

**D 5966
Roller Follower Wear Test**

Final Report Cover Sheet
RFWT VERSION 19980209 BETA
Report Packet Version No.

CC
CC

Conducted For:

C	V = Valid
	I = Invalid

Test Number					
Test Stand	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-CCCCCCCCCC-C-C-CCCCC-CC-CC-CCCC				
Alternate Codes	CCCCCCCCC	CCCCCCCCC	CCCCCCCCC	CCCCCCCCC	

In my opinion this test _____ 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: _____
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	S12		YYYYMMDD	YYYYMMDD	HH:MM	S12	
CMIR	TMC Oil Code	Viscosity Grade			Oil Code	Viscosity Grade			
CCCCCC	CCCCCC	CCCCCC			CCCCCC	CCCCCC	CCCCCC	CCCCCC	
Laboratory Oil Code	Laboratory Oil Code				Laboratory Oil Code	Laboratory Oil Code			
	Engine Displacement	Formulation Stand Code							
	CCCC								
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

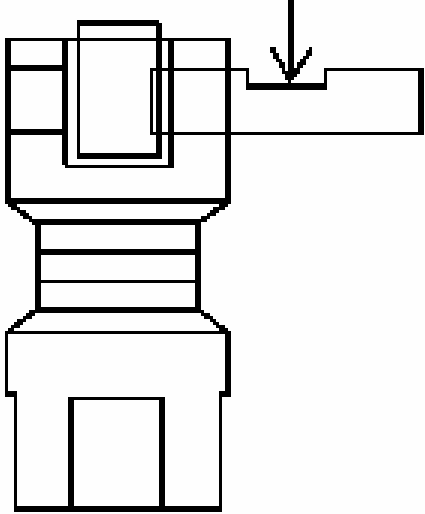
Laboratory	CC	Date Completed	YYYYMMDD	YYYYMMDD
Test Number	CCCCC	CCCC	CCCC	CCCCC
Oil Code	CC			CCCCC
Formulation/Stand Code	CC-CCCCCCCCC-C-C-CCCCC-CC-CC-CCCC			

Lifter Part Number
CCCCCCCCC

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



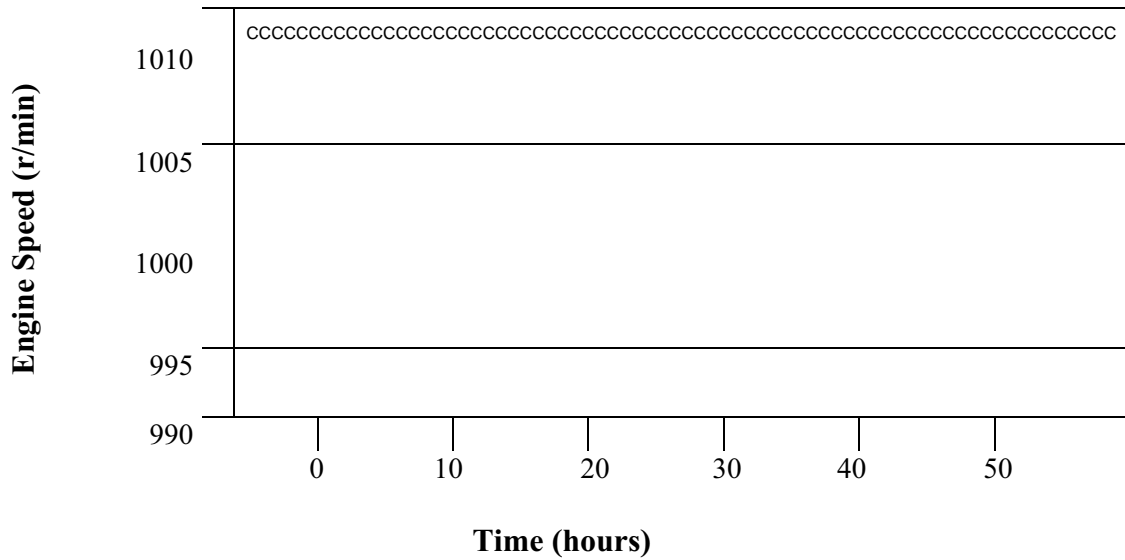
D 5966
Roller Follower Wear Test
Form 3
Operational Data Summary - Engine Speed

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

Engine Speed (r/min)

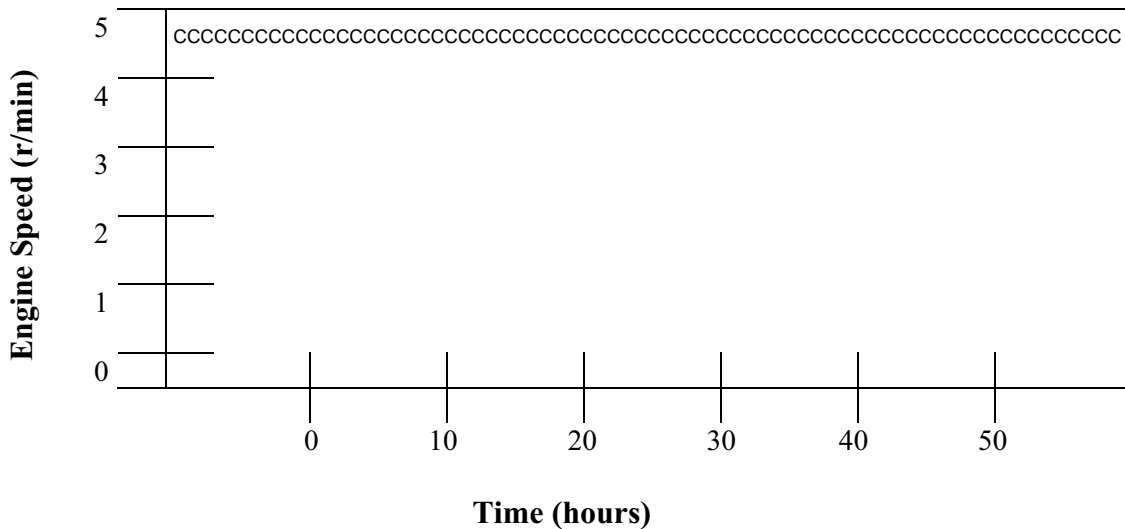
Process Mean

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



Process Variability (s)

$S_{av} = S12.1$



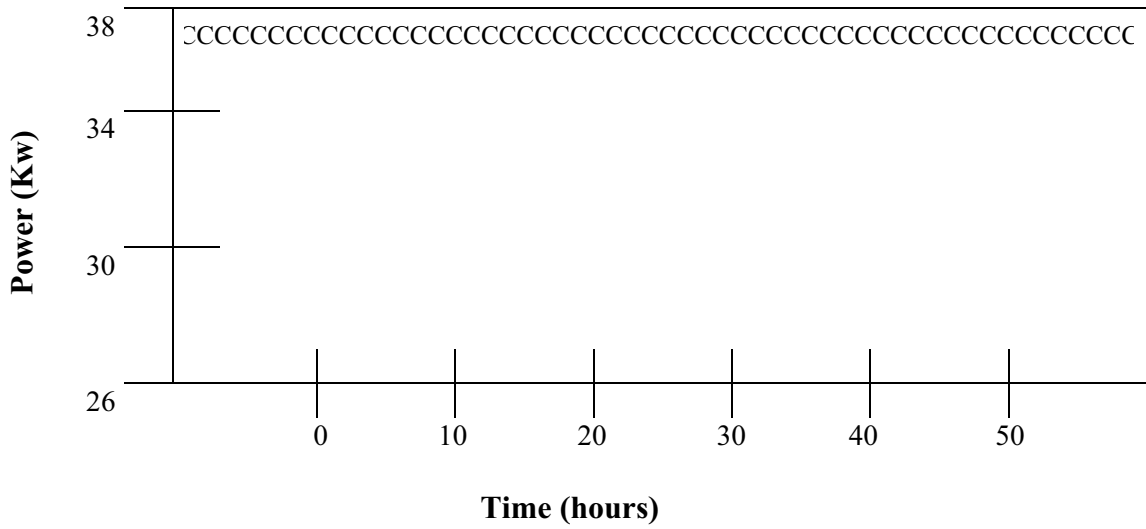
D 5966
Roller Follower Wear Test
Form 4
Operational Data Summary – Power

