTIM</i>
Oil Test Length, hhh:mm	<i>BCBTLEN</i>	<i>TOLEN</i>
Calibration Oil Batch	<i>BCOILBT</i>	
Flush Oil Batch	<i>BCFOILBT</i>	
Laboratory Oil Code		<i>LABOCODE</i>
SAE Viscosity Grade		<i>SAEVISG</i>
TMC Oil Code (Reference Oil Tests Only)		<i>IND</i>
New Oil Viscosity @ 40 °C, cSt		<i>V40NEW</i>
New Oil Viscosity @ 100°C, cSt		<i>V100NEW</i>
Total Test Length, hhh:mm	<i>TESTLEN</i>	
Total Engine Hours @ EOT	<i>ENHREND</i>	
Most Recent Fuel Batch	<i>FUELBTID</i>	

OVERALL RESULTS		
	BC Oil	Test Oil
	Before	Phase I
Fuel Consumed, kg	<i>BCKG</i>	<i>TOKG</i>
Fuel Economy Improvement, %		<i>FEI</i>
FEI Industry Correction Factor, %		<i>FEIICF</i>
FEI Severity Adjustment, % (non-reference tests only)		<i>FEIISA</i>
FEI Final Result, %		<i>FEIIFNL</i>

Last Reference Oil Test on Stand/Engine History (Non-Reference Tests Only)			
Date Completed	<i>RDTCOMP</i>	Fuel Batch	<i>RFUELBD</i>
TMC Oil Code	<i>RIND</i>	SAE Viscosity Grade	<i>RSAEVISG</i>
Oilcode	<i>ROILCODE</i>	Calibration Oil Batch	<i>RCALOIL</i>
Runs on Stand	<i>RSTRUN</i>	Runs on Engine	<i>RENRUN</i>
		Phase I	Phase II
Final FEI Results		<i>RFEIIFNL</i>	<i>RFEI2FNL</i>

Fig. A7.4 Test Result Summary - Non-reference and Reference Oil Tests

**SEQUENCE VIBSJ**  
**FORM 5**  
**OPERATIONAL DATA ANALYSIS**

Lab: <i>LAB</i>	Date Completed: <i>DTCOMP</i>	Time Completed: <i>EOTTIME</i>
Test Number		
Test Stand: <i>STAND</i>	Runs On The Stand: <i>STRUN</i>	Engine No.: <i>ENGNO</i>
Oil Code: <i>OILCODE</i>		
Formulation/Stand Code: <i>FORM</i>		

Computed Averages						
Oil	Stage	BSFC kg/kW-h	BSFC C.V.%	Nominal Power kW	Weight Factor	Weighted Fuel Consumed kg
<b>BC Oil</b>	<b>1</b>	<i>BFCARB1A</i>	<i>BFCCRB1A</i>	15.39	0.0802	<i>WFC_RB1A</i>
	<b>2</b>	<i>BFCARB2A</i>	<i>BFCCRB2A</i>	2.18	0.0787	<i>WFC_RB2A</i>
	<b>3</b>	<i>BFCARB3A</i>	<i>BFCCRB3A</i>	2.18	0.0848	<i>WFC_RB3A</i>
	<b>4</b>	<i>BFCARB4A</i>	<i>BFCCRB4A</i>	15.39	0.0864	<i>WFC_RB4A</i>
	<b>5</b>	<i>BFCARB5A</i>	<i>BFCCRB5A</i>	15.39	0.0699	<i>WFC_RB5A</i>
Total Fuel Consumed						<i>BCKG</i>

Computed Averages						
Oil	Stage	BSFC kg/kW-h	BSFC C.V.%	Nominal Power kW	Weight Factor	Weighted Fuel Consumed kg
<b>Test Oil</b>	<b>1</b>	<i>BFCARC1A</i>	<i>BFCCRC1A</i>	15.39	0.0802	<i>WFC_RC1A</i>
	<b>2</b>	<i>BFCARC2A</i>	<i>BFCCRC2A</i>	2.18	0.0787	<i>WFC_RC2A</i>
	<b>3</b>	<i>BFCARC3A</i>	<i>BFCCRC3A</i>	2.18	0.0848	<i>WFC_RC3A</i>
	<b>4</b>	<i>BFCARC4A</i>	<i>BFCCRC4A</i>	15.39	0.0864	<i>WFC_RC4A</i>
	<b>5</b>	<i>BFCARC5A</i>	<i>BFCCRC5A</i>	15.39	0.0699	<i>WFC_RC5A</i>
Total Fuel Consumed						<i>TOKG</i>

Fig. A7.5 Operational Data Analysis

**SEQUENCE VIBSJ  
FORM 6**

**GENERAL PARAMETER LISTING**

Lab: <i>LAB</i>	Date Completed: <i>DTCOMP</i>	Time Completed: <i>EOTTIME</i>		
Test Number				
Test Stand: <i>STAND</i>	Runs On The Stand: <i>STRUN</i>	Engine No.: <i>ENGNO</i>	Runs on Engine: <i>ENRUN</i>	
Oil Code: <i>OILCODE</i>				
Formulation/Stand Code: <i>FORM</i>				

