

**Test Method D 7589 for Measurement of the Effects of Automotive Engine Oils on  
the Fuel Economy of Passenger Cars and Light Trucks in the Sequence VID 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 7589 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 VID

#### Table of Contents

|     |   |         |
|-----|---|---------|
| 1.  | Report Cover Sheet (Includes Validity Statement)          | Form 1  |
| 2.  | Summary of Test Method                                    | Form 3  |
| 3.  | Test Result Summary                                       | Form 4  |
| 4.  | Operational Data Analysis, BSFC, BL Before 1 & 2          | Form 5  |
| 5.  | Operational Data Analysis, BSFC, BL Before 3 & Test Oil 1 | Form 6  |
| 6.  | Operational Data Analysis, BSFC, Test Oil 2 & BL After    | Form 7  |
| 7.  | General Parameter Listing, 16 h Aging                     | Form 8  |
| 8.  | General Parameter Listing, 84 h Aging                     | Form 9  |
| 9.  | General Parameter Summary, BL Before Test Oil 1           | Form 10 |
| 10. | General Parameter Summary, BL Before Test Oil 2           | Form 11 |
| 11. | General Parameter Summary, BL Before Test Oil 3           | Form 12 |
| 12. | General Parameter Summary, Test Oil Phase I               | Form 13 |
| 13. | General Parameter Summary, Test Oil Phase II              | Form 14 |
| 14. | General Parameter Summary, BL After Test Oil              | Form 15 |
| 15. | Critical Parameter Summary – Stages 1 & 2                 | Form 16 |
| 16. | Critical Parameter Summary - Stages 3 & 4                 | Form 17 |
| 17. | Critical Parameter Summary - Stages 5 & 6                 | Form 18 |
| 18. | Downtime Occurrences & Outliers                           | Form 19 |
| 19. | ACC Conformance Statement <sup>A</sup>                    | Form 20 |

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

**Sequence VID  
Form 3**

**Summary of Test Method**

The Sequence VID 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 six different stages of operation.

A 2008 Cadillac SRX 3.6L High Feature (HF) V6, 4-cycle engine is used as the test apparatus. The engine incorporates Dual Overhead Camshafts, 4 Valves / Cylinder, Dual Stage Plenum Induction Manifold, 94x85.6mm Bore & Stroke, with 10.2:1 compression ratio.

The Sequence VID test incorporates a flush and run type procedure. Each test consists of two 6-stage fuel economy measurements on baseline oil (BL), 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 2250 r/min and 120°C oil temperature. After the initial aging, a 6-stage fuel economy measurement is taken. The test oil is then aged an additional 84 hours at an engine speed of 2250 r/min and 120°C oil temperature. Following this final aging, the test oil once again goes through a 6-stage fuel economy measurement. The two fuel economy measurements taken on the baseline oil (BL) 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 6-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   | 2000                 | 105                 | 115                   | 109                       |
| 2   | 2000                 | 105                 | 65                    | 65                        |
| 3   | 1500                 | 105                 | 115                   | 109                       |
| 4   | 695                  | 20                  | 115                   | 109                       |
| 5   | 695                  | 20                  | 35                    | 35                        |
| 6   | 695                  | 40                  | 115                   | 109                       |

| <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 & 2              | 2250                 | 110                 | 120                   | 110                       |

**Sequence VID  
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.      | Runs on Engine: |
| Oil Code:  | Engine Serial Number: |                 |                 |
| Number of Full Length Tests Since Stand Calibration <sup>B</sup> |                       |                 |                 |
| Formulation/Stand Code:  |                       |                 |                 |

| Test Documentation                      |             |             |             |          |          |
|---|-------------|-------------|-------------|----------|----------|
|   | BL Before 1 | BL Before 2 | BL Before 3 | Test Oil | BL 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          |             |             |             |          |          |
| EOT Oil Viscosity @ 40 °C, cSt          |             |             |             |          |          |
| EOT Oil Viscosity @ 100°C, cSt          |             |             |             |          |          |
| Total Test Length, hhh:mm               |             |             |             |          |          |
| Total Engine Hours @ EOT                |             |             |             |          |          |
| Fuel Batch at Start of Test             |             |             |             |          |          |
| Fuel Batch at End of Test               |             |             |             |          |          |
| Test Hour when Fuel Batch was Changed   |             |             |             |          |          |