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

Power (kW)

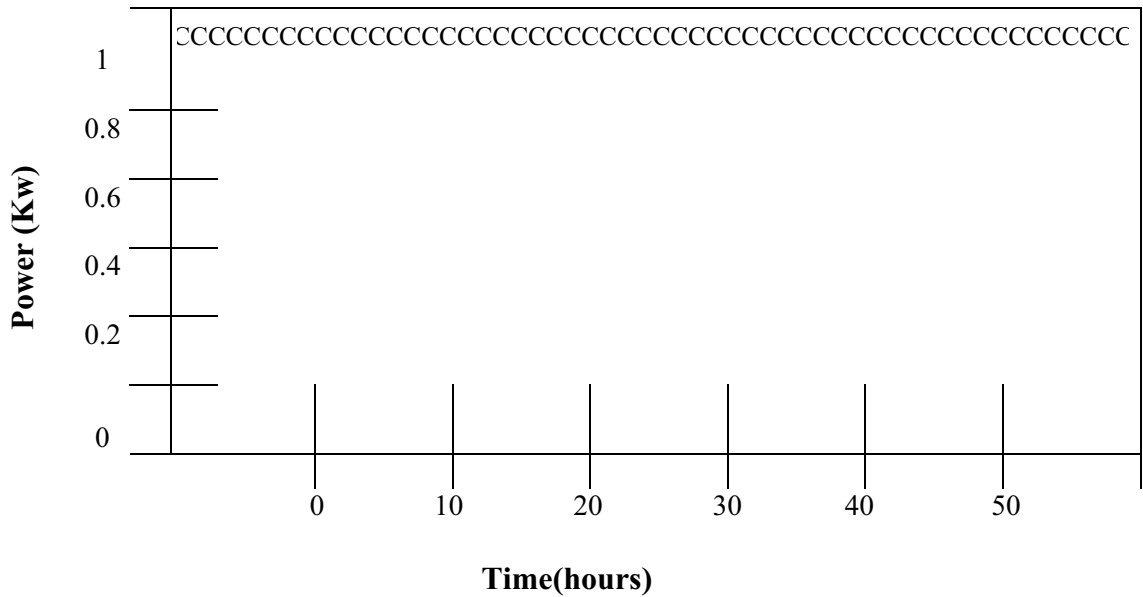
Process Mean

X_{av} = S12.1



Process Variability (s)

S_{av} = S12.1



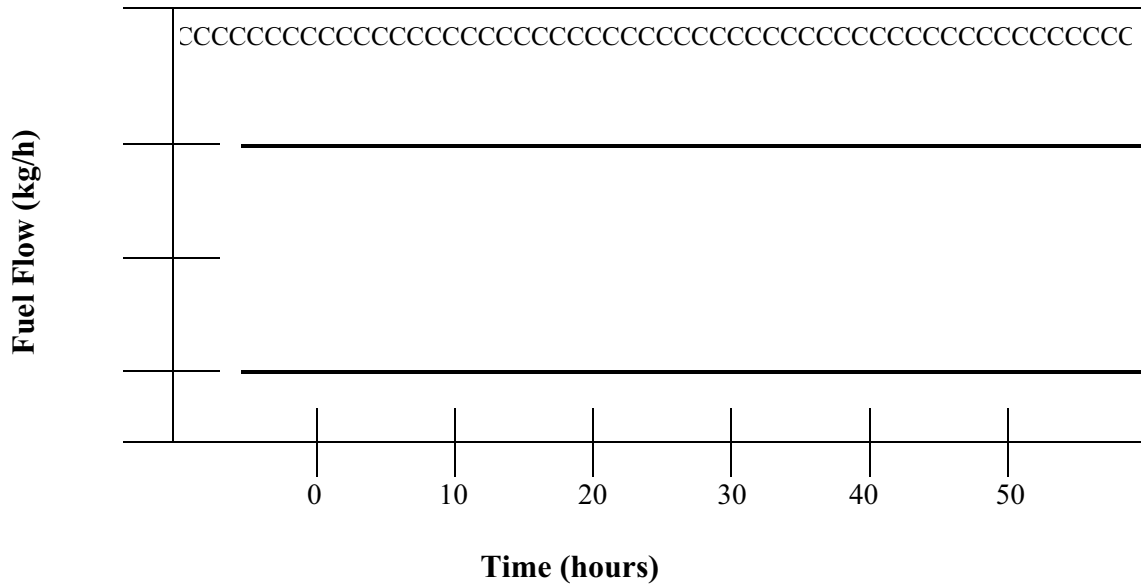
D 5966
Roller Follower Wear Test
Form 5
Operational Data Summary – Fuel Flow

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

Fuel Flow (kg/h)

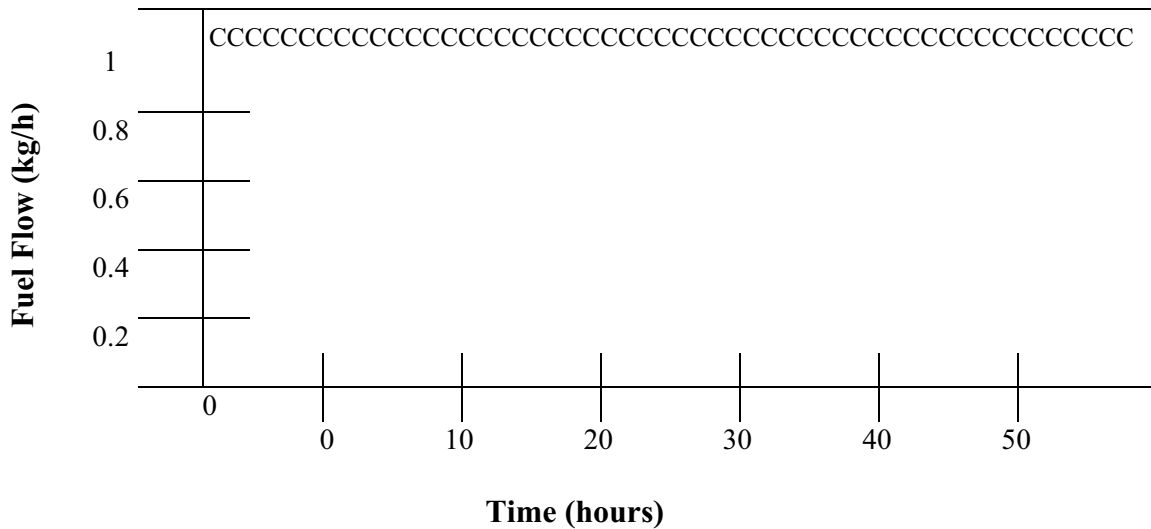
Process Mean

X_{av} = S1.1



Process Variability (s)

