

**D 5966
Roller Follower Wear Test**

Final Report Cover Sheet
RFWT VERSION 20040331 BETA
Report Packet Version No.

CC
CC

Conducted For:

C	V = Valid
	I = Invalid

Test Number					
Test Stand CCCCC	Stand Run CCCC CCCC	Engine CCCCCC	Engine Run CCCC CCCC		
Date Completed	YYYYMMDD	YYYYMMDD	Time Completed	HH:MM	HH:MM
Oil Code ^A	CC			CCCCCC	
Formulation/Stand Code	CC-CCCCCCCCC-C-C-CCCCC-CC-CC-CCCC				
Alternate Codes	CCCCCCCCCCCCCCCC	CCCCCCCCCCCCCCCC	CCCCCCCCCCCCCCCC	CCCCCCCCCCCCCCCC	

In my opinion this test CCCCCC been conducted in a valid manner in accordance with the Test Method D 6335 and the appropriate amendments through the Information Letter System. The remarks included in the report describe the anomalies associated with this test.

^A CMIR or Non-Reference Oil Code

Submitted By: _____ CCC
Testing Laboratory

Signature Image
Signature

Typed Name

Title

**D 5966
Roller Follower Wear Test
Form 1
Test Lab Affidavit**

Reference Oil Test					Non-Reference Oil Test				
Lab	Stand	Stand Run	Engine	Engine Run	Lab	Stand	Stand Run	Engine	Engine Run
CC	CCCCC	CCCC	CCCCCC	CCCC	CC	CCCCC	CCCC	CCCCCC	CCCC
Start Date	Date Completed	End of Test Time	Test Length		Start Date	Date Completed	End of Test Time	Test Length	
YYYYMMDD	YYYYMMDD	HH:MM	S1234		YYYYMMDD	YYYYMMDD	HH:MM	S1234	
CMIR	TMC Oil Code	Viscosity Grade			Oil Code	Viscosity Grade			
CCCCC	CCCCC	CCCCCC			CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC	CCCCCC		CCCCCC	
Laboratory Oil Code	Laboratory Oil Code	Formulation Stand Code			Laboratory Oil Code	Laboratory Oil Code	Formulation Stand Code		
		CCCCCCCCCCCC			CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC		
Average Wear (mils)	Severity Adjustment	Adjusted Average Wear			Average Wear (mils)	Severity Adjustment	Adjusted Average Wear		
S12.12	S1.12	S12.12			S12.12	S1.12	S12.12		

D 5966
Roller Follower Wear Test
Form 2
Summary of Roller Follower Wear

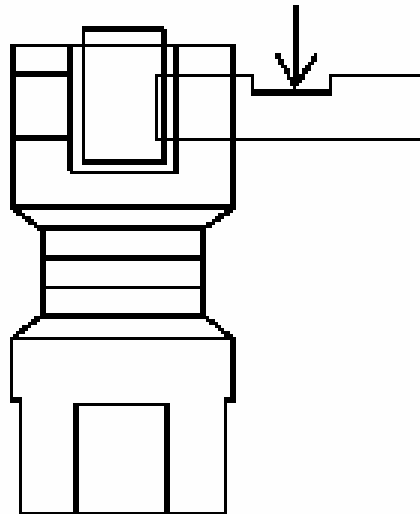
Laboratory	CC	Date Completed	YYYYMMDD	YYYYMMDD
Test Number	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC			
Oil Code	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC			CCCCCC
Formulation/Stand Code	CC-CCCCCCCC-C-C-CCCC-CC-CC-CCCC			

Lifter Part Number
CCCCCCCCCC

Profilometer Wear Measurements in Mils

Lifter Number	Wear (Mils)	Lifter Number	Wear (Mils)
1L	S12.12	1R	S12.12
2L	S12.12	2R	S12.12
3L	S12.12	3R	S12.12
4L	S12.12	4R	S12.12
5L	S12.12	5R	S12.12
6L	S12.12	6R	S12.12
7L	S12.12	7R	S12.12
8L	S12.12	8R	S12.12
Wear Statistics			
Minimum	Maximum	Average	Std. Deviation
S12.12	S12.12	S12.12	S12.12

Wear is measured at location shown by arrow



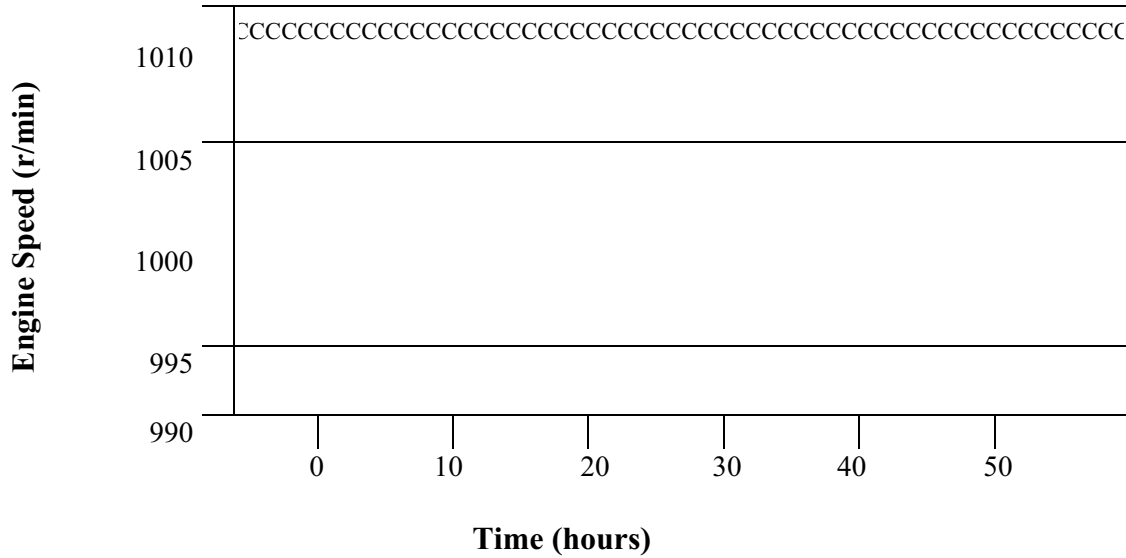
D 5966
Roller Follower Wear Test
Form 3
Operational Data Summary - Engine Speed

Laboratory	CC	Date Completed	YYYYMMDD	YYYYMMDD
Test Number	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC			
Oil Code	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC			CCCCCC
Formulation/Stand Code	CC-CCCCCCCCC-C-C-CCCCC-CC-CC-CCCC			

Engine Speed (r/min)

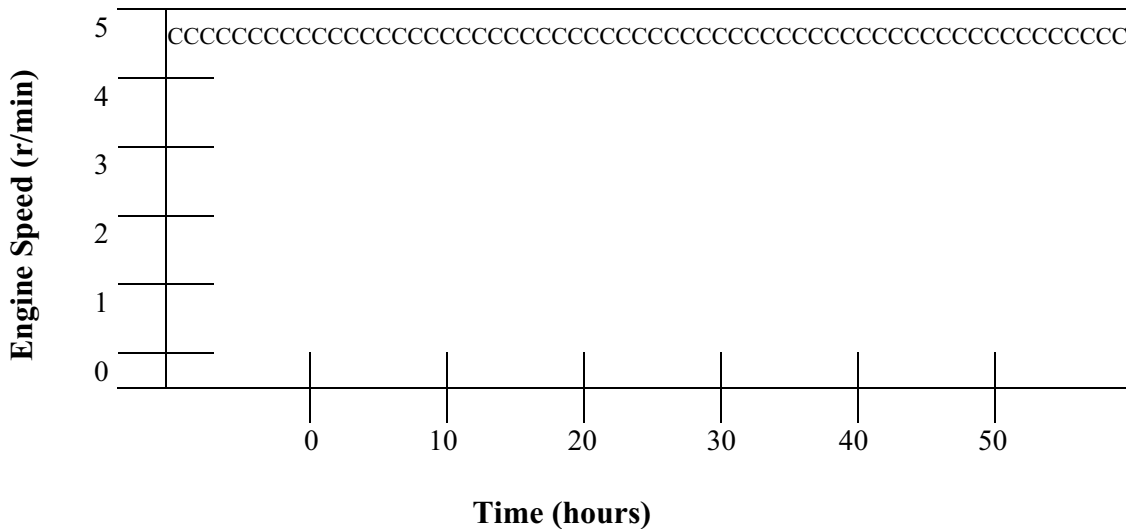
Process Mean

$\bar{X}_{av} = S1234.1$



Process Variability (s)