| Overall Results                                       |          |          |          |       |          |          |
|---|----------|----------|----------|-------|----------|----------|
|   | BL Oil   |          |          |       | Test Oil |          |
|   | Before 1 | Before 2 | Before 3 | After | Phase I  | Phase II |
| Fuel Consumed, Unweighted, kg                         |          |          |          |       |          |          |
| Fuel Consumed, weighted, kg                           |          |          |          |       |          |          |
| Shift Delta, % <sup>A</sup>                           |          |          |          |       |          |          |
| Fuel Economy Improvement, %                           |          |          |          |       |          |          |
| FEI Engine Hour Adjustment, %                         |          |          |          |       |          |          |
| FEI Industry Correction Factor, %                     |          |          |          |       |          |          |
| FEI Severity Adjustment, % (non-reference tests only) |          |          |          |       |          |          |
| FEI Final Result, %                                   |          |          |          |       |          |          |
| FEI Sum, sum of FEI1 and FEI2 final results           |          |          |          |       |          |          |
| Total Oil Consumption, ml                             |          |          |          |       |          |          |

<sup>A</sup> Calculate Baseline shift % using unweighted fuel consumed values. When a 3<sup>rd</sup> set of BL Before is used, calculate BL shift after using the BL Before 3 for BL Before 2

<sup>B</sup> Non reference tests only, full length tests including current one, if full length

**Sequence VID  
Form 5  
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<br/>kg/kW-h</b> | <b>BSFC<br/>C.V.<br/>%</b> | <b>Stage<br/>Length<br/>h</b> | <b>Nominal<br/>Power kW</b> | <b>Weight<br/>Factor</b> | <b>Weighted Fuel<br/>Consumed kg</b> |
| <b>BL<br/>Before<br/>Test<br/>Oil<br/>1</b> | 1            |                         |                            | <b>0.5</b>                    | <b>21.99</b>                | <b>0.300</b>             |                                      |
|   | 2            |                         |                            | <b>0.5</b>                    | <b>21.99</b>                | <b>0.032</b>             |                                      |
|   | 3            |                         |                            | <b>0.5</b>                    | <b>16.49</b>                | <b>0.310</b>             |                                      |
|   | 4            |                         |                            | <b>0.5</b>                    | <b>1.46</b>                 | <b>0.174</b>             |                                      |
|   | 5            |                         |                            | <b>0.5</b>                    | <b>1.46</b>                 | <b>0.011</b>             |                                      |
|   | 6            |                         |                            | <b>0.5</b>                    | <b>2.91</b>                 | <b>0.172</b>             |                                      |
| <b>Total Fuel Consumed</b>                  |              |                         |                            |                               |                             |                          |                                      |

| <b>Computed Averages</b>                    |              |                         |                            |                               |                             |                          |                                      |
|---|--------------|-------------------------|----------------------------|-------------------------------|-----------------------------|--------------------------|--------------------------------------|
| <b>Oil</b>                                  | <b>Stage</b> | <b>BSFC<br/>kg/kW-h</b> | <b>BSFC<br/>C.V.<br/>%</b> | <b>Stage<br/>Length<br/>h</b> | <b>Nominal<br/>Power kW</b> | <b>Weight<br/>Factor</b> | <b>Weighted Fuel<br/>Consumed kg</b> |
| <b>BL<br/>Before<br/>Test<br/>Oil<br/>2</b> | 1            |                         |                            | <b>0.5</b>                    | <b>21.99</b>                | <b>0.300</b>             |                                      |
|   | 2            |                         |                            | <b>0.5</b>                    | <b>21.99</b>                | <b>0.032</b>             |                                      |
|   | 3            |                         |                            | <b>0.5</b>                    | <b>16.49</b>                | <b>0.310</b>             |                                      |
|   | 4            |                         |                            | <b>0.5</b>                    | <b>1.46</b>                 | <b>0.174</b>             |                                      |
|   | 5            |                         |                            | <b>0.5</b>                    | <b>1.46</b>                 | <b>0.011</b>             |                                      |
|   | 6            |                         |                            | <b>0.5</b>                    | <b>2.91</b>                 | <b>0.172</b>             |                                      |
| <b>Total Fuel Consumed</b>                  |              |                         |                            |                               |                             |                          |                                      |