S_{av} = S1.1



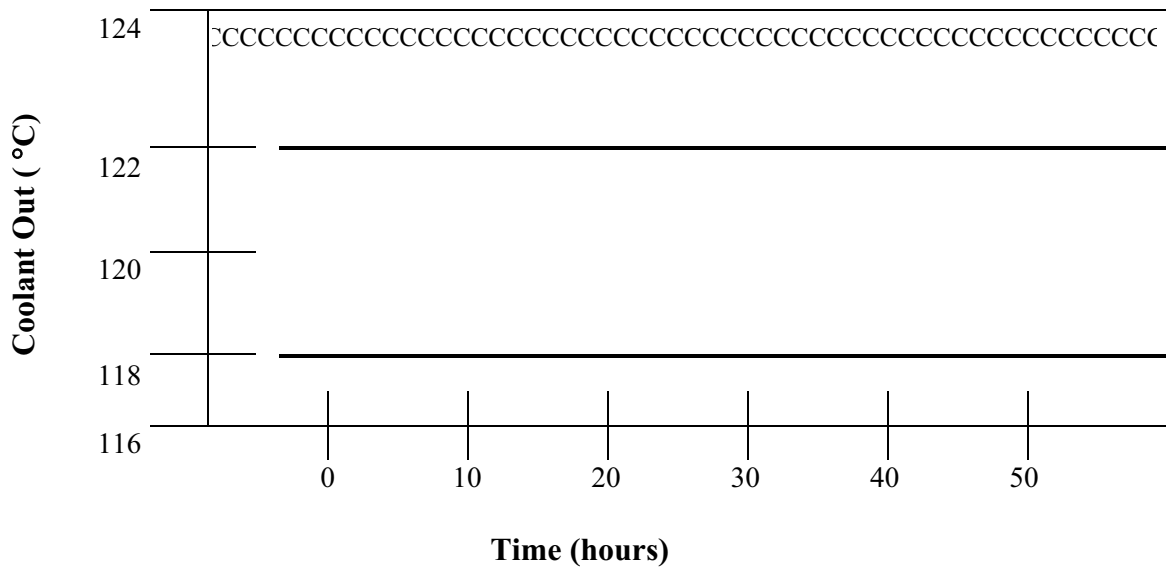
D 5966
Roller Follower Wear Test
Form 6
Operational Data Summary – Coolant Output Temperature

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

Coolant Out Temperature

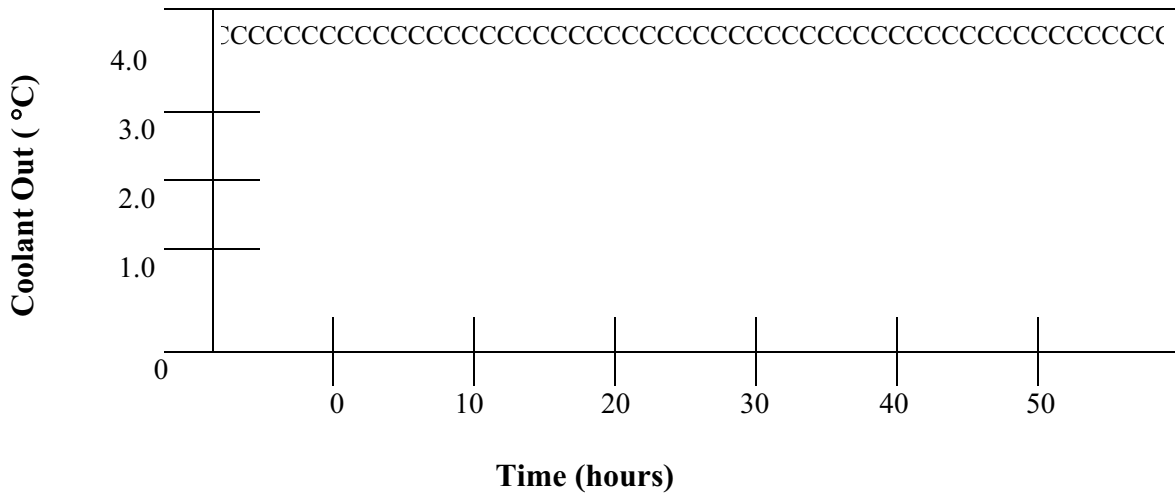
Process Mean

X_{av} = S123.1



Process Variability (s)

S_{av} = S12.1



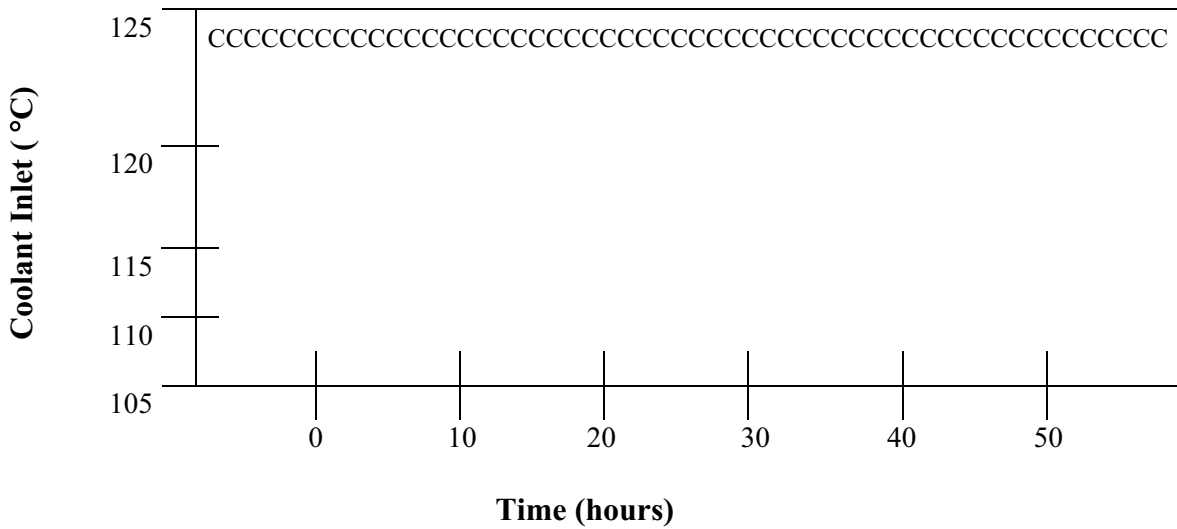
D 5966
Roller Follower Wear Test
Form 7
Operational Data Summary – Coolant Inlet Temperature