**16 Hour Aging**

	SPEC	AVERAGE <sup>A</sup>	MAX <sup>A</sup>	MIN <sup>A</sup>
1. Speed, r/min	1500 ± 5	<i>ARPM16H</i>	<i>XRPM16H</i>	<i>IRPM16H</i>
2. Torque, N-m	98 ± 0.10	<i>ALD16H</i>	<i>XLD16H</i>	<i>ILD16H</i>
3. Oil Gallery Temperature, °C	125 ± 2	<i>AOGT16H</i>	<i>XOGT16H</i>	<i>IOGT16H</i>
4. Coolant Inlet Temperature, °C	105 ± 2	<i>ACINT16H</i>	<i>XCINT16H</i>	<i>ICINT16H</i>
5. Oil Circulation Temperature, °C	Record	<i>ASMPT16H</i>	<i>XSMPT16H</i>	<i>ISMPT16H</i>
6. Coolant Out Temperature, °C	Record	<i>ACOT16H</i>	<i>XCOT16H</i>	<i>ICOT16H</i>
7. Intake Air Temperature, °C	27 ± 2	<i>AINAT16H</i>	<i>XINAT16H</i>	<i>IINAT16H</i>
8. Fuel to Flowmeter Temperature, °C	20 - 32	<i>AFTMM16H</i>	<i>XFTMM16H</i>	<i>IFTMM16H</i>
9. Fuel to Fuel Rail Temperature, °C	20 ± 2	<i>AFTFR16H</i>	<i>XFTFR16H</i>	<i>IFTFR16H</i>
10. Load Cell Temperature, °C	Record	<i>ALCT16H</i>	<i>XLCT16H</i>	<i>ILCT16H</i>
11. Oil Heater Temperature, °C	205 max	<i>AHEAT16H</i>	<i>XHEAT16H</i>	<i>IHEAT16H</i>
12. Intake Air Pressure, kPa	0.05 ± 0.02	<i>AINAP16H</i>	<i>XINAP16H</i>	<i>IINAP16H</i>
13. Fuel to Flowmeter Pressure, kPa	100 min	<i>AFPMM16H</i>	<i>XFPMM16H</i>	<i>IFPMM16H</i>
14. Fuel to Fuel Rail Pressure, kPa	205 - 310	<i>AFPFR16H</i>	<i>XFPFR16H</i>	<i>IFPFR16H</i>
15. Intake Manifold Pressure, kPa abs.	Record	<i>AINTV16H</i>	<i>XINTV16H</i>	<i>IINTV16H</i>
16. Exhaust Back Pressure, kPa abs.	104 ± 0.20	<i>AEXBP16H</i>	<i>XEXBP16H</i>	<i>IEXBP16H</i>
17. Engine Oil Pressure, kPa	Record	<i>AOGP16H</i>	<i>XOGP16H</i>	<i>IOGP16H</i>
18. Coolant Flow, L/min	130 ± 4	<i>AMCF16H</i>	<i>XMCF16H</i>	<i>IMCF16H</i>
19. Fuel Flow, kg/h	Record	<i>AFFLO16H</i>	<i>XFFLO16H</i>	<i>IFFLO16H</i>
20. Intake Air Humidity, grains/kg	11.4 ± 0.8	<i>AINAH16H</i>	<i>XINAH16H</i>	<i>IINAH16H</i>
21. Air/Fuel Ratio	Record	<i>AAFR16H</i>	<i>XAFR16H</i>	<i>IAFR16H</i>
22. Crankcase Pressure, kPa	0.00 ± 0.25	<i>ACCV16H</i>	<i>XCCV16H</i>	<i>ICCV16H</i>

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

Fig. A7.6 General Parameter Listing

**SEQUENCE VIBSJ  
FORM 7  
GENERAL PARAMETER SUMMARY**

Lab: <i>LAB</i>	Date Completed: <i>DTCOMP</i>	Time Completed: <i>EOTTIME</i>		
Test Number				
Test Stand: <i>STAND</i>	Runs On The Stand: <i>STRUN</i>	Engine No.: <i>ENGNO</i>	Runs on Engine: <i>ENRUN</i>	
Oil Code: <i>OILCODE</i>				
Formulation/Stand Code: <i>FORM</i>				

**BC Oil**

**General Parameters**

	Spec	Stage				
		1	2	3	4	5
1. Oil Circulation Temperature, °C	Record	<i>OCT_RB01</i>	<i>OCT_RB02</i>	<i>OCT_RB03</i>	<i>OCT_RB04</i>	<i>OCT_RB05</i>
2. Coolant Out Temperature, °C	Record	<i>COT_RB01</i>	<i>COT_RB02</i>	<i>COT_RB03</i>	<i>COT_RB04</i>	<i>COT_RB05</i>
3. Fuel to Flowmeter Temperature, °C	20-32	<i>FFT_RB01</i>	<i>FFT_RB02</i>	<i>FFT_RB03</i>	<i>FFT_RB04</i>	<i>FFT_RB05</i>
4. Delta Fuel to Flowmeter Temp., °C <sup>A</sup>	≤ 4	<i>FFTDRB01</i>	<i>FFTDRB02</i>	<i>FFTDRB03</i>	<i>FFTDRB04</i>	<i>FFTDRB05</i>
5. Test Cell Temperature, °C	Record	<i>TCT_RB01</i>	<i>TCT_RB02</i>	<i>TCT_RB03</i>	<i>TCT_RB04</i>	<i>TCT_RB05</i>
6. Load Cell Temperature, °C	Record	<i>LCT_RB01</i>	<i>LCT_RB02</i>	<i>LCT_RB03</i>	<i>LCT_RB04</i>	<i>LCT_RB05</i>
7. Delta Load Cell Temperature, °C <sup>A</sup>	≤ 12	<i>LCTDRB01</i>	<i>LCTDRB02</i>	<i>LCTDRB03</i>	<i>LCTDRB04</i>	<i>LCTDRB05</i>
8. Oil Heater Temperature, °C	205 max	<i>OHT_RB01</i>	<i>OHT_RB02</i>	<i>OHT_RB03</i>	<i>OHT_RB04</i>	<i>OHT_RB05</i>
9. Intake Air Pressure, kPa	0.05 ± .02	<i>IAP_RB01</i>	<i>IAP_RB02</i>	<i>IAP_RB03</i>	<i>IAP_RB04</i>	<i>IAP_RB05</i>
10. Fuel to Flowmeter Pressure, kPa	100 min	<i>FFP_RB01</i>	<i>FFP_RB02</i>	<i>FFP_RB03</i>	<i>FFP_RB04</i>	<i>FFP_RB05</i>
11. Fuel to Fuel Rail Pressure, kPa	205 - 310	<i>FFRPRB01</i>	<i>FFRPRB02</i>	<i>FFRPRB03</i>	<i>FFRPRB04</i>	<i>FFRPRB05</i>
12. Intake Manifold Pressure, kPa abs.	Record	<i>IMP_RB01</i>	<i>IMP_RB02</i>	<i>IMP_RB03</i>	<i>IMP_RB04</i>	<i>IMP_RB05</i>
13. Engine Oil Pressure, kPa	Record	<i>EOP_RB01</i>	<i>EOP_RB02</i>	<i>EOP_RB03</i>	<i>EOP_RB04</i>	<i>EOP_RB05</i>
14. Coolant Flow, L/min	130 ± 4	<i>CFLORB01</i>	<i>CFLORB02</i>	<i>CFLORB03</i>	<i>CFLORB04</i>	<i>CFLORB05</i>
15. Intake Air Humidity, grains/kg	11.4 ± 0.8	<i>IAH_RB01</i>	<i>IAH_RB02</i>	<i>IAH_RB03</i>	<i>IAH_RB04</i>	<i>IAH_RB05</i>
16. Crankcase Pressure, kPa	0.00 ± 0.25	<i>CCV_RB01</i>	<i>CCV_RB02</i>	<i>CCV_RB03</i>	<i>CCV_RB04</i>	<i>CCV_RB05</i>
17. Blowby, L/min <sup>B</sup>	Record	<i>BLBYB01</i>				
18. Barometric Pressure, kPa	Record	<i>BAP_RB01</i>	<i>BAP_RB02</i>	<i>BAP_RB03</i>	<i>BAP_RB04</i>	<i>BAP_RB05</i>

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

<sup>B</sup> Measurement not required by procedure.