**Sequence VID**  
**Form 6**  
**Operational Date 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<br/>kg/kW-h</b> | <b>BSFC<br/>C.V.<br/>%</b> | <b>Stage<br/>Length<br/>h</b> | <b>Nominal<br/>Power kW</b> | <b>Weight<br/>Factor</b> | <b>Weighted Fuel<br/>Consumed kg</b> |
| <b>BL<br/>Before<br/>Test<br/>Oil<br/>3</b> | 1            |                         |                            | 0.5                           | 21.99                       | 0.300                    |                                      |
|   | 2            |                         |                            | 0.5                           | 21.99                       | 0.032                    |                                      |
|   | 3            |                         |                            | 0.5                           | 16.49                       | 0.310                    |                                      |
|   | 4            |                         |                            | 0.5                           | 1.46                        | 0.174                    |                                      |
|   | 5            |                         |                            | 0.5                           | 1.46                        | 0.011                    |                                      |
|   | 6            |                         |                            | 0.5                           | 2.91                        | 0.172                    |                                      |
| <b>Total Fuel Consumed</b>                  |              |                         |                            |                               |                             |                          |                                      |

| <b>Computed Averages</b>            |              |                         |                            |                               |                             |                          |                                      |
|-------------------------------------|--------------|-------------------------|----------------------------|-------------------------------|-----------------------------|--------------------------|--------------------------------------|
| <b>Oil</b>                          | <b>Stage</b> | <b>BSFC<br/>kg/kW-h</b> | <b>BSFC<br/>C.V.<br/>%</b> | <b>Stage<br/>Length<br/>h</b> | <b>Nominal<br/>Power kW</b> | <b>Weight<br/>Factor</b> | <b>Weighted Fuel<br/>Consumed kg</b> |
| <b>Test<br/>Oil<br/>Phase<br/>I</b> | 1            |                         |                            | 0.5                           | 21.99                       | 0.300                    |                                      |
|                                     | 2            |                         |                            | 0.5                           | 21.99                       | 0.032                    |                                      |
|                                     | 3            |                         |                            | 0.5                           | 16.49                       | 0.310                    |                                      |
|                                     | 4            |                         |                            | 0.5                           | 1.46                        | 0.174                    |                                      |
|                                     | 5            |                         |                            | 0.5                           | 1.46                        | 0.011                    |                                      |
|                                     | 6            |                         |                            | 0.5                           | 2.91                        | 0.172                    |                                      |
| <b>Total Fuel Consumed</b>          |              |                         |                            |                               |                             |                          |                                      |

**Sequence VID  
Form 7  
Operational Date 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<br/>kg/kW-h</b> | <b>BSFC<br/>C.V.<br/>%</b> | <b>Stage<br/>Length<br/>h</b> | <b>Nominal<br/>Power kW</b> | <b>Weight<br/>Factor</b> | <b>Weighted Fuel<br/>Consumed kg</b> |
| <b>Test<br/>Oil<br/>Phase<br/>II</b> | 1            |                         |                            | <b>0.5</b>                    | <b>21.99</b>                | <b>0.300</b>             |                                      |
|                                      | 2            |                         |                            | <b>0.5</b>                    | <b>21.99</b>                | <b>0.032</b>             |                                      |
|                                      | 3            |                         |                            | <b>0.5</b>                    | <b>16.49</b>                | <b>0.310</b>             |                                      |
|                                      | 4            |                         |                            | <b>0.5</b>                    | <b>1.46</b>                 | <b>0.174</b>             |                                      |
|                                      | 5            |                         |                            | <b>0.5</b>                    | <b>1.46</b>                 | <b>0.011</b>             |                                      |
|                                      | 6            |                         |                            | <b>0.5</b>                    | <b>2.91</b>                 | <b>0.172</b>             |                                      |
| <b>Total Fuel Consumed</b>           |              |                         |                            |                               |                             |                          |                                      |