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

Coolant Inlet Temperature

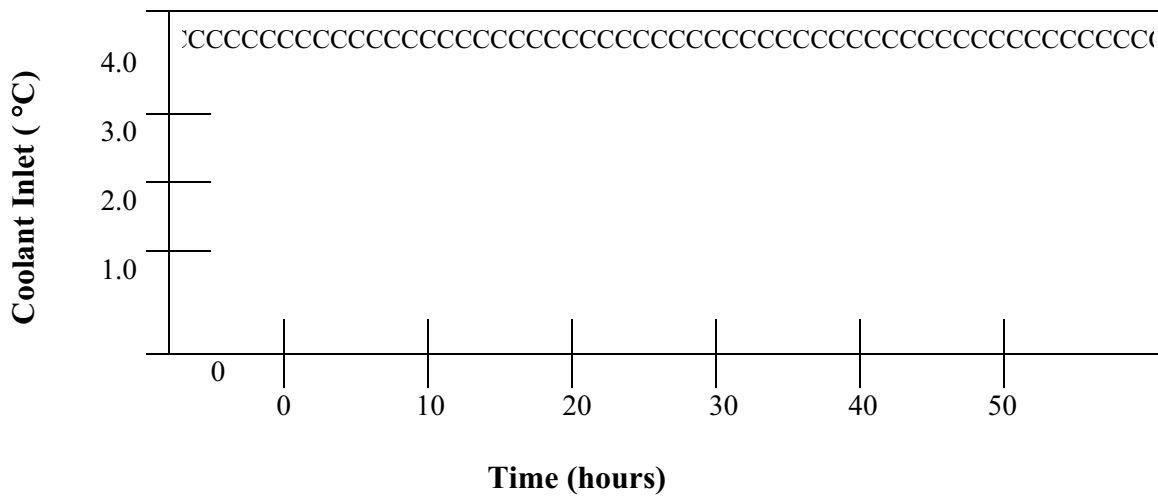
Process Mean

X_{av} = S123.1



Process Variability (s)

S_{av} = S12.1



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

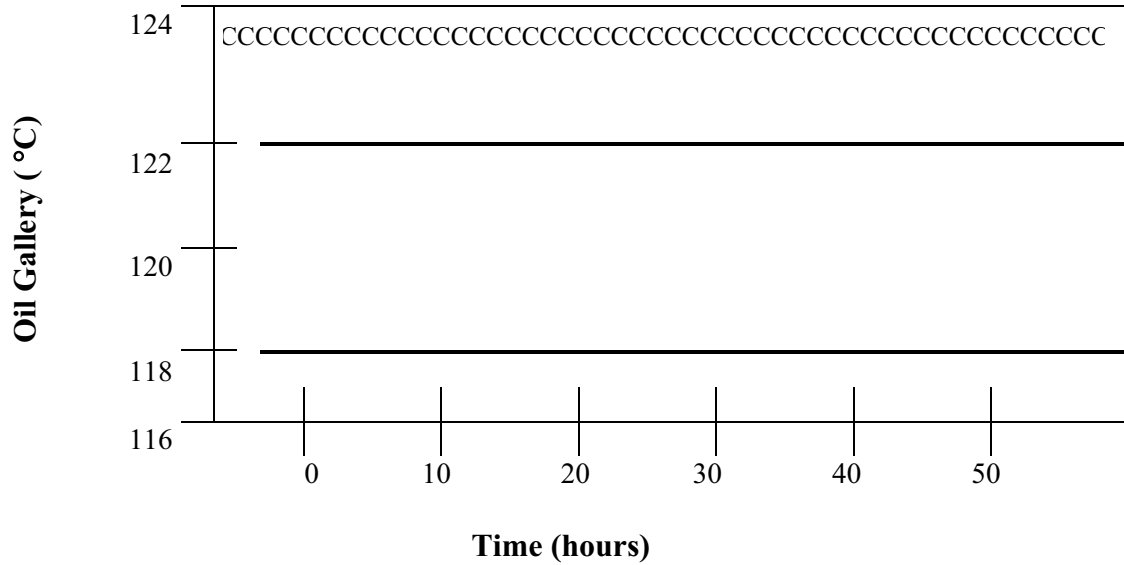
Operational Data Summary – Oil Gallery Temperature

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

Oil Gallery Temperature

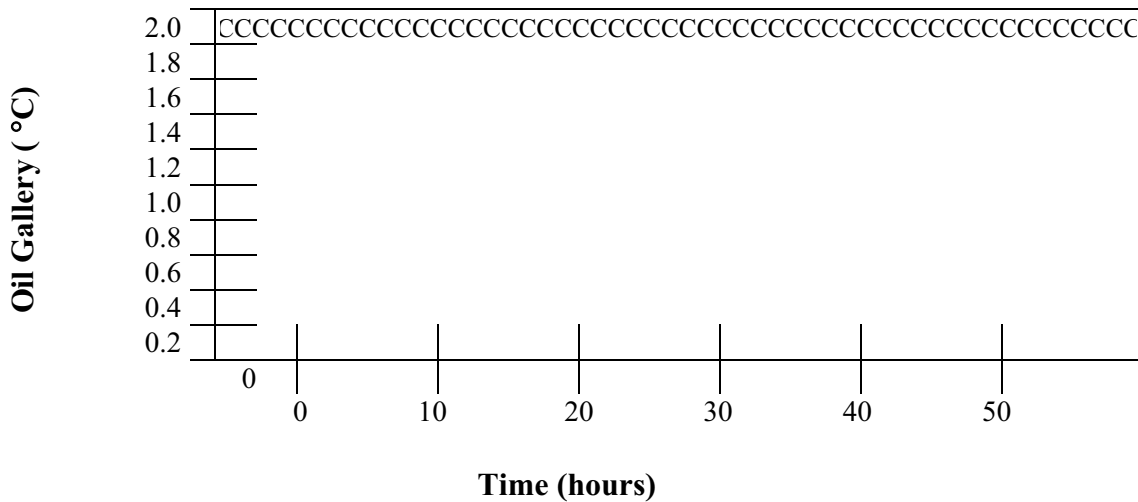
Process Mean

X_{av} = S123.1



Process Variability (s)

S_{av} = S12.1



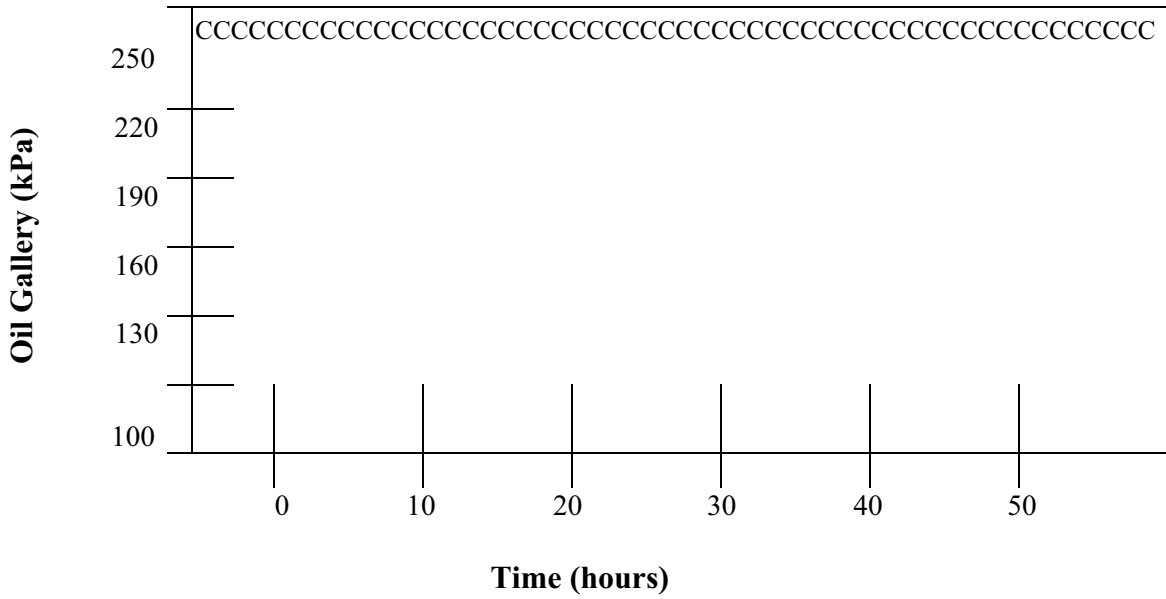
D 5966
Roller Follower Wear Test
Form 9
Operational Data Summary – Oil Gallery Pressure