$S_{av} = S12.1$



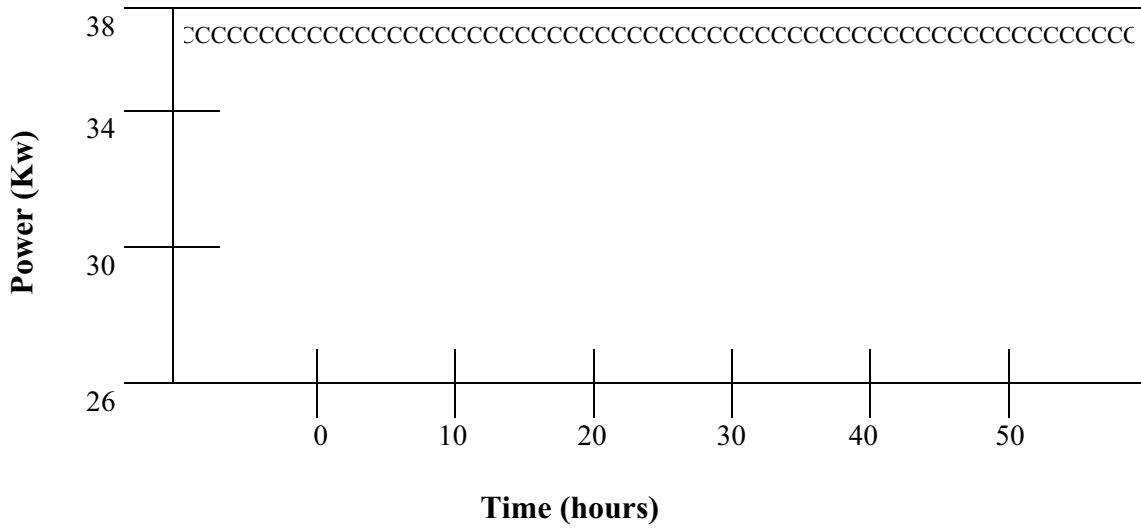
D 5966
Roller Follower Wear Test
Form 4
Operational Data Summary – Power

Laboratory	CC	Date Completed	YYYYMMDD	YYYYMMDD
Test Number	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC			
Oil Code	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC			CCCCCC
Formulation/Stand Code	CC-CCCCCCCC-C-C-CCCC-CC-CC-CCCC			

Power (kW)

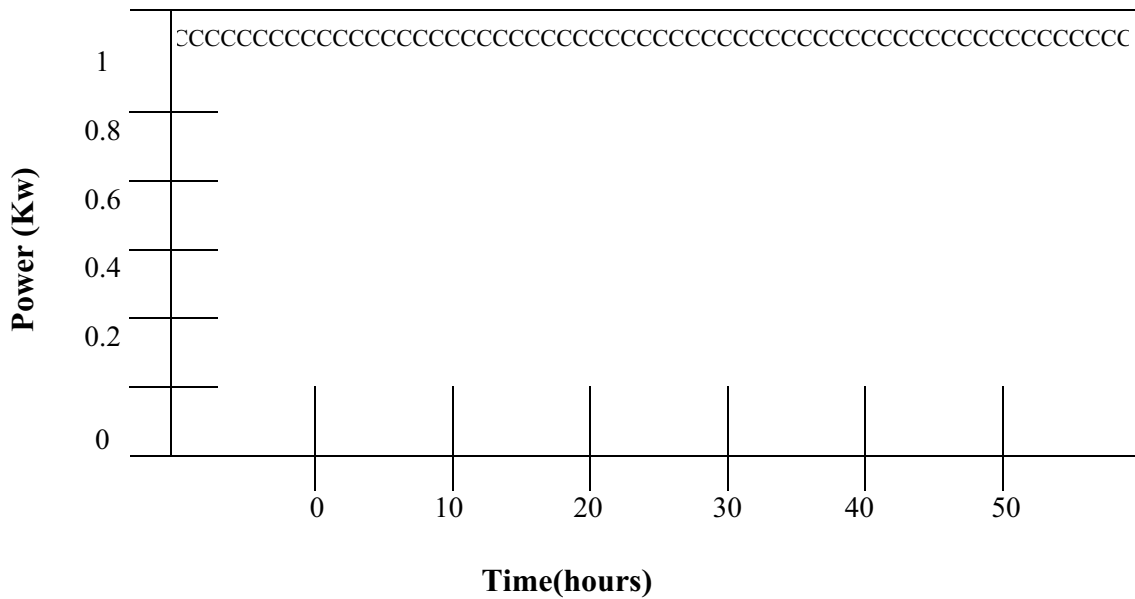
Process Mean

X_{av} = S12.1



Process Variability (s)

S_{av} = S12.1



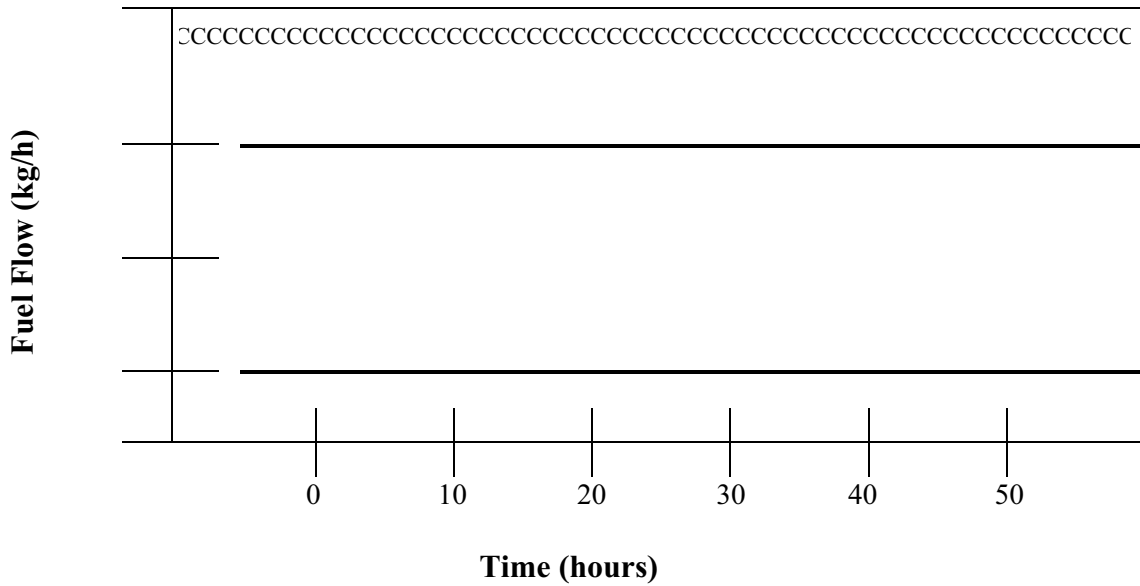
D 5966
Roller Follower Wear Test
Form 5
Operational Data Summary – Fuel Flow

Laboratory	CC	Date Completed	YYYYMMDD
Test Number	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC		
Oil Code	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC		CCCCC
Formulation/Stand Code	CC-CCCCCCCC-C-C-CCCC-CC-CC-CCCC		

Fuel Flow (kg/h)

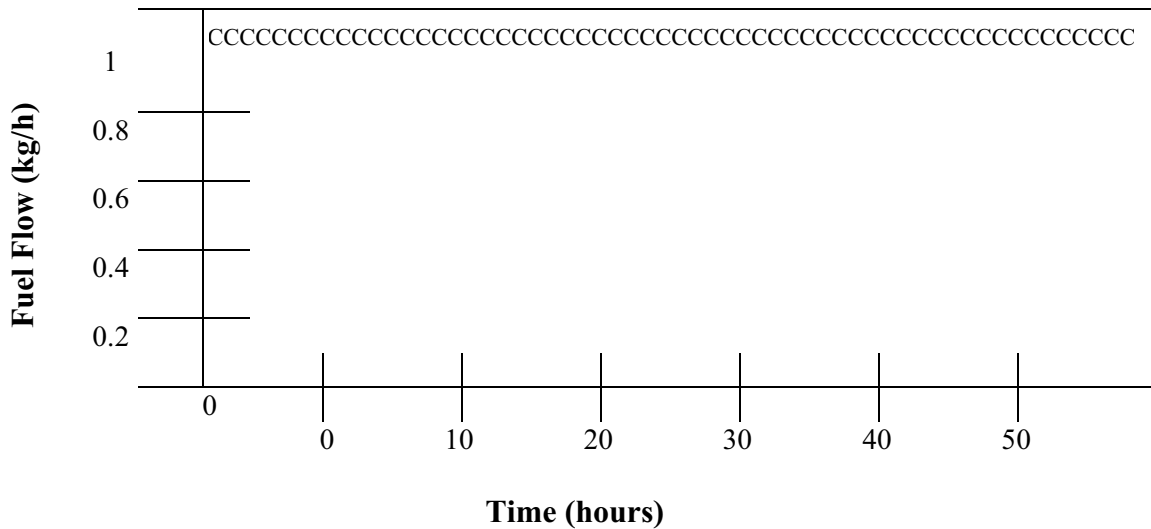
Process Mean

X_{av} = S1.1



Process Variability (s)