Fig. A7.7 General Parameter Summary

**SEQUENCE VIBSJ  
FORM 8  
GENERAL PARAMETER SUMMARY**

Lab: <i>LAB</i>	Date Completed: <i>DTCOMP</i>	Time Completed: <i>EOTTIME</i>		
Test Number				
Test Stand: <i>STAND</i>	Runs On The Stand: <i>STRUN</i>	Engine No.: <i>ENGNO</i>	Runs on Engine: <i>ENRUN</i>	
Oil Code: <i>OILCODE</i>				
Formulation/Stand Code: <i>FORM</i>				

**Test Oil  
General Parameters**

	Spec	Stage				
		1	2	3	4	5
1. Oil Circulation Temperature, °C	Record	<i>OCT_RC01</i>	<i>OCT_RC02</i>	<i>OCT_RC03</i>	<i>OCT_RC04</i>	<i>OCT_RC05</i>
2. Coolant Out Temperature, °C	Record	<i>COT_RC01</i>	<i>COT_RC02</i>	<i>COT_RC03</i>	<i>COT_RC04</i>	<i>COT_RC05</i>
3. Fuel to Flowmeter Temperature, °C	20-32	<i>FFT_RC01</i>	<i>FFT_RC02</i>	<i>FFT_RC03</i>	<i>FFT_RC04</i>	<i>FFT_RC05</i>
4. Delta Fuel to Flowmeter Temp., °C <sup>A</sup>	≤ 4	<i>FFTDRC01</i>	<i>FFTDRC02</i>	<i>FFTDRC03</i>	<i>FFTDRC04</i>	<i>FFTDRC05</i>
5. Test Cell Temperature, °C	Record	<i>TCT_RC01</i>	<i>TCT_RC02</i>	<i>TCT_RC03</i>	<i>TCT_RC04</i>	<i>TCT_RC05</i>
6. Load Cell Temperature, °C	Record	<i>LCT_RC01</i>	<i>LCT_RC02</i>	<i>LCT_RC03</i>	<i>LCT_RC04</i>	<i>LCT_RC05</i>
7. Delta Load Cell Temperature, °C <sup>A</sup>	≤ 12	<i>LCTDRC01</i>	<i>LCTDRC02</i>	<i>LCTDRC03</i>	<i>LCTDRC04</i>	<i>LCTDRC05</i>
8. Oil Heater Temperature, °C	205 max	<i>OHT_RC01</i>	<i>OHT_RC02</i>	<i>OHT_RC03</i>	<i>OHT_RC04</i>	<i>OHT_RC05</i>
9. Intake Air Pressure, kPa	0.05 ± .02	<i>IAP_RC01</i>	<i>IAP_RC02</i>	<i>IAP_RC03</i>	<i>IAP_RC04</i>	<i>IAP_RC05</i>
10. Fuel to Flowmeter Pressure, kPa	100 min	<i>FFP_RC01</i>	<i>FFP_RC02</i>	<i>FFP_RC03</i>	<i>FFP_RC04</i>	<i>FFP_RC05</i>
11. Fuel to Fuel Rail Pressure, kPa	205 - 310	<i>FFRPRC01</i>	<i>FFRPRC02</i>	<i>FFRPRC03</i>	<i>FFRPRC04</i>	<i>FFRPRC05</i>
12. Intake Manifold Pressure, kPa abs.	Record	<i>IMP_RC01</i>	<i>IMP_RC02</i>	<i>IMP_RC03</i>	<i>IMP_RC04</i>	<i>IMP_RC05</i>
13. Engine Oil Pressure, kPa	Record	<i>EOP_RC01</i>	<i>EOP_RC02</i>	<i>EOP_RC03</i>	<i>EOP_RC04</i>	<i>EOP_RC05</i>
14. Coolant Flow, L/min	130 ± 4	<i>CFLORC01</i>	<i>CFLORC02</i>	<i>CFLORC03</i>	<i>CFLORC04</i>	<i>CFLORC05</i>
15. Intake Air Humidity, grains/kg	11.4 ± 0.8	<i>IAH_RC01</i>	<i>IAH_RC02</i>	<i>IAH_RC03</i>	<i>IAH_RC04</i>	<i>IAH_RC05</i>
16. Crankcase Pressure, kPa	0.00 ± 0.25	<i>CCV_RC01</i>	<i>CCV_RC02</i>	<i>CCV_RC03</i>	<i>CCV_RC04</i>	<i>CCV_RC05</i>
17. Barometric Pressure, kPa	Record	<i>BAP_RC01</i>	<i>BAP_RC02</i>	<i>BAP_RC03</i>	<i>BAP_RC04</i>	<i>BAP_RC05</i>

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

Fig. A7.8 General Parameter Summary



**SEQUENCE VIBSJ**  
**FORM 9**  
**CRITICAL PARAMETER SUMMARY- STAGE 1**

Lab: <i>LAB</i>	Date Completed: <i>DTCOMP</i>	Time Completed: <i>EOTTIME</i>	
Test Number			
Test Stand: <i>STAND</i>	Runs On The Stand: <i>STRUN</i>	Engine No.: <i>ENGNO</i>	Runs on Engine: <i>ENRUN</i>
Oil Code: <i>OILCODE</i>			
Formulation/Stand Code: <i>FORM</i>			