| <b>Computed Averages</b>             |              |                         |                            |                               |                             |                          |                                      |
|--------------------------------------|--------------|-------------------------|----------------------------|-------------------------------|-----------------------------|--------------------------|--------------------------------------|
| <b>Oil</b>                           | <b>Stage</b> | <b>BSFC<br/>kg/kW-h</b> | <b>BSFC<br/>C.V.<br/>%</b> | <b>Stage<br/>Length<br/>h</b> | <b>Nominal<br/>Power kW</b> | <b>Weight<br/>Factor</b> | <b>Weighted Fuel<br/>Consumed kg</b> |
| <b>BL<br/>After<br/>Test<br/>Oil</b> | 1            |                         |                            | <b>0.5</b>                    | <b>21.99</b>                | <b>0.300</b>             |                                      |
|                                      | 2            |                         |                            | <b>0.5</b>                    | <b>21.99</b>                | <b>0.032</b>             |                                      |
|                                      | 3            |                         |                            | <b>0.5</b>                    | <b>16.49</b>                | <b>0.310</b>             |                                      |
|                                      | 4            |                         |                            | <b>0.5</b>                    | <b>1.46</b>                 | <b>0.174</b>             |                                      |
|                                      | 5            |                         |                            | <b>0.5</b>                    | <b>1.46</b>                 | <b>0.011</b>             |                                      |
|                                      | 6            |                         |                            | <b>0.5</b>                    | <b>2.91</b>                 | <b>0.172</b>             |                                      |
| <b>Total Fuel Consumed</b>           |              |                         |                            |                               |                             |                          |                                      |

**Sequence VID  
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: |                    |                 |                 |

**16 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>110 ±0.10</b>  |                      |                  |                  |
| 3. Oil Gallery Temperature, °C         | <b>120 ±2</b>     |                      |                  |                  |
| 4. Coolant Inlet Temperature, °C       | <b>110 ±2</b>     |                      |                  |                  |
| 5. Oil Circulation Temperature, °C     | <b>Record</b>     |                      |                  |                  |
| 6. Coolant Out Temperature, °C         | <b>Record</b>     |                      |                  |                  |
| 7. Intake Air Temperature, °C          | <b>29 ±2</b>      |                      |                  |                  |
| 8. Fuel to Flowmeter Temperature, °C   | <b>20-32</b>      |                      |                  |                  |
| 9. Fuel to Fuel Rail Temperature, °C   | <b>22 ±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>110±10</b>     |                      |                  |                  |
| 14. Fuel to Fuel Rail Pressure, kPa    | <b>405±10</b>     |                      |                  |                  |
| 15. Intake Manifold Pressure, kPa abs. | <b>Record</b>     |                      |                  |                  |
| 16. Exhaust Back Pressure, kPa abs.    | <b>105 ±0.20</b>  |                      |                  |                  |
| 17. Engine Oil Pressure, kPa           | <b>Record</b>     |                      |                  |                  |
| 18. Coolant Flow, L/min                | <b>80 ±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 VID  
Form 9  
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: |                    |                 |                 |

**84 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>110 ±0.10</b>  |                      |                  |                  |
| 3. Oil Gallery Temperature, °C         | <b>120±2</b>      |                      |                  |                  |
| 4. Coolant Inlet Temperature, °C       | <b>110 ±2</b>     |                      |                  |                  |
| 5. Oil Circulation Temperature, °C     | <b>Record</b>     |                      |                  |                  |
| 6. Coolant Out Temperature, °C         | <b>Record</b>     |                      |                  |                  |
| 7. Intake Air Temperature, °C          | <b>29 ±2</b>      |                      |                  |                  |
| 8. Fuel to Flowmeter Temperature, °C   | <b>20-32</b>      |                      |                  |                  |
| 9. Fuel to Fuel Rail Temperature, °C   | <b>22 ±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>110±10</b>     |                      |                  |                  |
| 14. Fuel to Fuel Rail Pressure, kPa    | <b>405±10</b>     |                      |                  |                  |
| 15. Intake Manifold Pressure, kPa abs. | <b>Record</b>     |                      |                  |                  |
| 16. Exhaust Back Pressure, kPa abs.    | <b>105 ± 0.20</b> |                      |                  |                  |
| 17. Engine Oil Pressure, kPa           | <b>Record</b>     |                      |                  |                  |
| 18. Coolant Flow, L/min                | <b>80±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 VID  
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: |                    |                 |                 |