S_{av} = S1.1



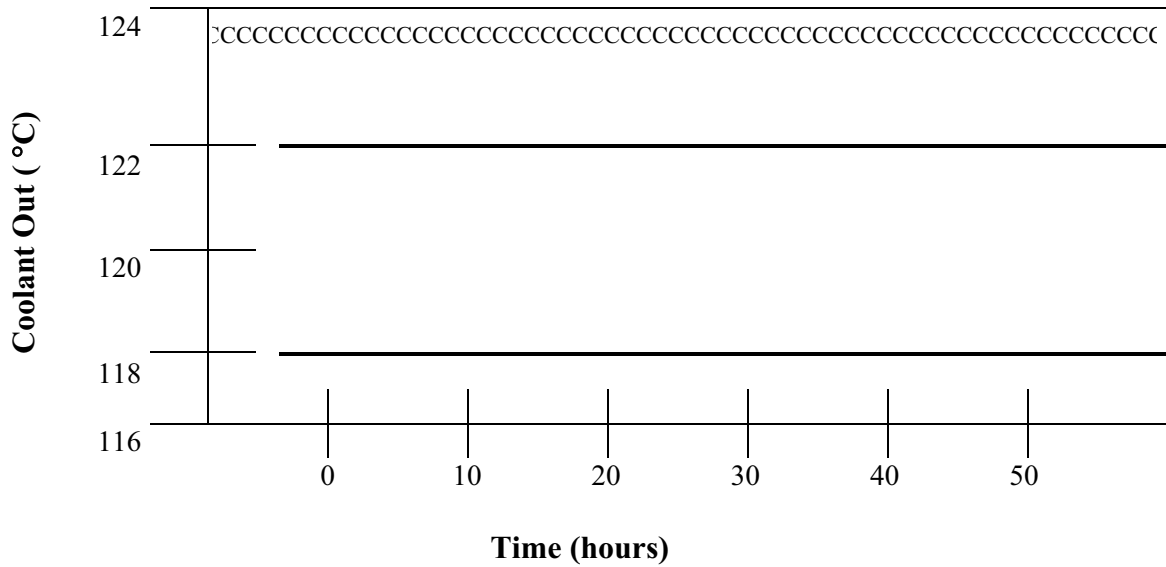
D 5966
Roller Follower Wear Test
Form 6
Operational Data Summary – Coolant Output Temperature

Laboratory	CC	Date Completed	YYYYMMDD
Test Number	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC		
Oil Code	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC		CCCCCC
Formulation/Stand Code	CC-CCCCCCCC-C-C-CCCCC-CC-CC-CCCC		

Coolant Out Temperature

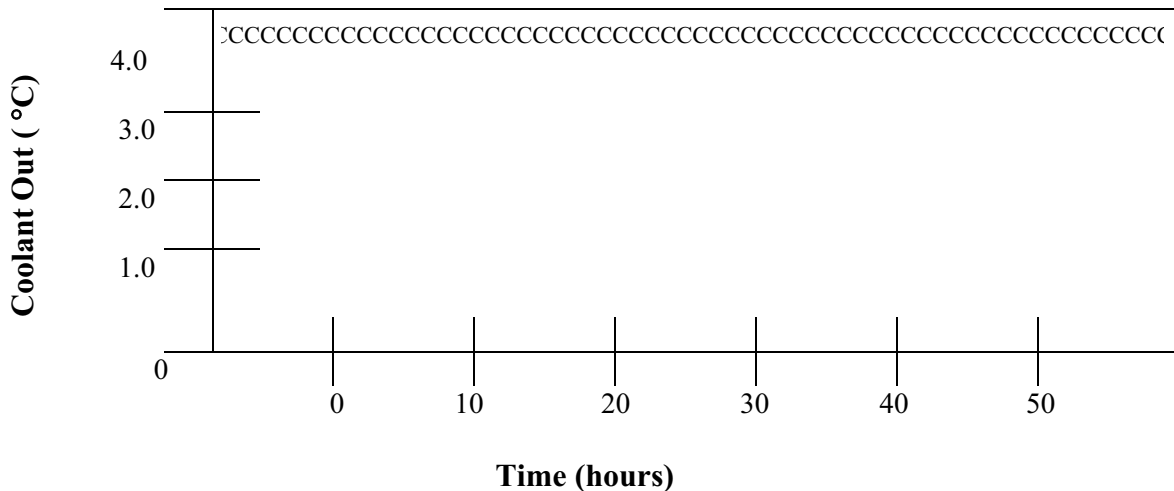
Process Mean

X_{av} = S123.1



Process Variability (s)

S_{av} = S12.1



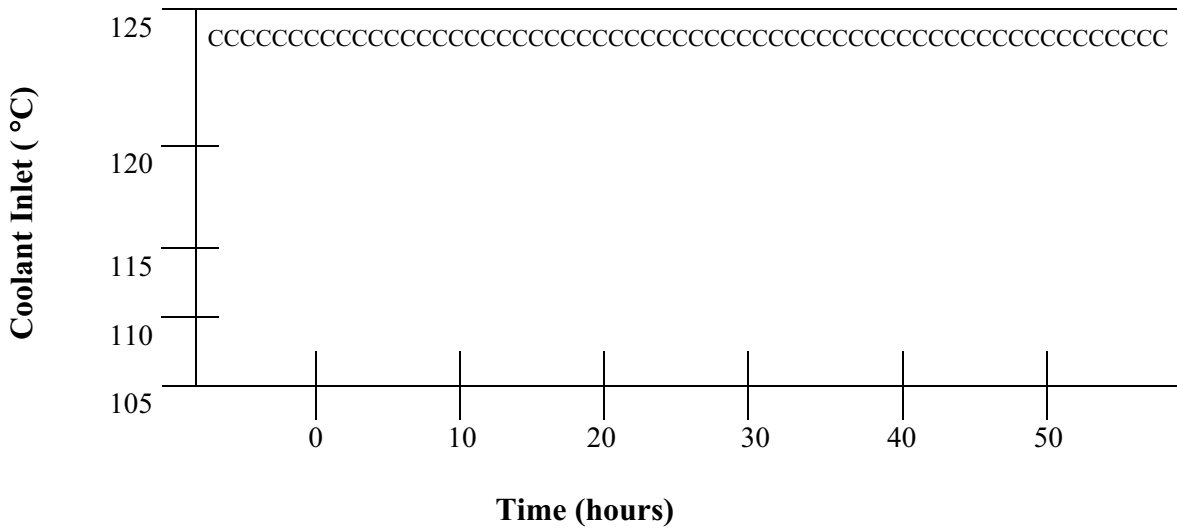
D 5966
Roller Follower Wear Test
Form 7
Operational Data Summary – Coolant Inlet Temperature

Laboratory	CC	Date Completed	YYYYMMDD	YYYYMMDD
Test Number	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC			
Oil Code	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC			CCCCCC
Formulation/Stand Code	CC-CCCCCCCC-C-C-CCCC-CC-CC-CCCC			

Coolant Inlet Temperature

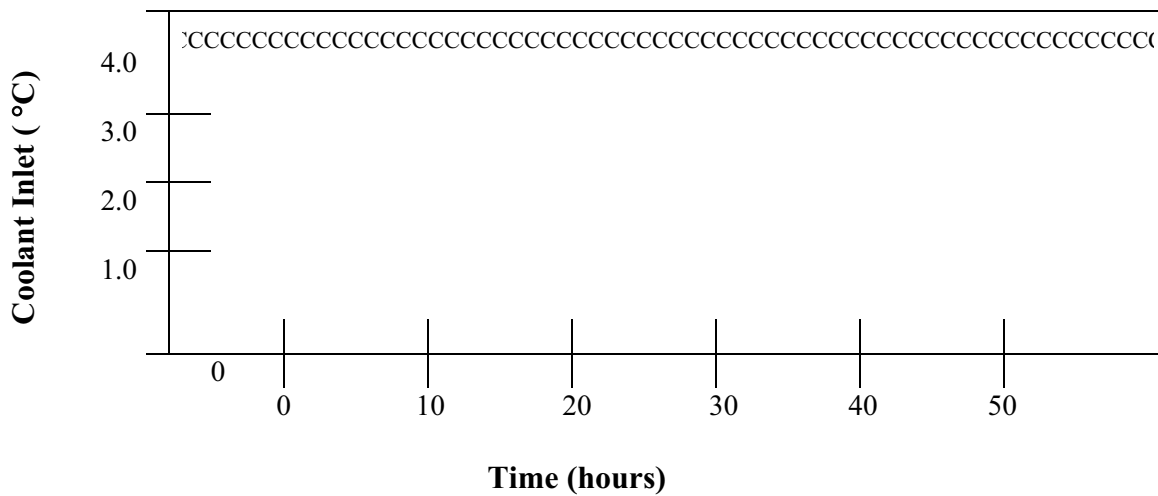
Process Mean

X_{av} = S123.1



Process Variability (s)