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

Oil Gallery Pressure

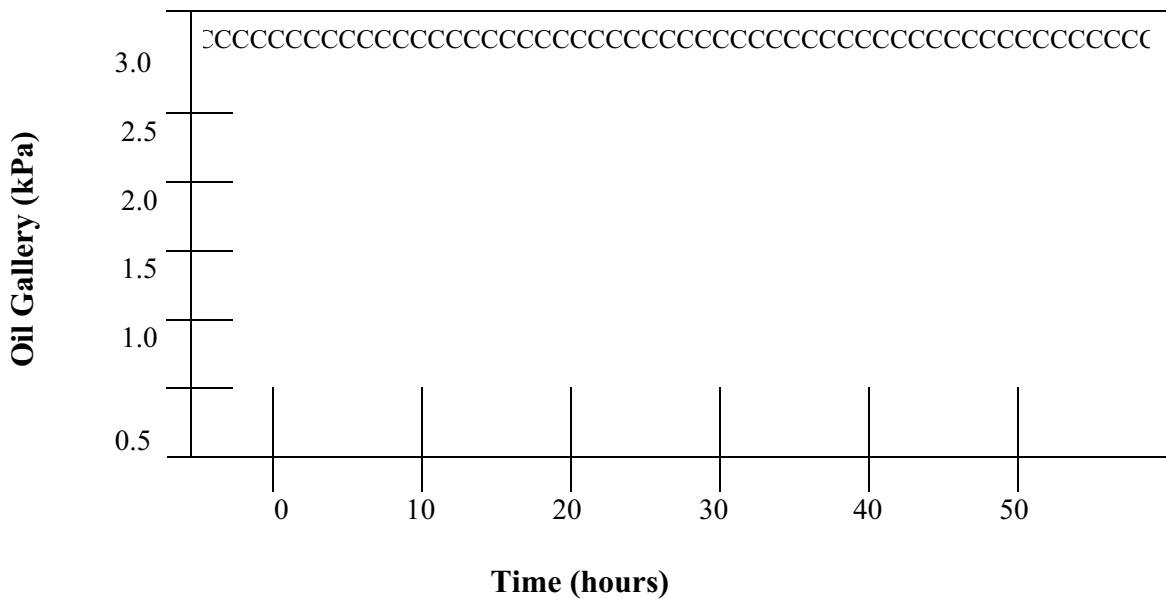
Process Mean

X_{av} = S12.1



Process Variability (s)

S_{av} = S12.1



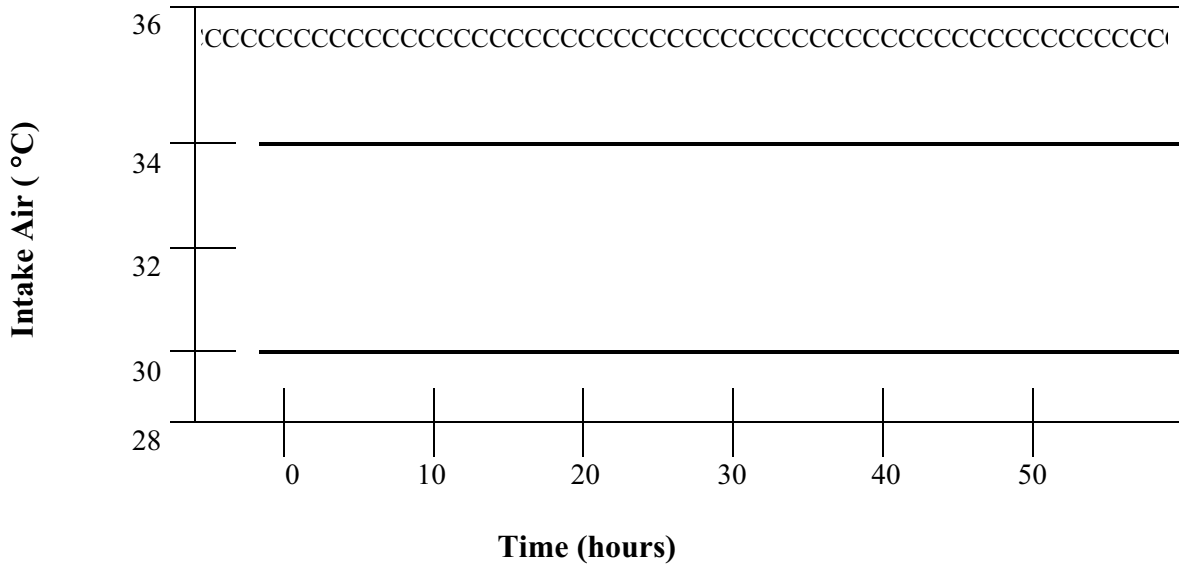
D 5966
Roller Follower Wear Test
Form 10
Operational Data Summary – Intake Air Temperature

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

Intake Air Temperature

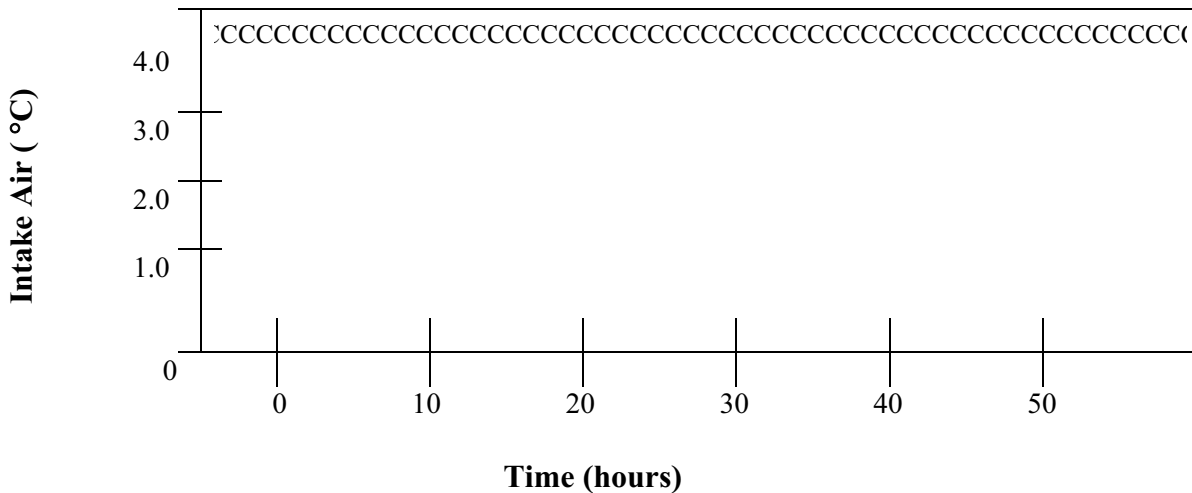
Process Mean

X_{av} = S12.1



Process Variability (s)