**BL Before Test Oil 1**

**General Parameters**

|   | Spec               | Stage Average |   |   |   |   |   |
|---|--------------------|---------------|---|---|---|---|---|
|   |                    | 1             | 2 | 3 | 4 | 5 | 6 |
| 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. Load Cell Power Supply Temp., °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>110±10</b>      |               |   |   |   |   |   |
| 11. Fuel to Fuel Rail Pressure, kPa               | <b>405±10</b>      |               |   |   |   |   |   |
| 12. Intake Manifold Pressure, kPa abs.            | <b>Record</b>      |               |   |   |   |   |   |
| 13. Engine Oil Pressure, kPa                      | <b>Record</b>      |               |   |   |   |   |   |
| 14. Coolant Flow, L/min                           | <b>80 ± 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 VID  
Form 11  
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: |                    |                 |                 |

**BL Before Test Oil 2**

**General Parameters**

|   | Spec               | Stage Average |   |   |   |   |   |
|---|--------------------|---------------|---|---|---|---|---|
|   |                    | 1             | 2 | 3 | 4 | 5 | 6 |
| 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. Load Cell Power Supply Temp., °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>110±10</b>      |               |   |   |   |   |   |
| 11. Fuel to Fuel Rail Pressure, kPa               | <b>405±10</b>      |               |   |   |   |   |   |
| 12. Intake Manifold Pressure, kPa abs.            | <b>Record</b>      |               |   |   |   |   |   |
| 13. Engine Oil Pressure, kPa                      | <b>Record</b>      |               |   |   |   |   |   |
| 14. Coolant Flow, L/min                           | <b>80 ± 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 VID  
Form 12  
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: |                    |                 |                 |

**BL Before Test Oil 3  
General Parameters**

|   | Spec               | Stage Average |   |   |   |   |   |
|---|--------------------|---------------|---|---|---|---|---|
|   |                    | 1             | 2 | 3 | 4 | 5 | 6 |
| 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. Load Cell Power Supply Temp., °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>110±10</b>      |               |   |   |   |   |   |
| 11. Fuel to Fuel Rail Pressure, kPa               | <b>405±10</b>      |               |   |   |   |   |   |
| 12. Intake Manifold Pressure, kPa abs.            | <b>Record</b>      |               |   |   |   |   |   |
| 13. Engine Oil Pressure, kPa                      | <b>Record</b>      |               |   |   |   |   |   |
| 14. Coolant Flow, L/min                           | <b>80 ± 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 VID  
Form 13  
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 Average |   |   |   |   |   |
|---|--------------------|---------------|---|---|---|---|---|
|   |                    | 1             | 2 | 3 | 4 | 5 | 6 |
| 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. Load Cell Power Supply Temp., °C               | <b>Record</b>      |               |   |   |   |   |   |
| 6. Load Cell Temperature, °C                      | <b>Record</b>      |               |   |   |   |   |   |
| 7. Delta Load Cell Temperature, °C <sup>A</sup>   | <b>&lt; 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>110±10</b>      |               |   |   |   |   |   |
| 11. Fuel to Fuel Rail Pressure, kPa               | <b>405±10</b>      |               |   |   |   |   |   |
| 12. Intake Manifold Pressure, kPa abs.            | <b>Record</b>      |               |   |   |   |   |   |
| 13. Engine Oil Pressure, kPa                      | <b>Record</b>      |               |   |   |   |   |   |
| 14. Coolant Flow, L/min                           | <b>80 ± 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 VID  
Form 14  
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 II  
General Parameters**

|   |                    | Stage Average |   |   |   |   |   |
|---|--------------------|---------------|---|---|---|---|---|
|   | Spec               | 1             | 2 | 3 | 4 | 5 | 6 |
| 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. Load Cell Power Supply Temp., °C               | <b>Record</b>      |               |   |   |   |   |   |
| 6. Load Cell Temperature, °C                      | <b>Record</b>      |               |   |   |   |   |   |
| 7. Delta Load Cell Temperature, °C <sup>A</sup>   | <b>&lt; 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>110±10</b>      |               |   |   |   |   |   |
| 11. Fuel to Fuel Rail Pressure, kPa               | <b>405±10</b>      |               |   |   |   |   |   |
| 12. Intake Manifold Pressure, kPa abs.            | <b>Record</b>      |               |   |   |   |   |   |
| 13. Engine Oil Pressure, kPa                      | <b>Record</b>      |               |   |   |   |   |   |
| 14. Coolant Flow, L/min                           | <b>80 ± 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 VID  
Form 15  
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: |                    |                 |                 |