S_{av} = S12.1



**D 5966
Roller Follower Wear Test
Form 8**

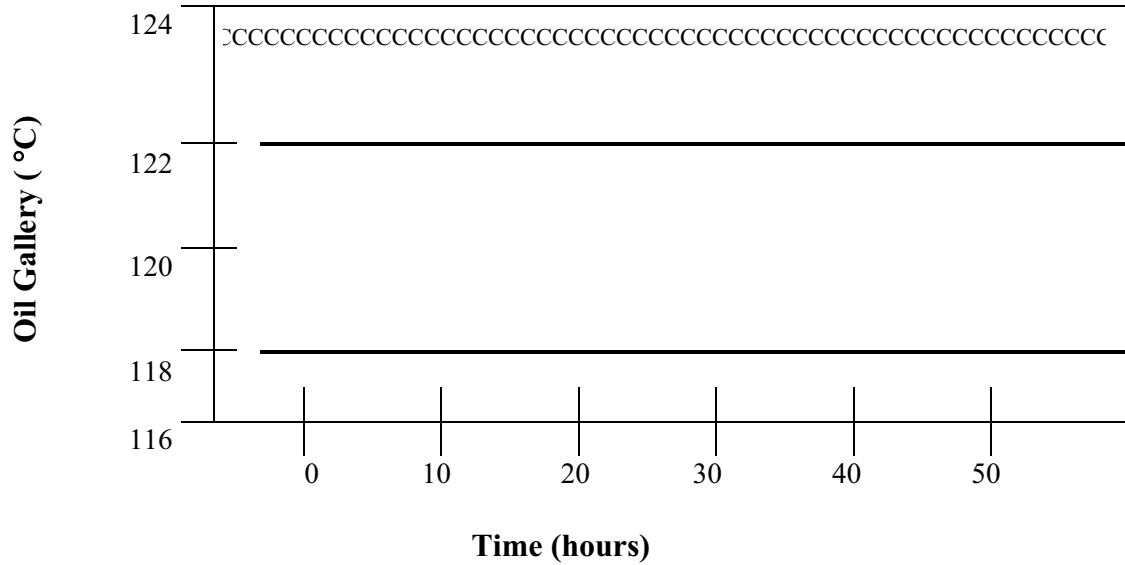
Operational Data Summary – Oil Gallery Temperature

Laboratory	CC	Date Completed	YYYYMMDD	YYYYMMDD
Test Number	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC			
Oil Code	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC			CCCCCC
Formulation/Stand Code	CC-CCCCCCCC-C-C-CCCC-CC-CC-CCCC			

Oil Gallery Temperature

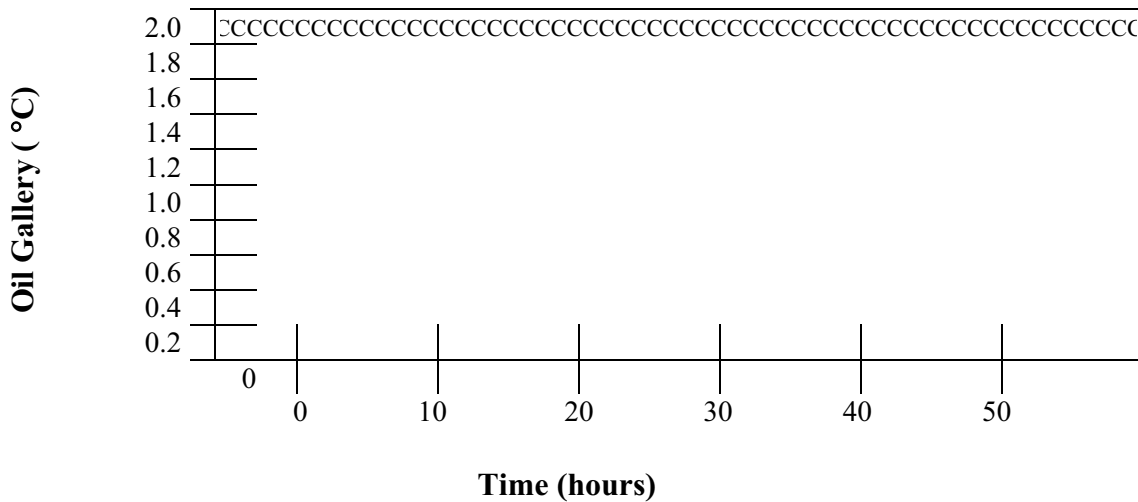
Process Mean

X_{av} = S123.1



Process Variability (s)

S_{av} = S12.1



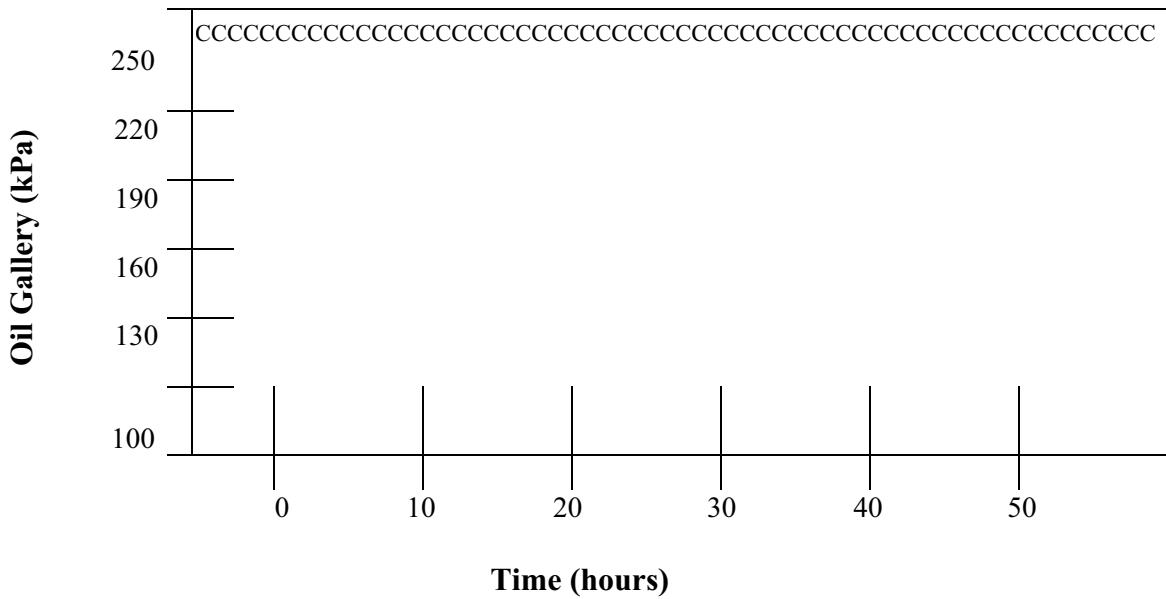
D 5966
Roller Follower Wear Test
Form 9
Operational Data Summary – Oil Gallery Pressure

Laboratory	CC	Date Completed	YYYYMMDD	YYYYMMDD
Test Number	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC			
Oil Code	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC			CCCCCC
Formulation/Stand Code	CC-CCCCCCCC-C-C-CCCC-CC-CC-CCCC			

Oil Gallery Pressure

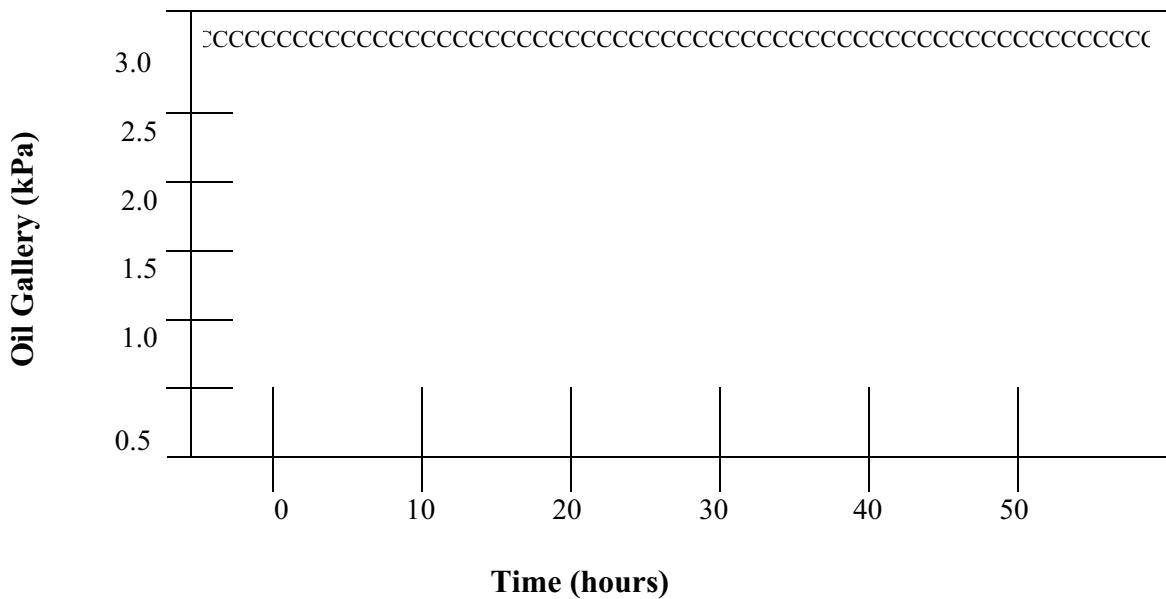
Process Mean

X_{av} = S12.1



Process Variability (s)