**BC 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 14.25-15.25	Delta AFR ≤ .50 <sup>A</sup>
1	<i>BFC_RB11</i>	<i>RPM_RB11</i>	<i>LOADRB11</i>	<i>OGT_RB11</i>	<i>CINTRB11</i>	<i>IAT_RB11</i>	<i>FRT_RB11</i>	<i>EBP_RB11</i>	<i>FCR_RB11</i>	<i>AFR_RB11</i>	
2	<i>BFC_RB12</i>	<i>RPM_RB12</i>	<i>LOADRB12</i>	<i>OGT_RB12</i>	<i>CINTRB12</i>	<i>IAT_RB12</i>	<i>FRT_RB12</i>	<i>EBP_RB12</i>	<i>FCR_RB12</i>	<i>AFR_RB12</i>	
3	<i>BFC_RB13</i>	<i>RPM_RB13</i>	<i>LOADRB13</i>	<i>OGT_RB13</i>	<i>CINTRB13</i>	<i>IAT_RB13</i>	<i>FRT_RB13</i>	<i>EBP_RB13</i>	<i>FCR_RB13</i>	<i>AFR_RB13</i>	
4	<i>BFC_RB14</i>	<i>RPM_RB14</i>	<i>LOADRB14</i>	<i>OGT_RB14</i>	<i>CINTRB14</i>	<i>IAT_RB14</i>	<i>FRT_RB14</i>	<i>EBP_RB14</i>	<i>FCR_RB14</i>	<i>AFR_RB14</i>	
5	<i>BFC_RB15</i>	<i>RPM_RB15</i>	<i>LOADRB15</i>	<i>OGT_RB15</i>	<i>CINTRB15</i>	<i>IAT_RB15</i>	<i>FRT_RB15</i>	<i>EBP_RB15</i>	<i>FCR_RB15</i>	<i>AFR_RB15</i>	
6	<i>BFC_RB16</i>	<i>RPM_RB16</i>	<i>LOADRB16</i>	<i>OGT_RB16</i>	<i>CINTRB16</i>	<i>IAT_RB16</i>	<i>FRT_RB16</i>	<i>EBP_RB16</i>	<i>FCR_RB16</i>	<i>AFR_RB16</i>	
AVG.	<i>BFCARB1A</i>	<i>RPM_RB1A</i>	<i>LOADRB1A</i>	<i>OGT_RB1A</i>	<i>CINTRB1A</i>	<i>IAT_RB1A</i>	<i>FRT_RB1A</i>	<i>EBP_RB1A</i>	<i>FCR_RB1A</i>	<i>AFR_RB1A</i>	<i>AFRDRB1A</i>
SD	<i>BFCSRB1A</i>										
C.V.	<i>BFCRB1A</i>										

**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 14.25-15.25	Delta AFR ≤ .50 <sup>A</sup>
1	<i>BFC_RC11</i>	<i>RPM_RC11</i>	<i>LOADRC11</i>	<i>OGT_RC11</i>	<i>CINTRC11</i>	<i>IAT_RC11</i>	<i>FRT_RC11</i>	<i>EBP_RC11</i>	<i>FCR_RC11</i>	<i>AFR_RC11</i>	
2	<i>BFC_RC12</i>	<i>RPM_RC12</i>	<i>LOADRC12</i>	<i>OGT_RC12</i>	<i>CINTRC12</i>	<i>IAT_RC12</i>	<i>FRT_RC12</i>	<i>EBP_RC12</i>	<i>FCR_RC12</i>	<i>AFR_RC12</i>	
3	<i>BFC_RC13</i>	<i>RPM_RC13</i>	<i>LOADRC13</i>	<i>OGT_RC13</i>	<i>CINTRC13</i>	<i>IAT_RC13</i>	<i>FRT_RC13</i>	<i>EBP_RC13</i>	<i>FCR_RC13</i>	<i>AFR_RC13</i>	
4	<i>BFC_RC14</i>	<i>RPM_RC14</i>	<i>LOADRC14</i>	<i>OGT_RC14</i>	<i>CINTRC14</i>	<i>IAT_RC14</i>	<i>FRT_RC14</i>	<i>EBP_RC14</i>	<i>FCR_RC14</i>	<i>AFR_RC14</i>	
5	<i>BFC_RC15</i>	<i>RPM_RC15</i>	<i>LOADRC15</i>	<i>OGT_RC15</i>	<i>CINTRC15</i>	<i>IAT_RC15</i>	<i>FRT_RC15</i>	<i>EBP_RC15</i>	<i>FCR_RC15</i>	<i>AFR_RC15</i>	
6	<i>BFC_RC16</i>	<i>RPM_RC16</i>	<i>LOADRC16</i>	<i>OGT_RC16</i>	<i>CINTRC16</i>	<i>IAT_RC16</i>	<i>FRT_RC16</i>	<i>EBP_RC16</i>	<i>FCR_RC16</i>	<i>AFR_RC16</i>	
AVG.	<i>BFCARC1A</i>	<i>RPM_RC1A</i>	<i>LOADRC1A</i>	<i>OGT_RC1A</i>	<i>CINTRC1A</i>	<i>IAT_RC1A</i>	<i>FRT_RC1A</i>	<i>EBP_RC1A</i>	<i>FCR_RC1A</i>	<i>AFR_RC1A</i>	<i>AFRDRC1A</i>
SD	<i>BFCSRC1A</i>										
C.V.	<i>BFCRC1A</i>										

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

Fig. A7.9 Critical Parameter Summary - Stage 1

**SEQUENCE VIBSJ**  
**FORM 10**  
**CRITICAL PARAMETER SUMMARY- STAGE 2**

Lab: <i>LAB</i>	Date Completed: <i>DTCOMP</i>	Time Completed: <i>EOTTIME</i>
Test Number		
Test Stand: <i>STAND</i>	Runs On The Stand: <i>STRUN</i>	Engine No.: <i>ENGNO</i>
Oil Code: <i>OILCODE</i>		
Formulation/Stand Code: <i>FORM</i>		