**BL After Test Oil Phase  
General Parameters**

|   |                    | Stage Average |   |   |   |   |   |
|---|--------------------|---------------|---|---|---|---|---|
|   | Spec               | 1             | 2 | 3 | 4 | 5 | 6 |
| 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. Load Cell Power Supply Temp., °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>110±10</b>      |               |   |   |   |   |   |
| 11. Fuel to Fuel Rail Pressure, kPa               | <b>405±10</b>      |               |   |   |   |   |   |
| 12. Intake Manifold Pressure, kPa abs.            | <b>Record</b>      |               |   |   |   |   |   |
| 13. Engine Oil Pressure, kPa                      | <b>Record</b>      |               |   |   |   |   |   |
| 14. Coolant Flow, L/min                           | <b>80 ± 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 VID  
Form 16  
Critical 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: |                    |                 |                 |

**Stage 1 Average**

|                                   | Spec               | BL<br>Before<br>Test Oil<br>1 | BL<br>Before<br>Test Oil<br>2 | BL<br>Before<br>Test Oil<br>3 | Test Oil<br>Phase I | Test Oil<br>Phase II | BL<br>After<br>Test Oil |
|-----------------------------------|--------------------|-------------------------------|-------------------------------|-------------------------------|---------------------|----------------------|-------------------------|
| Speed, r/min                      | <b>2000±5</b>      |                               |                               |                               |                     |                      |                         |
| Torque, N-m                       | <b>105±0.10</b>    |                               |                               |                               |                     |                      |                         |
| Oil Gallery Temperature, °C       | <b>115±2</b>       |                               |                               |                               |                     |                      |                         |
| Coolant Inlet Temperature, °C     | <b>109±2</b>       |                               |                               |                               |                     |                      |                         |
| Intake Air Temperature, °C        | <b>29±2</b>        |                               |                               |                               |                     |                      |                         |
| Fuel to Fuel Rail Temperature, °C | <b>22±2</b>        |                               |                               |                               |                     |                      |                         |
| Exhaust Back Pressure, kPa abs.   | <b>105±0.17</b>    |                               |                               |                               |                     |                      |                         |
| Fuel Flow, kg/h                   | <b>Record</b>      |                               |                               |                               |                     |                      |                         |
| Air/Fuel Ratio                    | <b>14.00–15.00</b> |                               |                               |                               |                     |                      |                         |
| Delta AFR <sup>A</sup>            | <b>≤ .50</b>       |                               |                               |                               |                     |                      |                         |
| BSFC, kg/Kw-h                     | <b>Record</b>      |                               |                               |                               |                     |                      |                         |
| BSFC, Standard Deviation          | <b>Record</b>      |                               |                               |                               |                     |                      |                         |
| BSFC C.V., %                      | <b>Record</b>      |                               |                               |                               |                     |                      |                         |

**Stage 2 Average**

|                                   | Spec               | BL<br>Before<br>Test Oil<br>1 | BL<br>Before<br>Test Oil<br>2 | BL<br>Before<br>Test Oil<br>3 | Test Oil<br>Phase I | Test Oil<br>Phase II | BL<br>After<br>Test Oil |
|-----------------------------------|--------------------|-------------------------------|-------------------------------|-------------------------------|---------------------|----------------------|-------------------------|
| Speed, r/min                      | <b>2000±5</b>      |                               |                               |                               |                     |                      |                         |
| Torque, N-m                       | <b>105±0.10</b>    |                               |                               |                               |                     |                      |                         |
| Oil Gallery Temperature, °C       | <b>65±2</b>        |                               |                               |                               |                     |                      |                         |
| Coolant Inlet Temperature, °C     | <b>65±2</b>        |                               |                               |                               |                     |                      |                         |
| Intake Air Temperature, °C        | <b>29±2</b>        |                               |                               |                               |                     |                      |                         |
| Fuel to Fuel Rail Temperature, °C | <b>22±2</b>        |                               |                               |                               |                     |                      |                         |
| Exhaust Back Pressure, kPa abs.   | <b>105±0.17</b>    |                               |                               |                               |                     |                      |                         |
| Fuel Flow, kg/h                   | <b>Record</b>      |                               |                               |                               |                     |                      |                         |
| Air/Fuel Ratio                    | <b>14.00–15.00</b> |                               |                               |                               |                     |                      |                         |
| Delta AFR <sup>A</sup>            | <b>≤ .50</b>       |                               |                               |                               |                     |                      |                         |
| BSFC, kg/Kw-h                     | <b>Record</b>      |                               |                               |                               |                     |                      |                         |
| BSFC, Standard Deviation          | <b>Record</b>      |                               |                               |                               |                     |                      |                         |
| BSFC C.V., %                      | <b>Record</b>      |                               |                               |                               |                     |                      |                         |