S_{av} = S12.1



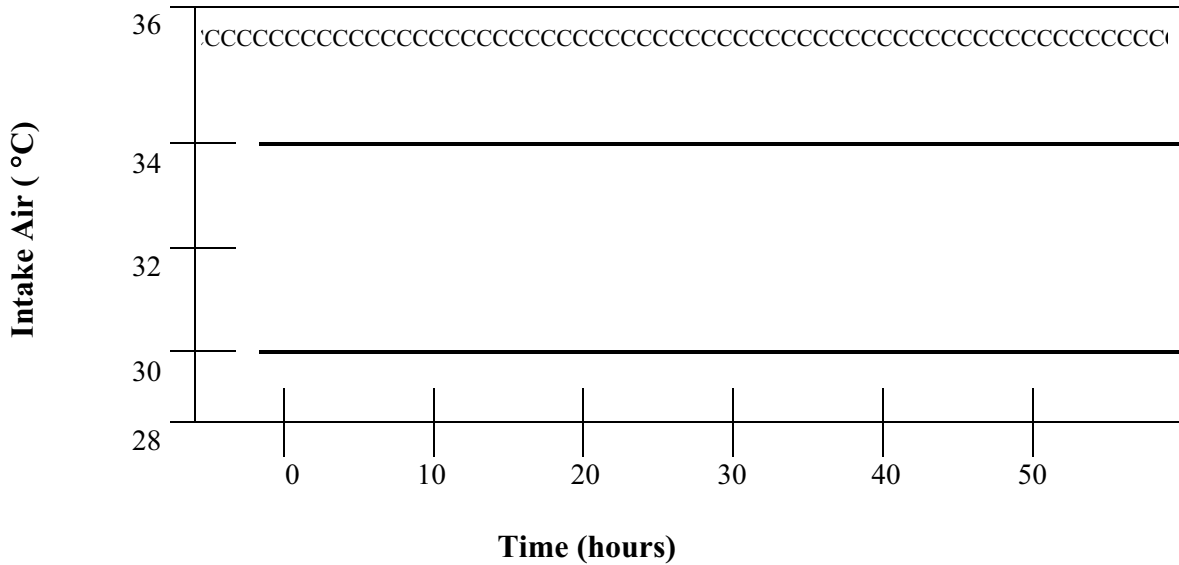
D 5966
Roller Follower Wear Test
Form 10
Operational Data Summary – Intake Air Temperature

Laboratory	CC	Date Completed	YYYYMMDD	YYYYMMDD
Test Number	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC			
Oil Code	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC			CCCCCC
Formulation/Stand Code	CC-CCCCCCCC-C-C-CCCCC-CC-CC-CCCC			

Intake Air Temperature

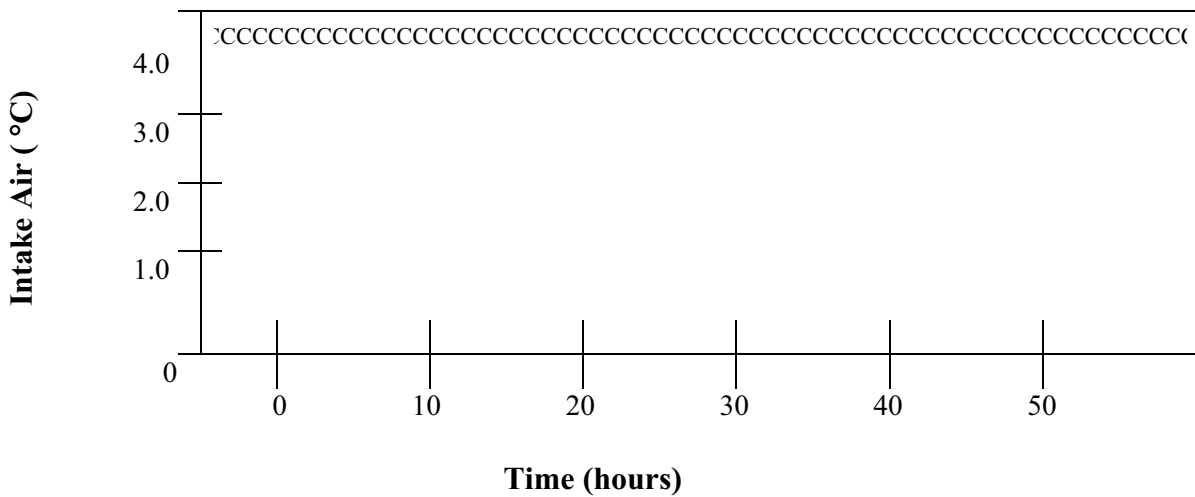
Process Mean

X_{av} = S12.1



Process Variability (s)

S_{av} = S12.1



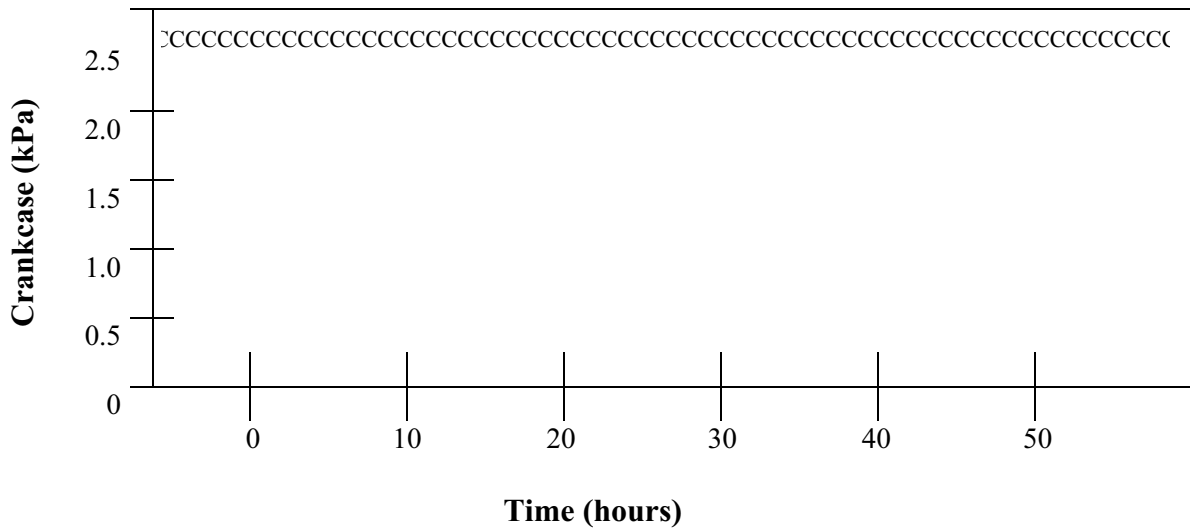
D 5966
Roller Follower Wear Test
Form 11
Operational Data Summary – Crankcase Pressure

Laboratory	CC	Date Completed	YYYYMMDD
Test Number	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC		
Oil Code	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC		CCCCCC
Formulation/Stand Code	CC-CCCCCCCC-C-C-CCCC-CC-CC-CCCC		

Crankcase Pressure

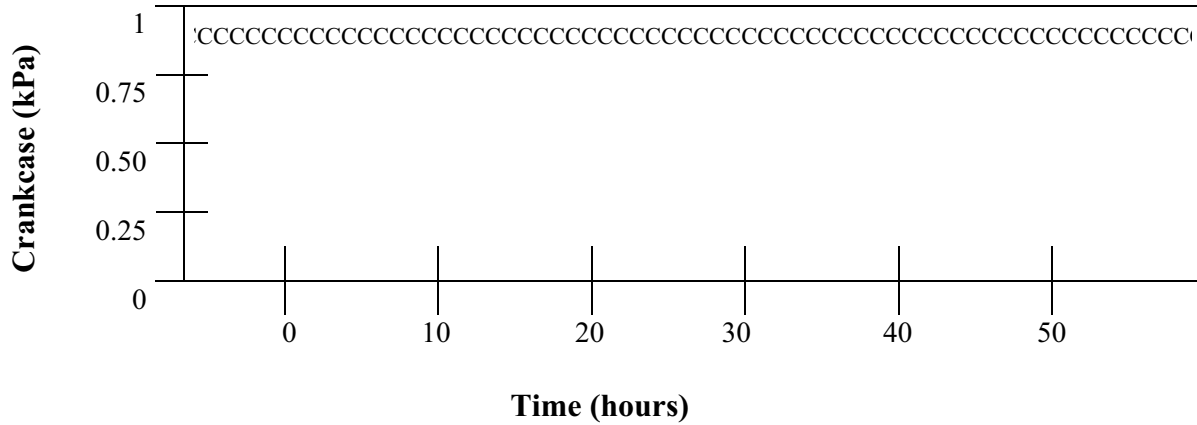
Process Mean

X_{av} = S1.1



Process Variability (s)