S_{av} = S12.1



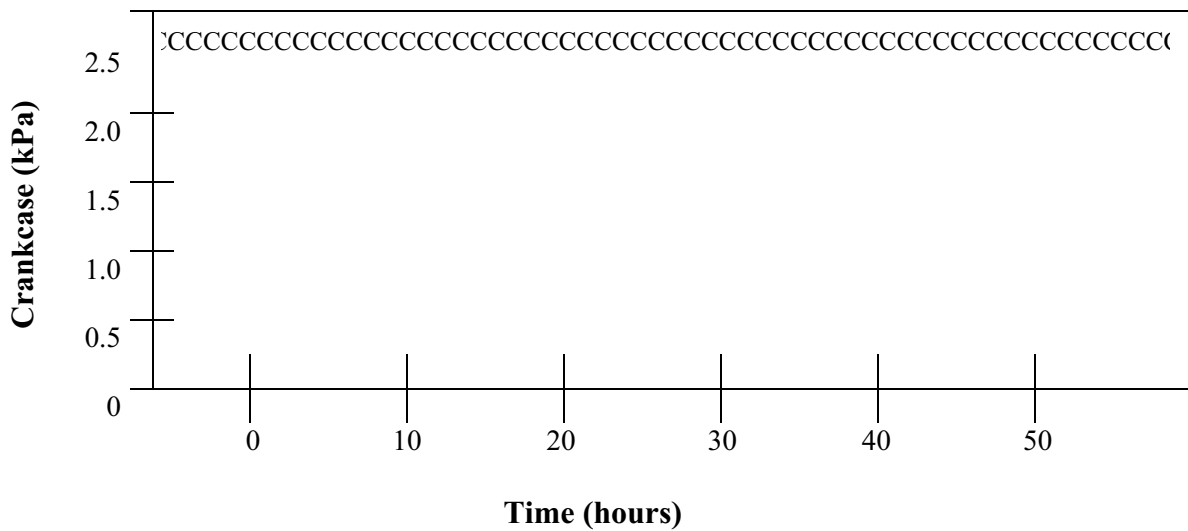
D 5966
Roller Follower Wear Test
Form 11
Operational Data Summary – Crankcase Pressure

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

Crankcase Pressure

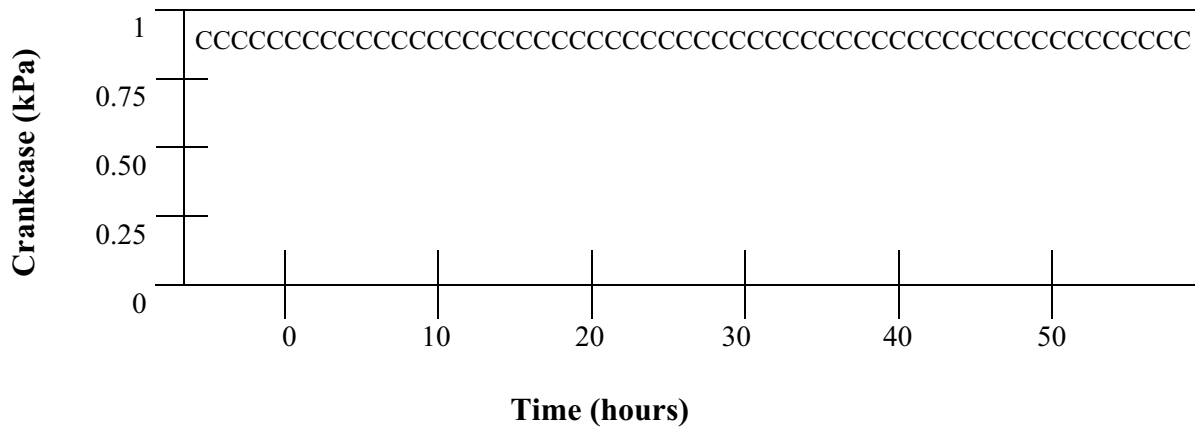
Process Mean

X_{av} = S1.1



Process Variability (s)

S_{av} = S1.1



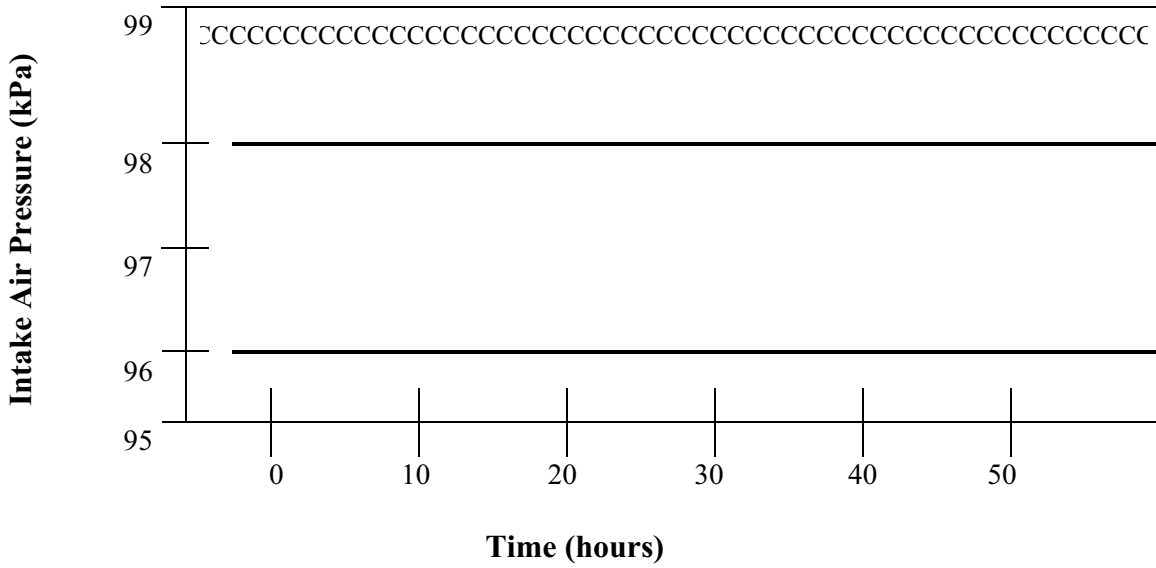
D 5966
Roller Follower Wear Test
Form 12
Operational Data Summary – Intake Air Pressure

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

Intake Air Pressure

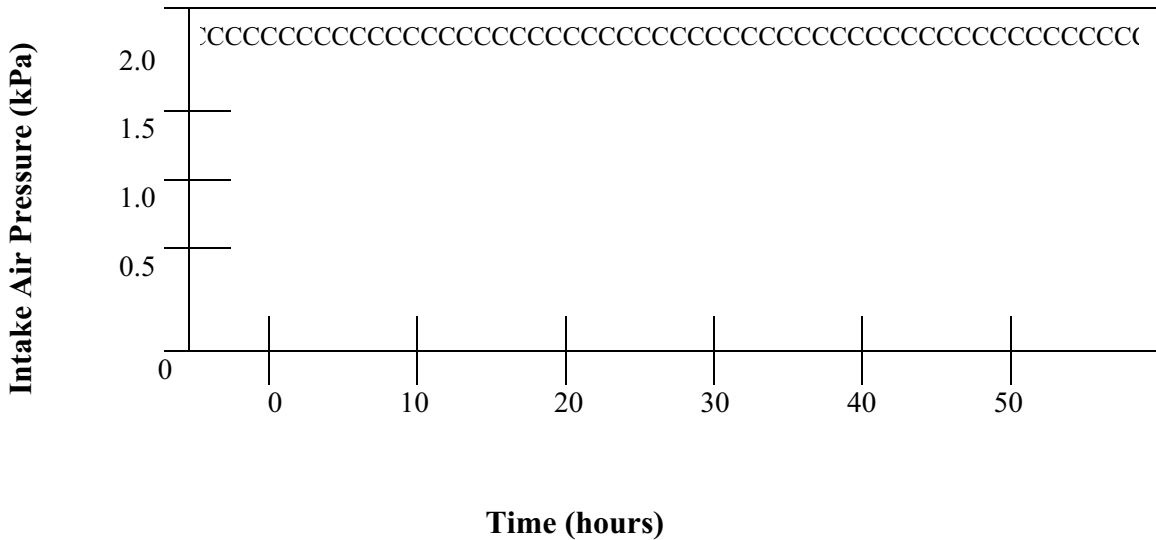
Process Mean

X_{av} = S12.1



Process Variability (s)