**BC 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 14.25-15.25	Delta AFR ≤ .50 <sup>A</sup>
1	<i>BFC_RB21</i>	<i>RPM_RB21</i>	<i>LOADRB21</i>	<i>OGT_RB21</i>	<i>CINTRB21</i>	<i>IAT_RB21</i>	<i>FRT_RB21</i>	<i>EBP_RB21</i>	<i>FCR_RB21</i>	<i>AFR_RB21</i>	
2	<i>BFC_RB22</i>	<i>RPM_RB22</i>	<i>LOADRB22</i>	<i>OGT_RB22</i>	<i>CINTRB22</i>	<i>IAT_RB22</i>	<i>FRT_RB22</i>	<i>EBP_RB22</i>	<i>FCR_RB22</i>	<i>AFR_RB22</i>	
3	<i>BFC_RB23</i>	<i>RPM_RB23</i>	<i>LOADRB23</i>	<i>OGT_RB23</i>	<i>CINTRB23</i>	<i>IAT_RB23</i>	<i>FRT_RB23</i>	<i>EBP_RB23</i>	<i>FCR_RB23</i>	<i>AFR_RB23</i>	
4	<i>BFC_RB24</i>	<i>RPM_RB24</i>	<i>LOADRB24</i>	<i>OGT_RB24</i>	<i>CINTRB24</i>	<i>IAT_RB24</i>	<i>FRT_RB24</i>	<i>EBP_RB24</i>	<i>FCR_RB24</i>	<i>AFR_RB24</i>	
5	<i>BFC_RB25</i>	<i>RPM_RB25</i>	<i>LOADRB25</i>	<i>OGT_RB25</i>	<i>CINTRB25</i>	<i>IAT_RB25</i>	<i>FRT_RB25</i>	<i>EBP_RB25</i>	<i>FCR_RB25</i>	<i>AFR_RB25</i>	
6	<i>BFC_RB26</i>	<i>RPM_RB26</i>	<i>LOADRB26</i>	<i>OGT_RB26</i>	<i>CINTRB26</i>	<i>IAT_RB26</i>	<i>FRT_RB26</i>	<i>EBP_RB26</i>	<i>FCR_RB26</i>	<i>AFR_RB26</i>	
AVG.	<i>BFCARB2A</i>	<i>RPM_RB2A</i>	<i>LOADRB2A</i>	<i>OGT_RB2A</i>	<i>CINTRB2A</i>	<i>IAT_RB2A</i>	<i>FRT_RB2A</i>	<i>EBP_RB2A</i>	<i>FCR_RB2A</i>	<i>AFR_RB2A</i>	<i>AFRDRB2A</i>
SD	<i>BFCSRB2A</i>										
C.V.	<i>BFCRB2A</i>										

**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 14.25-15.25	Delta AFR ≤ .50 <sup>A</sup>
1	<i>BFC_RC21</i>	<i>RPM_RC21</i>	<i>LOADRC21</i>	<i>OGT_RC21</i>	<i>CINTRC21</i>	<i>IAT_RC21</i>	<i>FRT_RC21</i>	<i>EBP_RC21</i>	<i>FCR_RC21</i>	<i>AFR_RC21</i>	
2	<i>BFC_RC22</i>	<i>RPM_RC22</i>	<i>LOADRC22</i>	<i>OGT_RC22</i>	<i>CINTRC22</i>	<i>IAT_RC22</i>	<i>FRT_RC22</i>	<i>EBP_RC22</i>	<i>FCR_RC22</i>	<i>AFR_RC22</i>	
3	<i>BFC_RC23</i>	<i>RPM_RC23</i>	<i>LOADRC23</i>	<i>OGT_RC23</i>	<i>CINTRC23</i>	<i>IAT_RC23</i>	<i>FRT_RC23</i>	<i>EBP_RC23</i>	<i>FCR_RC23</i>	<i>AFR_RC23</i>	
4	<i>BFC_RC24</i>	<i>RPM_RC24</i>	<i>LOADRC24</i>	<i>OGT_RC24</i>	<i>CINTRC24</i>	<i>IAT_RC24</i>	<i>FRT_RC24</i>	<i>EBP_RC24</i>	<i>FCR_RC24</i>	<i>AFR_RC24</i>	
5	<i>BFC_RC25</i>	<i>RPM_RC25</i>	<i>LOADRC25</i>	<i>OGT_RC25</i>	<i>CINTRC25</i>	<i>IAT_RC25</i>	<i>FRT_RC25</i>	<i>EBP_RC25</i>	<i>FCR_RC25</i>	<i>AFR_RC25</i>	
6	<i>BFC_RC26</i>	<i>RPM_RC26</i>	<i>LOADRC26</i>	<i>OGT_RC26</i>	<i>CINTRC26</i>	<i>IAT_RC26</i>	<i>FRT_RC26</i>	<i>EBP_RC26</i>	<i>FCR_RC26</i>	<i>AFR_RC26</i>	
AVG.	<i>BFCARC2A</i>	<i>RPM_RC2A</i>	<i>LOADRC2A</i>	<i>OGT_RC2A</i>	<i>CINTRC2A</i>	<i>IAT_RC2A</i>	<i>FRT_RC2A</i>	<i>EBP_RC2A</i>	<i>FCR_RC2A</i>	<i>AFR_RC2A</i>	<i>AFRDRC2A</i>
SD	<i>BFCSRC2A</i>										
C.V.	<i>BFCRC2A</i>										

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

Fig. A7.10 Critical Parameter Summary - Stage 2

**SEQUENCE VIBSJ**  
**FORM 11**  
**CRITICAL PARAMETER SUMMARY- STAGE 3**

Lab: <i>LAB</i>	Date Completed: <i>DTCOMP</i>	Time Completed: <i>EOTTIME</i>	
Test Number			
Test Stand: <i>STAND</i>	Runs On The Stand: <i>STRUN</i>	Engine No.: <i>ENGNO</i>	Runs on Engine: <i>ENRUN</i>
Oil Code: <i>OILCODE</i>			
Formulation/Stand Code: <i>FORM</i>			