S_{av} = S1.1



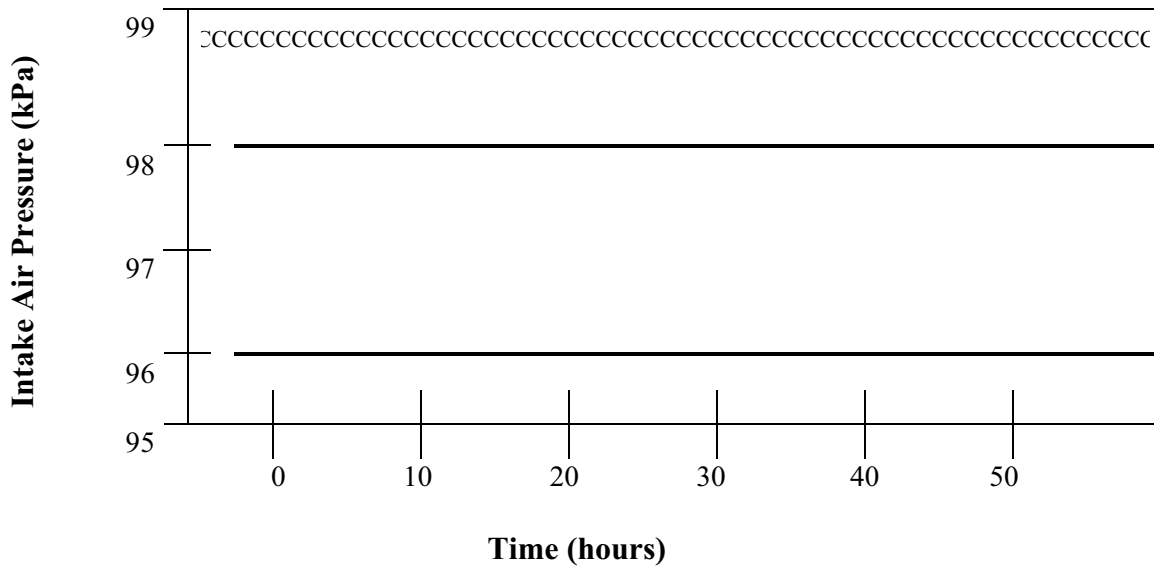
D 5966
Roller Follower Wear Test
Form 12
Operational Data Summary – Intake Air Pressure

Laboratory	CC	Date Completed	YYYYMMDD
Test Number	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC		
Oil Code	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC		CCCCCC
Formulation/Stand Code	CC-CCCCCCCC-C-C-CCCCC-CC-CC-CCCC		

Intake Air Pressure

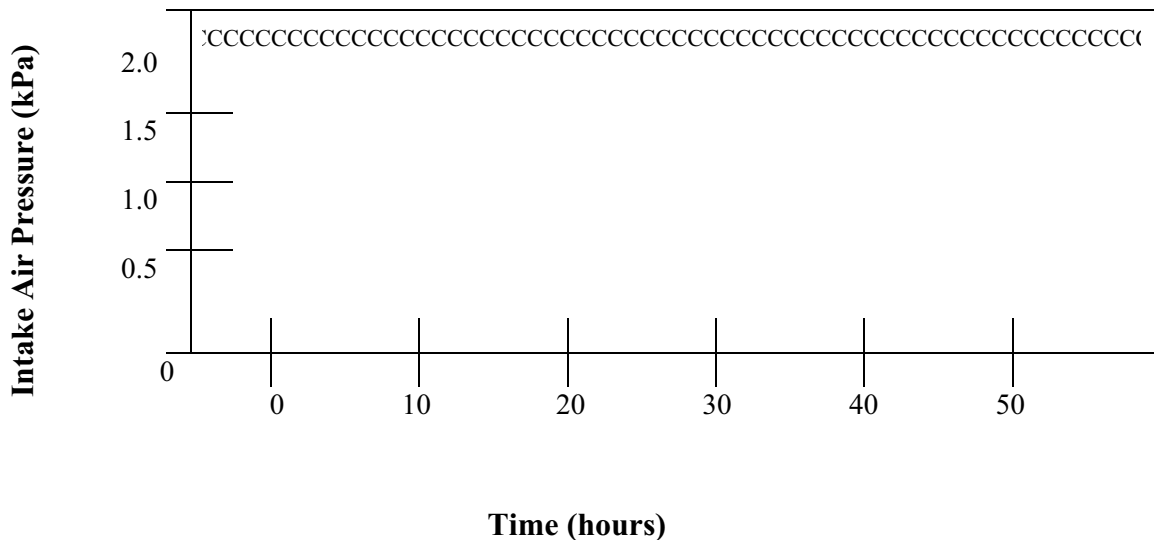
Process Mean

X_{av} = S12.1



Process Variability (s)

S_{av} = S12.1



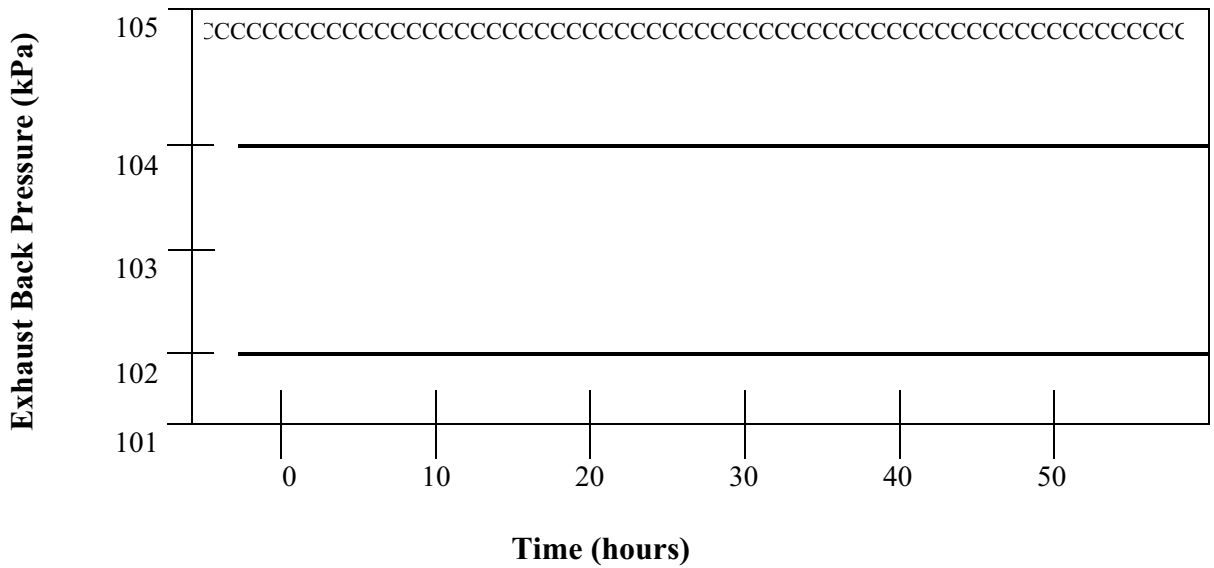
D 5966
Roller Follower Wear Test
Form 13
Operational Data Summary – Exhaust Back Pressure

Laboratory	CC	Date Completed	YYYYMMDD
Test Number	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC		
Oil Code	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC		CCCCCC
Formulation/Stand Code	CC-CCCCCCCC-C-C-CCCCC-CC-CC-CCCC		

Exhaust Back Pressure

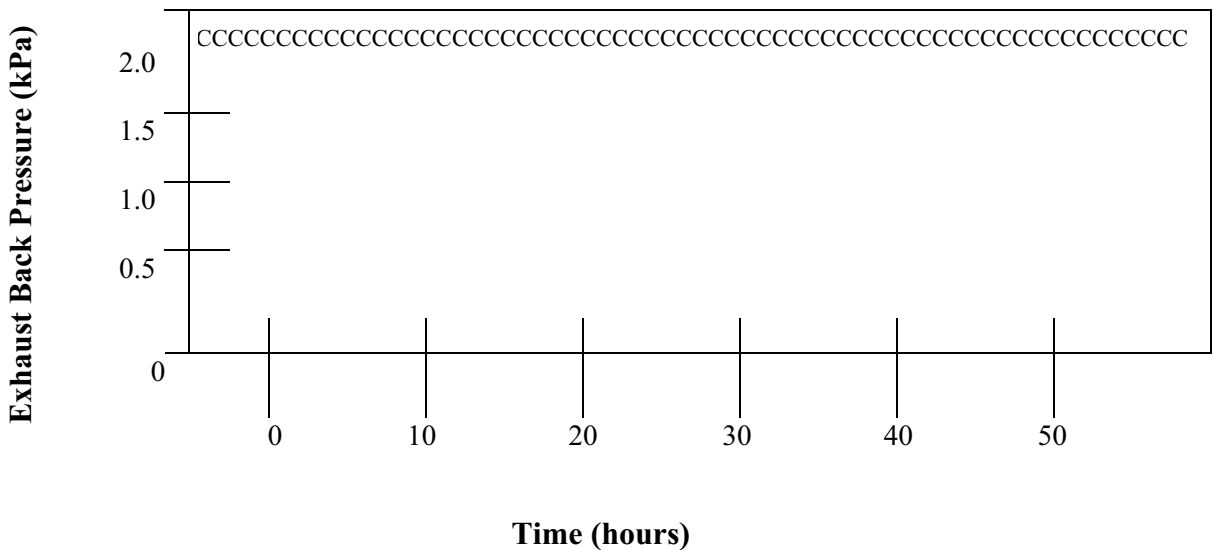
Process Mean

X_{av} = S12.1



Process Variability (s)