S_{av} = S12.1



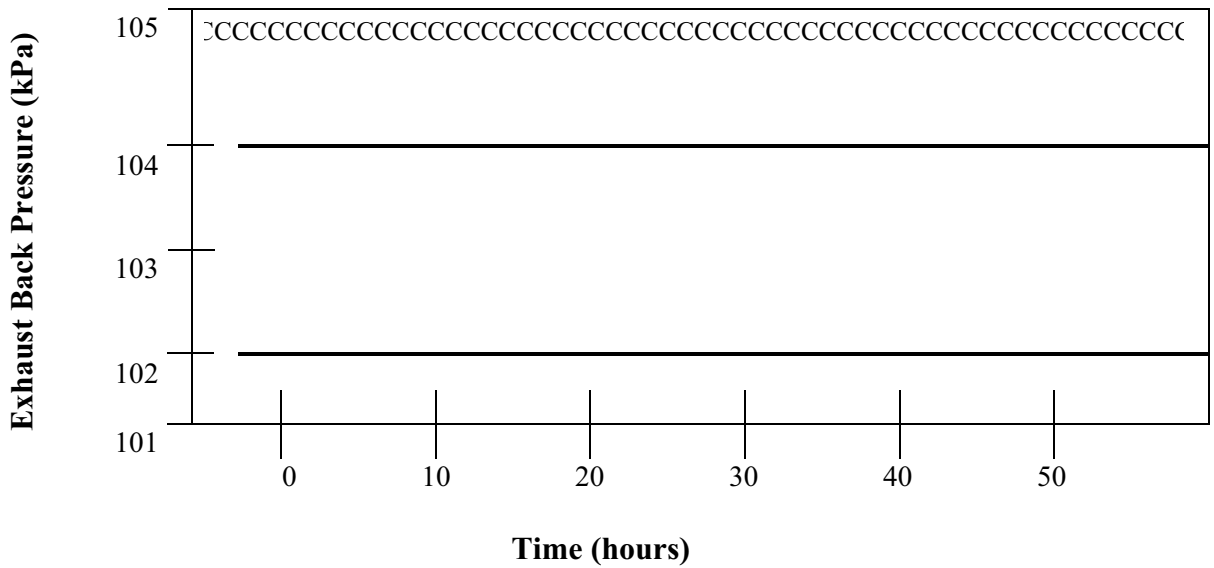
D 5966
Roller Follower Wear Test
Form 13
Operational Data Summary – Exhaust Back Pressure

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

Exhaust Back Pressure

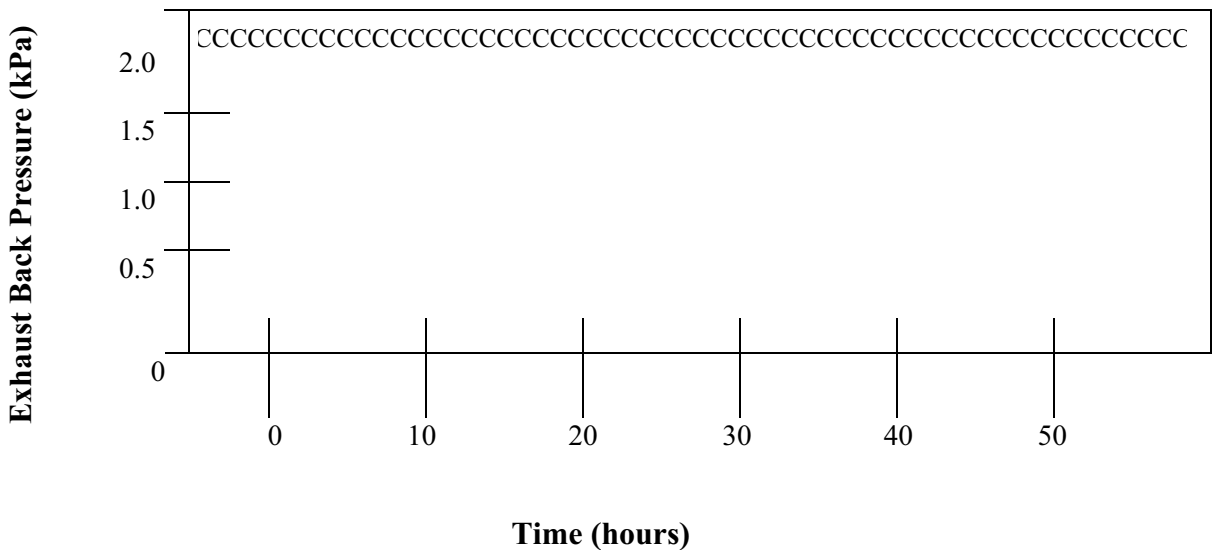
Process Mean

X_{av} = S12.1



Process Variability (s)

S_{av} = S12.1



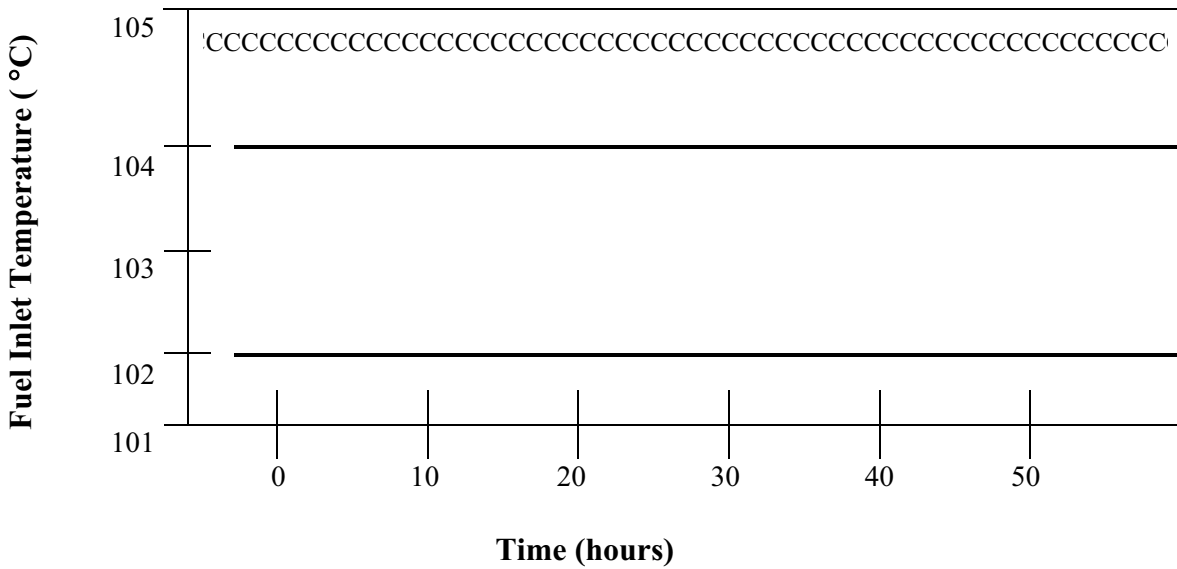
D 5966
Roller Follower Wear Test
Form 14
Operational Data Summary – Fuel Inlet Temperature