**BC 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 14.25-15.25	Delta AFR ≤ .50 <sup>A</sup>
1	<i>BFC_RB31</i>	<i>RPM_RB31</i>	<i>LOADRB31</i>	<i>OGT_RB31</i>	<i>CINTRB31</i>	<i>IAT_RB31</i>	<i>FRT_RB31</i>	<i>EBP_RB31</i>	<i>FCR_RB31</i>	<i>AFR_RB31</i>	
2	<i>BFC_RB32</i>	<i>RPM_RB32</i>	<i>LOADRB32</i>	<i>OGT_RB32</i>	<i>CINTRB32</i>	<i>IAT_RB32</i>	<i>FRT_RB32</i>	<i>EBP_RB32</i>	<i>FCR_RB32</i>	<i>AFR_RB32</i>	
3	<i>BFC_RB33</i>	<i>RPM_RB33</i>	<i>LOADRB33</i>	<i>OGT_RB33</i>	<i>CINTRB33</i>	<i>IAT_RB33</i>	<i>FRT_RB33</i>	<i>EBP_RB33</i>	<i>FCR_RB33</i>	<i>AFR_RB33</i>	
4	<i>BFC_RB34</i>	<i>RPM_RB34</i>	<i>LOADRB34</i>	<i>OGT_RB34</i>	<i>CINTRB34</i>	<i>IAT_RB34</i>	<i>FRT_RB34</i>	<i>EBP_RB34</i>	<i>FCR_RB34</i>	<i>AFR_RB34</i>	
5	<i>BFC_RB35</i>	<i>RPM_RB35</i>	<i>LOADRB35</i>	<i>OGT_RB35</i>	<i>CINTRB35</i>	<i>IAT_RB35</i>	<i>FRT_RB35</i>	<i>EBP_RB35</i>	<i>FCR_RB35</i>	<i>AFR_RB35</i>	
6	<i>BFC_RB36</i>	<i>RPM_RB36</i>	<i>LOADRB36</i>	<i>OGT_RB36</i>	<i>CINTRB36</i>	<i>IAT_RB36</i>	<i>FRT_RB36</i>	<i>EBP_RB36</i>	<i>FCR_RB36</i>	<i>AFR_RB36</i>	
AVG.	<i>BFCARB3A</i>	<i>RPM_RB3A</i>	<i>LOADRB3A</i>	<i>OGT_RB3A</i>	<i>CINTRB3A</i>	<i>IAT_RB3A</i>	<i>FRT_RB3A</i>	<i>EBP_RB3A</i>	<i>FCR_RB3A</i>	<i>AFR_RB3A</i>	<i>AFRDRB3A</i>
SD	<i>BFCSRB3A</i>										
C.V.	<i>BFCRB3A</i>										

**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 14.25-15.25	Delta AFR ≤ .50 <sup>A</sup>
1	<i>BFC_RC31</i>	<i>RPM_RC31</i>	<i>LOADRC31</i>	<i>OGT_RC31</i>	<i>CINTRC31</i>	<i>IAT_RC31</i>	<i>FRT_RC31</i>	<i>EBP_RC31</i>	<i>FCR_RC31</i>	<i>AFR_RC31</i>	
2	<i>BFC_RC32</i>	<i>RPM_RC32</i>	<i>LOADRC32</i>	<i>OGT_RC32</i>	<i>CINTRC32</i>	<i>IAT_RC32</i>	<i>FRT_RC32</i>	<i>EBP_RC32</i>	<i>FCR_RC32</i>	<i>AFR_RC32</i>	
3	<i>BFC_RC33</i>	<i>RPM_RC33</i>	<i>LOADRC33</i>	<i>OGT_RC33</i>	<i>CINTRC33</i>	<i>IAT_RC33</i>	<i>FRT_RC33</i>	<i>EBP_RC33</i>	<i>FCR_RC33</i>	<i>AFR_RC33</i>	
4	<i>BFC_RC34</i>	<i>RPM_RC34</i>	<i>LOADRC34</i>	<i>OGT_RC34</i>	<i>CINTRC34</i>	<i>IAT_RC34</i>	<i>FRT_RC34</i>	<i>EBP_RC34</i>	<i>FCR_RC34</i>	<i>AFR_RC34</i>	
5	<i>BFC_RC35</i>	<i>RPM_RC35</i>	<i>LOADRC35</i>	<i>OGT_RC35</i>	<i>CINTRC35</i>	<i>IAT_RC35</i>	<i>FRT_RC35</i>	<i>EBP_RC35</i>	<i>FCR_RC35</i>	<i>AFR_RC35</i>	
6	<i>BFC_RC36</i>	<i>RPM_RC36</i>	<i>LOADRC36</i>	<i>OGT_RC36</i>	<i>CINTRC36</i>	<i>IAT_RC36</i>	<i>FRT_RC36</i>	<i>EBP_RC36</i>	<i>FCR_RC36</i>	<i>AFR_RC36</i>	
AVG.	<i>BFCARC3A</i>	<i>RPM_RC3A</i>	<i>LOADRC3A</i>	<i>OGT_RC3A</i>	<i>CINTRC3A</i>	<i>IAT_RC3A</i>	<i>FRT_RC3A</i>	<i>EBP_RC3A</i>	<i>FCR_RC3A</i>	<i>AFR_RC3A</i>	<i>AFRDRC3A</i>
SD	<i>BFCSRC3A</i>										
C.V.	<i>BFCRC3A</i>										

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

Fig. A7.11 Critical Parameter Summary - Stage 3

**SEQUENCE VIBSJ**  
**FORM 12**  
**CRITICAL PARAMETER SUMMARY- STAGE 4**

Lab: <i>LAB</i>	Date Completed: <i>DTCOMP</i>	Time Completed: <i>EOTTIME</i>	
Test Number			
Test Stand: <i>STAND</i>	Runs On The Stand: <i>STRUN</i>	Engine No.: <i>ENGNO</i>	Runs on Engine: <i>ENRUN</i>
Oil Code: <i>OILCODE</i>			
Formulation/Stand Code: <i>FORM</i>			