S_{av} = S12.1



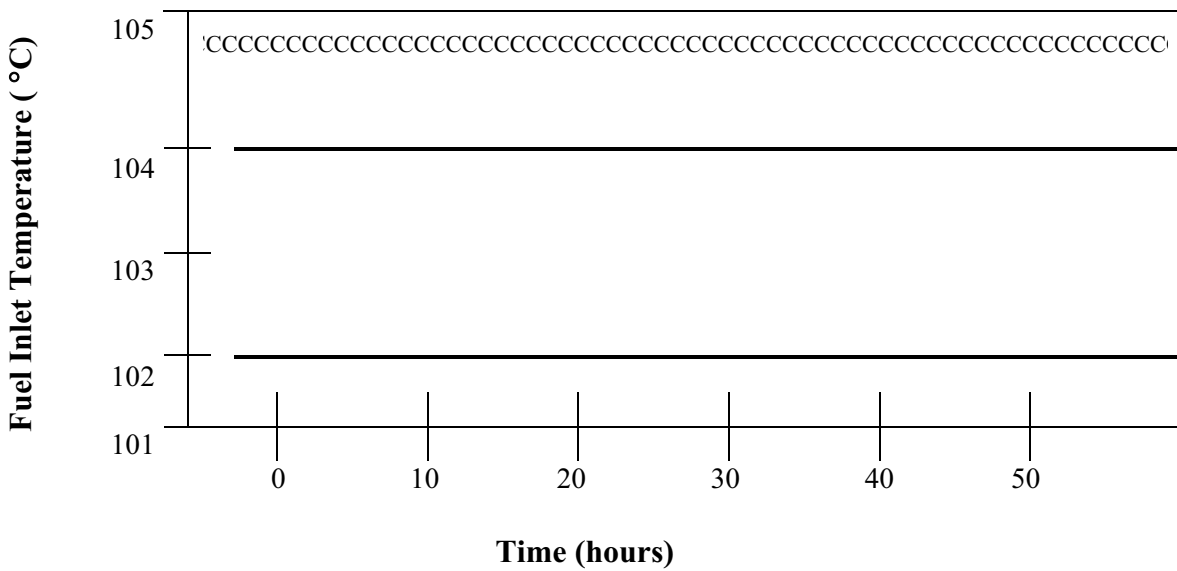
D 5966
Roller Follower Wear Test
Form 14
Operational Data Summary – Fuel Inlet Temperature

Laboratory	CC	Date Completed	YYYYMMDD
Test Number	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC		
Oil Code	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC		CCCCCC
Formulation/Stand Code	CC-CCCCCCCC-C-C-CCCCC-CC-CC-CCCC		

Fuel Inlet Temperature

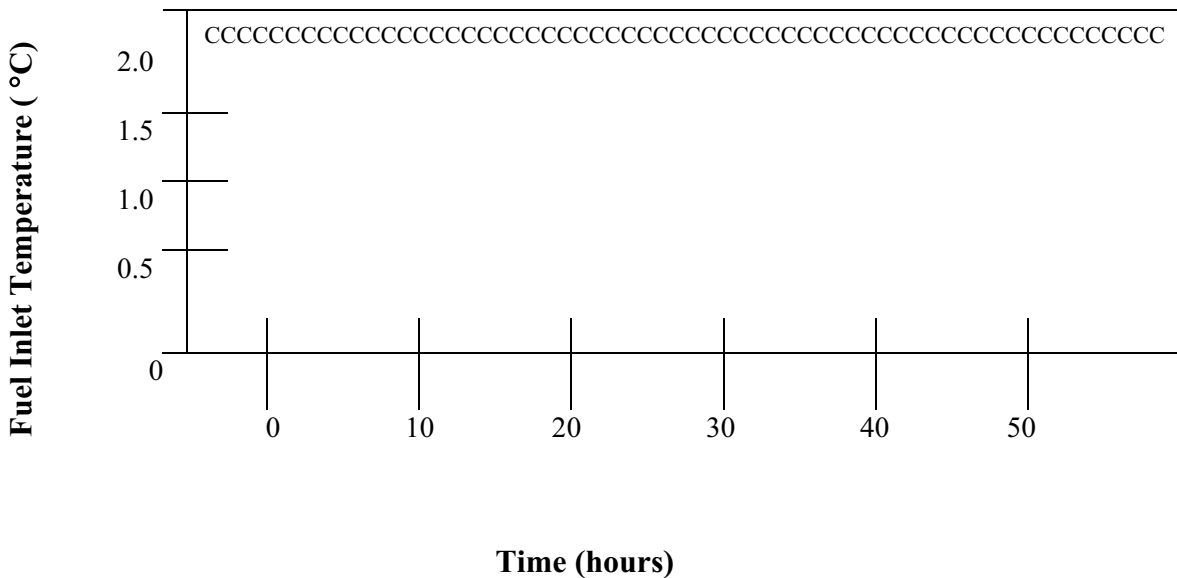
Process Mean

$X_{av} = S12.1$



Process Variability (s)

$S_{av} = S12.1$



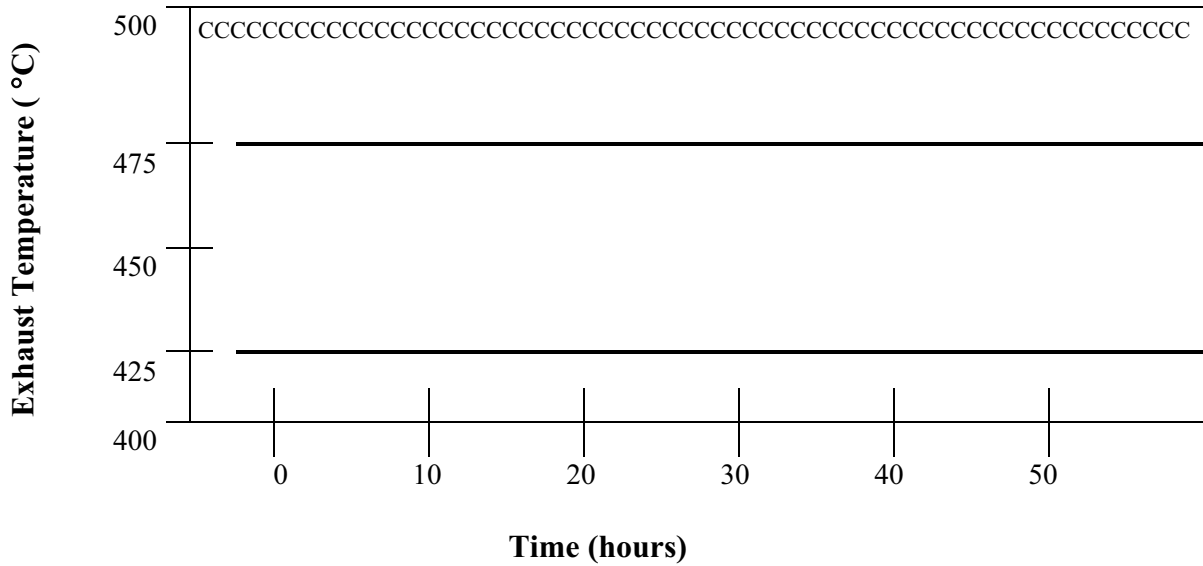
D 5966
Roller Follower Wear Test
Form 15
Operational Data Summary – Exhaust Temperature

Laboratory	CC	Date Completed	YYYYMMDD
Test Number	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC		
Oil Code	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC		CCCCCC
Formulation/Stand Code	CC-CCCCCCCC-C-C-CCCC-CC-CC-CCCC		