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



**Sequence VID  
Form 17  
Critical 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: |                    |                 |                 |

**Stage 3 Average**

|                                   | Spec               | BL<br>Before<br>Test Oil<br>1 | BL<br>Before<br>Test Oil<br>2 | BL<br>Before<br>Test Oil<br>3 | Test Oil<br>Phase I | Test Oil<br>Phase II | BL<br>After<br>Test Oil |
|-----------------------------------|--------------------|-------------------------------|-------------------------------|-------------------------------|---------------------|----------------------|-------------------------|
| Speed, r/min                      | <b>1500±5</b>      |                               |                               |                               |                     |                      |                         |
| Torque, N-m                       | <b>105±0.10</b>    |                               |                               |                               |                     |                      |                         |
| Oil Gallery Temperature, °C       | <b>115±2</b>       |                               |                               |                               |                     |                      |                         |
| Coolant Inlet Temperature, °C     | <b>109±2</b>       |                               |                               |                               |                     |                      |                         |
| Intake Air Temperature, °C        | <b>29±2</b>        |                               |                               |                               |                     |                      |                         |
| Fuel to Fuel Rail Temperature, °C | <b>22±2</b>        |                               |                               |                               |                     |                      |                         |
| Exhaust Back Pressure, kPa abs.   | <b>105±0.17</b>    |                               |                               |                               |                     |                      |                         |
| Fuel Flow, kg/h                   | <b>Record</b>      |                               |                               |                               |                     |                      |                         |
| Air/Fuel Ratio                    | <b>14.00–15.00</b> |                               |                               |                               |                     |                      |                         |
| Delta AFR <sup>A</sup>            | <b>≤ .50</b>       |                               |                               |                               |                     |                      |                         |
| BSFC, kg/Kw-h                     | <b>Record</b>      |                               |                               |                               |                     |                      |                         |
| BSFC, Standard Deviation          | <b>Record</b>      |                               |                               |                               |                     |                      |                         |
| BSFC C.V., %                      | <b>Record</b>      |                               |                               |                               |                     |                      |                         |

**Stage 4 Average**

|                                   | Spec               | BL<br>Before<br>Test Oil<br>1 | BL<br>Before<br>Test Oil<br>2 | BL<br>Before<br>Test Oil<br>3 | Test Oil<br>Phase I | Test Oil<br>Phase II | BL<br>After<br>Test Oil |
|-----------------------------------|--------------------|-------------------------------|-------------------------------|-------------------------------|---------------------|----------------------|-------------------------|
| Speed, r/min                      | <b>695±5</b>       |                               |                               |                               |                     |                      |                         |
| Torque, N-m                       | <b>20±0.10</b>     |                               |                               |                               |                     |                      |                         |
| Oil Gallery Temperature, °C       | <b>115±2</b>       |                               |                               |                               |                     |                      |                         |
| Coolant Inlet Temperature, °C     | <b>109±2</b>       |                               |                               |                               |                     |                      |                         |
| Intake Air Temperature, °C        | <b>29±2</b>        |                               |                               |                               |                     |                      |                         |
| Fuel to Fuel Rail Temperature, °C | <b>22±2</b>        |                               |                               |                               |                     |                      |                         |
| Exhaust Back Pressure, kPa abs.   | <b>104±0.17</b>    |                               |                               |                               |                     |                      |                         |
| Fuel Flow, kg/h                   | <b>Record</b>      |                               |                               |                               |                     |                      |                         |
| Air/Fuel Ratio                    | <b>14.00–15.00</b> |                               |                               |                               |                     |                      |                         |
| Delta AFR <sup>A</sup>            | <b>≤ .50</b>       |                               |                               |                               |                     |                      |                         |
| BSFC, kg/Kw-h                     | <b>Record</b>      |                               |                               |                               |                     |                      |                         |
| BSFC, Standard Deviation          | <b>Record</b>      |                               |                               |                               |                     |                      |                         |
| BSFC C.V., %                      | <b>Record</b>      |                               |                               |                               |                     |                      |                         |