**BC Oil**

Step SPEC	BSFC kg/kW-h	Speed r/min 1500 ± 2	Torque N-m 98 ± .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 14.25-15.25	Delta AFR ≤ .50 <sup>A</sup>
1	<i>BFC_RB41</i>	<i>RPM_RB41</i>	<i>LOADRB41</i>	<i>OGT_RB41</i>	<i>CINTRB41</i>	<i>IAT_RB41</i>	<i>FRT_RB41</i>	<i>EBP_RB41</i>	<i>FCR_RB41</i>	<i>AFR_RB41</i>	
2	<i>BFC_RB42</i>	<i>RPM_RB42</i>	<i>LOADRB42</i>	<i>OGT_RB42</i>	<i>CINTRB42</i>	<i>IAT_RB42</i>	<i>FRT_RB42</i>	<i>EBP_RB42</i>	<i>FCR_RB42</i>	<i>AFR_RB42</i>	
3	<i>BFC_RB43</i>	<i>RPM_RB43</i>	<i>LOADRB43</i>	<i>OGT_RB43</i>	<i>CINTRB43</i>	<i>IAT_RB43</i>	<i>FRT_RB43</i>	<i>EBP_RB43</i>	<i>FCR_RB43</i>	<i>AFR_RB43</i>	
4	<i>BFC_RB44</i>	<i>RPM_RB44</i>	<i>LOADRB44</i>	<i>OGT_RB44</i>	<i>CINTRB44</i>	<i>IAT_RB44</i>	<i>FRT_RB44</i>	<i>EBP_RB44</i>	<i>FCR_RB44</i>	<i>AFR_RB44</i>	
5	<i>BFC_RB45</i>	<i>RPM_RB45</i>	<i>LOADRB45</i>	<i>OGT_RB45</i>	<i>CINTRB45</i>	<i>IAT_RB45</i>	<i>FRT_RB45</i>	<i>EBP_RB45</i>	<i>FCR_RB45</i>	<i>AFR_RB45</i>	
6	<i>BFC_RB46</i>	<i>RPM_RB46</i>	<i>LOADRB46</i>	<i>OGT_RB46</i>	<i>CINTRB46</i>	<i>IAT_RB46</i>	<i>FRT_RB46</i>	<i>EBP_RB46</i>	<i>FCR_RB46</i>	<i>AFR_RB46</i>	
AVG.	<i>BFCARB4A</i>	<i>RPM_RB4A</i>	<i>LOADRB4A</i>	<i>OGT_RB4A</i>	<i>CINTRB4A</i>	<i>IAT_RB4A</i>	<i>FRT_RB4A</i>	<i>EBP_RB4A</i>	<i>FCR_RB4A</i>	<i>AFR_RB4A</i>	<i>AFRDRB4A</i>
SD	<i>BFCSRB4A</i>										
C.V.	<i>BFCORB4A</i>										

**Test Oil**

Step SPEC	BSFC kg/kW-h	Speed r/min 1500 ± 2	Torque N-m 98 ± .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 14.25-15.25	Delta AFR ≤ .50 <sup>A</sup>
1	<i>BFC_RC41</i>	<i>RPM_RC41</i>	<i>LOADRC41</i>	<i>OGT_RC41</i>	<i>CINTRC41</i>	<i>IAT_RC41</i>	<i>FRT_RC41</i>	<i>EBP_RC41</i>	<i>FCR_RC41</i>	<i>AFR_RC41</i>	
2	<i>BFC_RC42</i>	<i>RPM_RC42</i>	<i>LOADRC42</i>	<i>OGT_RC42</i>	<i>CINTRC42</i>	<i>IAT_RC42</i>	<i>FRT_RC42</i>	<i>EBP_RC42</i>	<i>FCR_RC42</i>	<i>AFR_RC42</i>	
3	<i>BFC_RC43</i>	<i>RPM_RC43</i>	<i>LOADRC43</i>	<i>OGT_RC43</i>	<i>CINTRC43</i>	<i>IAT_RC43</i>	<i>FRT_RC43</i>	<i>EBP_RC43</i>	<i>FCR_RC43</i>	<i>AFR_RC43</i>	
4	<i>BFC_RC44</i>	<i>RPM_RC44</i>	<i>LOADRC44</i>	<i>OGT_RC44</i>	<i>CINTRC44</i>	<i>IAT_RC44</i>	<i>FRT_RC44</i>	<i>EBP_RC44</i>	<i>FCR_RC44</i>	<i>AFR_RC44</i>	
5	<i>BFC_RC45</i>	<i>RPM_RC45</i>	<i>LOADRC45</i>	<i>OGT_RC45</i>	<i>CINTRC45</i>	<i>IAT_RC45</i>	<i>FRT_RC45</i>	<i>EBP_RC45</i>	<i>FCR_RC45</i>	<i>AFR_RC45</i>	
6	<i>BFC_RC46</i>	<i>RPM_RC46</i>	<i>LOADRC46</i>	<i>OGT_RC46</i>	<i>CINTRC46</i>	<i>IAT_RC46</i>	<i>FRT_RC46</i>	<i>EBP_RC46</i>	<i>FCR_RC46</i>	<i>AFR_RC46</i>	
AVG.	<i>BFCARC4A</i>	<i>RPM_RC4A</i>	<i>LOADRC4A</i>	<i>OGT_RC4A</i>	<i>CINTRC4A</i>	<i>IAT_RC4A</i>	<i>FRT_RC4A</i>	<i>EBP_RC4A</i>	<i>FCR_RC4A</i>	<i>AFR_RC4A</i>	<i>AFRDRC4A</i>
SD	<i>BFCSRC4A</i>										
C.V.	<i>BFCORC4A</i>										

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

Fig. A7.12 Critical Parameter Summary - Stage 4

**SEQUENCE VIBSJ**  
**FORM 13**  
**CRITICAL PARAMETER SUMMARY- STAGE 5**

Lab: <i>LAB</i>	Date Completed: <i>DTCOMP</i>	Time Completed: <i>EOTTIME</i>	
Test Number			
Test Stand: <i>STAND</i>	Runs On The Stand: <i>STRUN</i>	Engine No.: <i>ENGNO</i>	Runs on Engine: <i>ENRUN</i>
Oil Code: <i>OILCODE</i>			
Formulation/Stand Code: <i>FORM</i>			