Exhaust Temperature

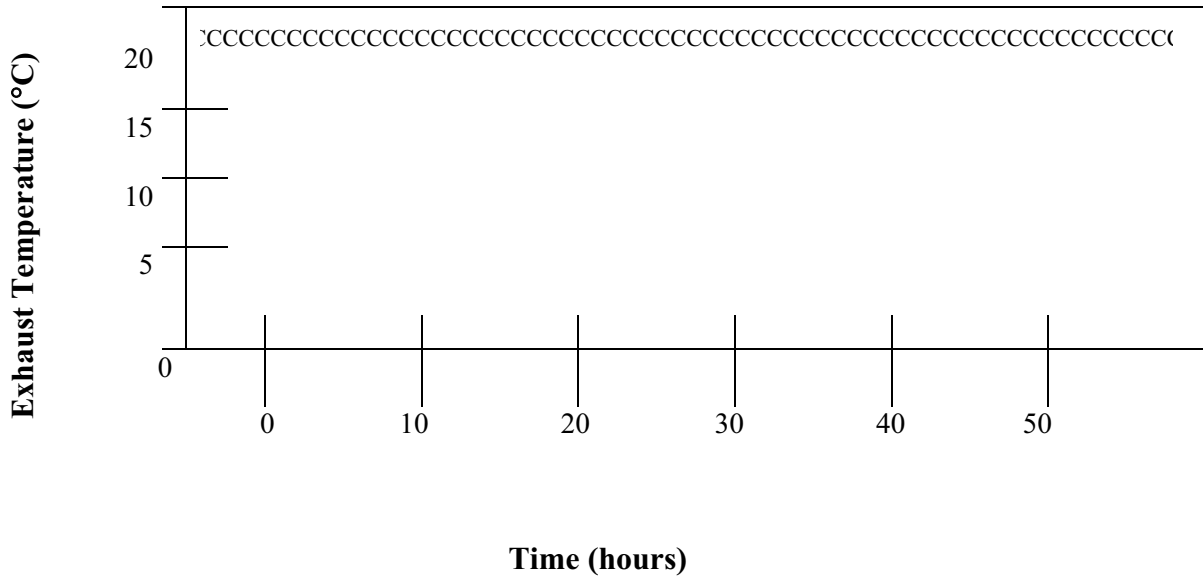
Process Mean

X_{av} = S123.1



Process Variability (s)

S_{av} = S123.1



D 5966
Roller Follower Wear Test
Form 16
Operational Summary

Laboratory	CC	Date Completed	YYYYMMDD	YYYYMMDD
Test Number	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC			
Oil Code	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC			CCCCCC
Formulation/Stand Code	CC-CCCCCCCC-C-C-CCCC-CC-CC-CCCC			

Specification

Test Parameter	6.2L Engine	6.5L Engine	Average	Std. Dev.	Minimum	Maximum
Engine Speed, r/min	1000 ± 5	1000 ± 5	S1234.1	S12.1	S1234.1	S1234.1
Torque, N-m	Record	Record	S123.1	S12.1	S123.1	S123.1
Fuel Flow, kg/h	9.0 ± 0.1	9.4 ± 0.1	S1.1	S1.1	S1.1	S1.1
Total Oil Consumption, kg	Record	Record	S1.1			

Temperatures	Specification	Average	Std. Dev.	Minimum	Maximum
Coolant Out, °C	120 ± 2	S123.1	S12.1	S123.1	S123.1
Coolant In, °C	Report Only	S123.1	S12.1	S123.1	S123.1
Main Oil Gallery, °C	120 ± 2	S123.1	S12.1	S123.1	S123.1
Fuel In, °C	35 ± 2	S12.1	S12.1	S12.1	S12.1
Intake Air, °C	32 ± 2	S12.1	S12.1	S12.1	S12.1
Oil Sump, °C	Report	S123.1	S12.1	S123.1	S123.1
Exhaust, °C	Report	S123.1	S12.1	S123.1	S123.1

Pressures	Specification	Average	Std. Dev.	Minimum	Maximum
Crankcase, kPa	Report	S1.1	S1.1	S1.1	S1.1
Back Pressure, kPa	103 ± 1	S123.1	S12.1	S123.1	S123.1
Intake Air, kPa	97 ± 1	S12.1	S12.1	S12.1	S12.1

D 5966
Roller Follower Wear Test
Form 21
Test Fuel Analysis (Last batch)

Laboratory	CC	Date Completed	YYYYMMDD	YYYYMMDD
Test Number	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC			
Oil Code	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC			CCCCCC
Formulation/Stand Code	CC-CCCCCCCCC-C-C-CCCCC-CC-CC-CCCC			

Supplier	CCCCCCCCCCCCCCCCCCCC	Batch Identifiers	CCCCCCCCCCCCCCCC
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Measurement	Specs.	Analysis	Test Method
Total Sulfur, % Weight	0.03 - 0.05	S12.12	D 2622
Gravity, °API	32 – 36	S1.1	D 287 or D 4052
Hydrocarbon Composition			
Aromatics % Vol.	28 – 35	S12.1	D 1319
Olefin	Report	S123.1	D 1319
Saturates	Report	S12.1	D 1319
Cetane Index	Report	S1.1	D 4737
Cetane No.	42 - 48	S1.1	D 613
Copper Strip Corrosion	3 Maximum	CCCCC	D 130
Flash Point, °C	54 Minimum	S1234	D 93
Cloud Point, °C	-12 Maximum	S1234	D 2500
Pour Point, °C	-18 Maximum	S12345	D 97
Carbon Residue on 10% Residium, %	0.35 Maximum	S12.12	D 524 (10 % Bottoms)
Water & Sediment, % Vol	0.05 Maximum	S123.12	D 2709
Ash, % Wgt.	0.01 Maximum	S12.123	D 482
Viscosity, cSt @ 40°C	2.0 - 3.2	S1.1	D 445
Distillation, °C			
IBP	177 - 199	S12345	D 86
10%	210 - 232	S12345	D 86
50%	249 - 277	S12345	D 86
90%	299 - 327	S12345	D 86
EP	327 - 360	S12345	D 86

D 5966
Roller Follower Wear Test
Form 22
Characteristics of the Data Acquisition System

Laboratory	CC	Date Completed	YYYYMMDD	YYYYMMDD
Test Number	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC			
Oil Code	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC			CCCCCC
Formulation/Stand Code	CC-CCCCCCCCC-C-C-CCCCC-CC-CC-CCCC			

Parameter (1)	Sensing Device (2)	Calibration Frequency (3)	Record Device (4)	Observation Frequency (5)	Record Frequency (6)	Log Frequency (7)	System Response (8)
Temperatures							
Main Oil G.	CCCCCCCCCCCC	CCCCCCCCCCCC	CCC	CCCCCCC	CCCCCCC	CCCCCCCC	
Fuel In.	CCCCCCCCCCCC	CCCCCCCCCCCC	CCC	CCCCCCC	CCCCCCC	CCCCCCCC	
Intake Air	CCCCCCCCCCCC	CCCCCCCCCCCC	CCC	CCCCCCC	CCCCCCC	CCCCCCCC	
Oil Sump	CCCCCCCCCCCC	CCCCCCCCCCCC	CCC	CCCCCCC	CCCCCCC	CCCCCCCC	
Exhaust	CCCCCCCCCCCC	CCCCCCCCCCCC	CCC	CCCCCCC	CCCCCCC	CCCCCCCC	
Cool. Out	CCCCCCCCCCCC	CCCCCCCCCCCC	CCC	CCCCCCC	CCCCCCC	CCCCCCCC	
Other							
Fuel Flow	CCCCCCCCCCCC	CCCCCCCCCCCC	CCC	CCCCCCC	CCCCCCC	CCCCCCCC	CCCCCCCC
Engine Rpm	CCCCCCCCCCCC	CCCCCCCCCCCC	CCC	CCCCCCC	CCCCCCC	CCCCCCCC	CCCCCCCC
Load	CCCCCCCCCCCC	CCCCCCCCCCCC	CCC	CCCCCCC	CCCCCCC	CCCCCCCC	CCCCCCCC
Intake Pres.	CCCCCCCCCCCC	CCCCCCCCCCCC	CCC	CCCCCCC	CCCCCCC	CCCCCCCC	CCCCCCCC
Exh. Press.	CCCCCCCCCCCC	CCCCCCCCCCCC	CCC	CCCCCCC	CCCCCCC	CCCCCCCC	CCCCCCCC
Oil Gal Pres	CCCCCCCCCCCC	CCCCCCCCCCCC	CCC	CCCCCCC	CCCCCCC	CCCCCCCC	CCCCCCCC

Legend:

- (1) Operating parameter
- (2) The type of device used to measure temperature, pressure, or flow
- (3) Frequency at which the measurement system is calibrated
- (4) The type of device where data is recorded
 - LG – Handlog sheet
 - DL – Automatic data logger
 - SC – Strip chart recorder
 - C/M – Computer, using manual data entry
 - C/D – Computer, using direct I/O entry
- (5) Data are observed but only recorded if off spec.
- (6) Data are recorded but are not retained at eot
- (7) Data are logged as permanent record, note specify if:
 - SS – Snapshot taken at specified frequency
 - AG/X Average of x data points at specified frequency
- (8) Time for the output to reach 63.2% of final value for step change at input

**Roller Follower Wear Test
Form 23
American Chemistry Council Code of Practice
Test Laboratory Conformance Statement**

Test Laboratory	CC				
Test Sponsor	CC				
Formulation / Stand Code	CC-CCCCCCCCCC-C-C-CCCCCC-CC-CC-CCCC				
Test Number	CC				
Start Date	YYYYMMDD	Start Time	HH:MM	Time Zone	CCC

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 C No C *

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 C No C *

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 C * No C

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 C * No C (*This currently applies only to specific deviations identified in the ASTM Information Letter System*)

Check The Appropriate Conclusion

C	Operational review of this test indicates that the results should be included in the Multiple Test Acceptance Criteria calculations.
C	*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.*

<i>Comments</i>
CC
CC
CC
CC

Signature Image _____
Signature

YYYYMMDD _____
Date

CC
Typed Name

CC
Title