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

**Sequence VID  
Form 18  
Critical 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: |                    |                 |                 |

**Stage 5 Average**

|                                   | Spec               | BL<br>Before<br>Test Oil<br>1 | BL<br>Before<br>Test Oil<br>2 | BL<br>Before<br>Test Oil<br>3 | Test Oil<br>Phase I | Test Oil<br>Phase II | BL<br>After<br>Test Oil |
|-----------------------------------|--------------------|-------------------------------|-------------------------------|-------------------------------|---------------------|----------------------|-------------------------|
| Speed, r/min                      | <b>695±5</b>       |                               |                               |                               |                     |                      |                         |
| Torque, N-m                       | <b>20±0.10</b>     |                               |                               |                               |                     |                      |                         |
| Oil Gallery Temperature, °C       | <b>35±2</b>        |                               |                               |                               |                     |                      |                         |
| Coolant Inlet Temperature, °C     | <b>35±2</b>        |                               |                               |                               |                     |                      |                         |
| Intake Air Temperature, °C        | <b>29±2</b>        |                               |                               |                               |                     |                      |                         |
| Fuel to Fuel Rail Temperature, °C | <b>22±2</b>        |                               |                               |                               |                     |                      |                         |
| Exhaust Back Pressure, kPa abs.   | <b>104±0.17</b>    |                               |                               |                               |                     |                      |                         |
| Fuel Flow, kg/h                   | <b>Record</b>      |                               |                               |                               |                     |                      |                         |
| Air/Fuel Ratio                    | <b>14.00–15.00</b> |                               |                               |                               |                     |                      |                         |
| Delta AFR <sup>A</sup>            | <b>≤ .50</b>       |                               |                               |                               |                     |                      |                         |
| BSFC, kg/Kw-h                     | <b>Record</b>      |                               |                               |                               |                     |                      |                         |
| BSFC, Standard Deviation          | <b>Record</b>      |                               |                               |                               |                     |                      |                         |
| BSFC C.V., %                      | <b>Record</b>      |                               |                               |                               |                     |                      |                         |

**Stage 6 Average**

|                                   | Spec               | BL<br>Before<br>Test Oil<br>1 | BL<br>Before<br>Test Oil<br>2 | BL<br>Before<br>Test Oil<br>3 | Test Oil<br>Phase I | Test Oil<br>Phase II | BL<br>After<br>Test Oil |
|-----------------------------------|--------------------|-------------------------------|-------------------------------|-------------------------------|---------------------|----------------------|-------------------------|
| Speed, r/min                      | <b>695±5</b>       |                               |                               |                               |                     |                      |                         |
| Torque, N-m                       | <b>40±0.10</b>     |                               |                               |                               |                     |                      |                         |
| Oil Gallery Temperature, °C       | <b>115±2</b>       |                               |                               |                               |                     |                      |                         |
| Coolant Inlet Temperature, °C     | <b>109±2</b>       |                               |                               |                               |                     |                      |                         |
| Intake Air Temperature, °C        | <b>29±2</b>        |                               |                               |                               |                     |                      |                         |
| Fuel to Fuel Rail Temperature, °C | <b>22±2</b>        |                               |                               |                               |                     |                      |                         |
| Exhaust Back Pressure, kPa abs.   | <b>104±0.17</b>    |                               |                               |                               |                     |                      |                         |
| Fuel Flow, kg/h                   | <b>Record</b>      |                               |                               |                               |                     |                      |                         |
| Air/Fuel Ratio                    | <b>14.00–15.00</b> |                               |                               |                               |                     |                      |                         |
| Delta AFR <sup>A</sup>            | <b>≤ .50</b>       |                               |                               |                               |                     |                      |                         |
| BSFC, kg/Kw-h                     | <b>Record</b>      |                               |                               |                               |                     |                      |                         |
| BSFC, Standard Deviation          | <b>Record</b>      |                               |                               |                               |                     |                      |                         |
| BSFC C.V., %                      | <b>Record</b>      |                               |                               |                               |                     |                      |                         |

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







**Sequence VID  
Form 20  
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