**BC Oil**

Step SPEC	BSFC kg/kW-h	Speed r/min 1500 ± 2	Torque N-m 98 ± .07	Oil Gallery Temp. °C 45 ± 1	Coolant In Temp, °C 45 ± 1	Intake Air Temp, °C 27 ± 2	Fuel Rail Temp, °C 20 ± 2	EBP kPa 104 ± .17	Fuel Flow kg/h Record	AFR 14.25-15.25	Delta AFR ≤ .50 <sup>A</sup>
1	<i>BFC_RB51</i>	<i>RPM_RB51</i>	<i>LOADRB51</i>	<i>OGT_RB51</i>	<i>CINTRB51</i>	<i>IAT_RB51</i>	<i>FRT_RB51</i>	<i>EBP_RB51</i>	<i>FCR_RB51</i>	<i>AFR_RB51</i>	
2	<i>BFC_RB52</i>	<i>RPM_RB52</i>	<i>LOADRB52</i>	<i>OGT_RB52</i>	<i>CINTRB52</i>	<i>IAT_RB52</i>	<i>FRT_RB52</i>	<i>EBP_RB52</i>	<i>FCR_RB52</i>	<i>AFR_RB52</i>	
3	<i>BFC_RB53</i>	<i>RPM_RB53</i>	<i>LOADRB53</i>	<i>OGT_RB53</i>	<i>CINTRB53</i>	<i>IAT_RB53</i>	<i>FRT_RB53</i>	<i>EBP_RB53</i>	<i>FCR_RB53</i>	<i>AFR_RB53</i>	
4	<i>BFC_RB54</i>	<i>RPM_RB54</i>	<i>LOADRB54</i>	<i>OGT_RB54</i>	<i>CINTRB54</i>	<i>IAT_RB54</i>	<i>FRT_RB54</i>	<i>EBP_RB54</i>	<i>FCR_RB54</i>	<i>AFR_RB54</i>	
5	<i>BFC_RB55</i>	<i>RPM_RB55</i>	<i>LOADRB55</i>	<i>OGT_RB55</i>	<i>CINTRB55</i>	<i>IAT_RB55</i>	<i>FRT_RB55</i>	<i>EBP_RB55</i>	<i>FCR_RB55</i>	<i>AFR_RB55</i>	
6	<i>BFC_RB56</i>	<i>RPM_RB56</i>	<i>LOADRB56</i>	<i>OGT_RB56</i>	<i>CINTRB56</i>	<i>IAT_RB56</i>	<i>FRT_RB56</i>	<i>EBP_RB56</i>	<i>FCR_RB56</i>	<i>AFR_RB56</i>	
AVG.	<i>BFCARB5A</i>	<i>RPM_RB5A</i>	<i>LOADRB5A</i>	<i>OGT_RB5A</i>	<i>CINTRB5A</i>	<i>IAT_RB5A</i>	<i>FRT_RB5A</i>	<i>EBP_RB5A</i>	<i>FCR_RB5A</i>	<i>AFR_RB5A</i>	<i>AFRDRB5A</i>
SD	<i>BFCSRB5A</i>										
C.V.	<i>BFC CRB5A</i>										

**Test Oil**

Step SPEC	BSFC kg/kW-h	Speed r/min 1500 ± 2	Torque N-m 98 ± .07	Oil Gallery Temp. °C 45 ± 1	Coolant In Temp, °C 45 ± 1	Intake Air Temp, °C 27 ± 2	Fuel Rail Temp, °C 20 ± 2	EBP kPa 104 ± .17	Fuel Flow kg/h Record	AFR 14.25-15.25	Delta AFR ≤ .50 <sup>A</sup>
1	<i>BFC_RC51</i>	<i>RPM_RC51</i>	<i>LOADRC51</i>	<i>OGT_RC51</i>	<i>CINTRC51</i>	<i>IAT_RC51</i>	<i>FRT_RC51</i>	<i>EBP_RC51</i>	<i>FCR_RC51</i>	<i>AFR_RC51</i>	
2	<i>BFC_RC52</i>	<i>RPM_RC52</i>	<i>LOADRC52</i>	<i>OGT_RC52</i>	<i>CINTRC52</i>	<i>IAT_RC52</i>	<i>FRT_RC52</i>	<i>EBP_RC52</i>	<i>FCR_RC52</i>	<i>AFR_RC52</i>	
3	<i>BFC_RC53</i>	<i>RPM_RC53</i>	<i>LOADRC53</i>	<i>OGT_RC53</i>	<i>CINTRC53</i>	<i>IAT_RC53</i>	<i>FRT_RC53</i>	<i>EBP_RC53</i>	<i>FCR_RC53</i>	<i>AFR_RC53</i>	
4	<i>BFC_RC54</i>	<i>RPM_RC54</i>	<i>LOADRC54</i>	<i>OGT_RC54</i>	<i>CINTRC54</i>	<i>IAT_RC54</i>	<i>FRT_RC54</i>	<i>EBP_RC54</i>	<i>FCR_RC54</i>	<i>AFR_RC54</i>	
5	<i>BFC_RC55</i>	<i>RPM_RC55</i>	<i>LOADRC55</i>	<i>OGT_RC55</i>	<i>CINTRC55</i>	<i>IAT_RC55</i>	<i>FRT_RC55</i>	<i>EBP_RC55</i>	<i>FCR_RC55</i>	<i>AFR_RC55</i>	
6	<i>BFC_RC56</i>	<i>RPM_RC56</i>	<i>LOADRC56</i>	<i>OGT_RC56</i>	<i>CINTRC56</i>	<i>IAT_RC56</i>	<i>FRT_RC56</i>	<i>EBP_RC56</i>	<i>FCR_RC56</i>	<i>AFR_RC56</i>	
AVG.	<i>BFCARC5A</i>	<i>RPM_RC5A</i>	<i>LOADRC5A</i>	<i>OGT_RC5A</i>	<i>CINTRC5A</i>	<i>IAT_RC5A</i>	<i>FRT_RC5A</i>	<i>EBP_RC5A</i>	<i>FCR_RC5A</i>	<i>AFR_RC5A</i>	<i>AFRDRC5A</i>
SD	<i>BFC SRC5A</i>										
C.V.	<i>BFC CRC5A</i>										

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

Fig. A7.13 Critical Parameter Summary - Stage 5

**SEQUENCE VIBSJ  
FORM 14  
DOWNTIME AND OTHER COMMENTS**

Lab: <i>LAB</i>	Date Completed: <i>DTCOMP</i>	Time Completed: <i>EOTIME</i>	
Test Number			
Test Stand: <i>STAND</i>	Runs On The Stand: <i>STRUN</i>	Engine No.: <i>ENGNO</i>	Runs on Engine: <i>ENRUN</i>
Oil Code: <i>OILCODE</i>			
Formulation/Stand Code: <i>FORM</i>			

Downtime Occurrences		<i>DWNOCR</i>	
Test Hours	Date	Downtime	Reasons
<i>DOWNR001</i>	<i>DDATR001</i>	<i>DTIMR001</i>	<i>DREAR001</i>
Total Downtime		<i>TOTLDOWN</i>	

Total Number of Comments & Outlier Lines	<i>TOTCOM</i>
<i>OCOMR001</i>	

Fig. A7.14 Downtime and Other Comments