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

Fuel Inlet Temperature

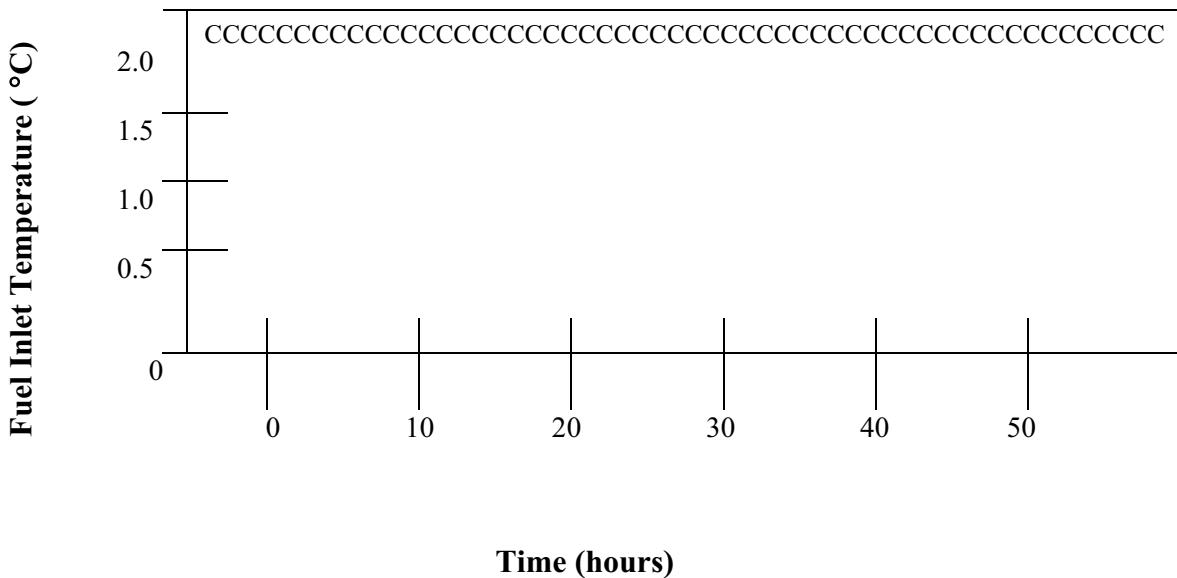
Process Mean

$X_{av} = S12.1$



Process Variability (s)

$S_{av} = S12.1$



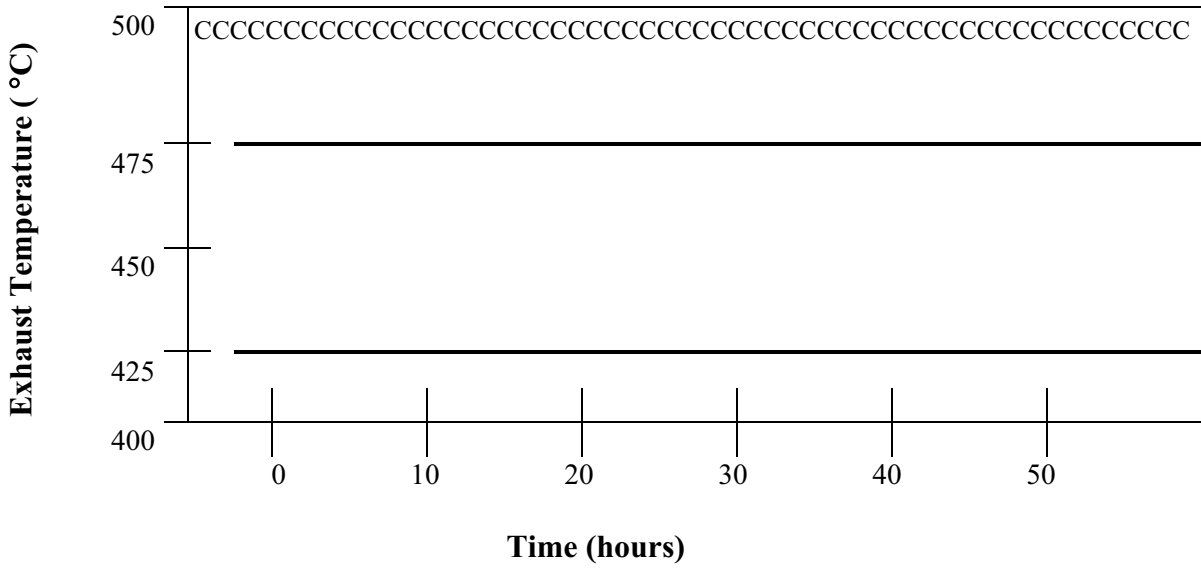
D 5966
Roller Follower Wear Test
Form 15
Operational Data Summary – Exhaust Temperature

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

Exhaust Temperature

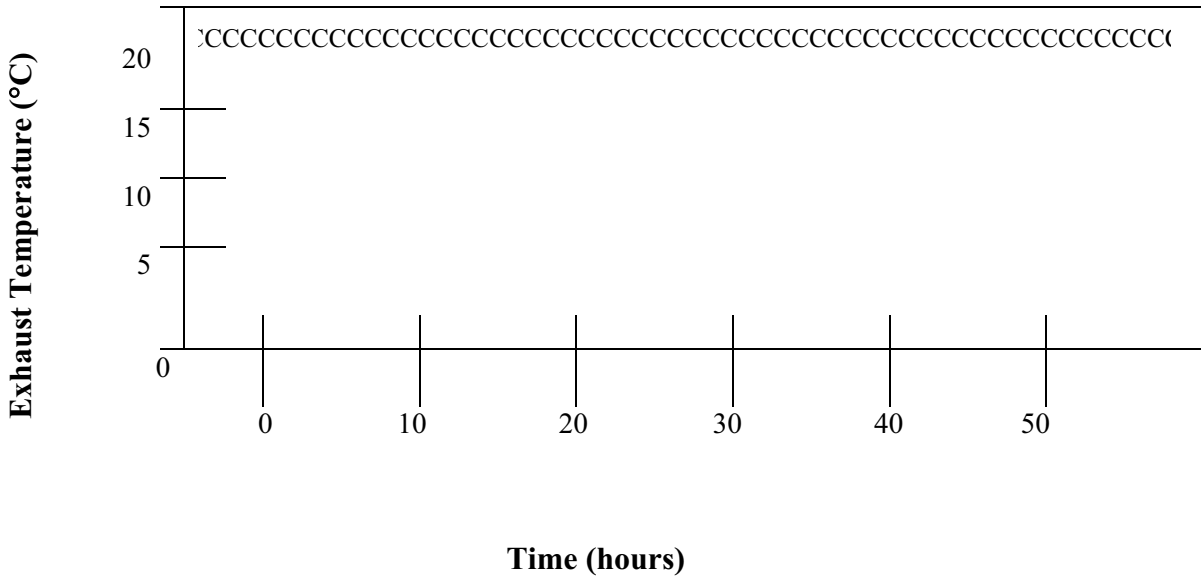
Process Mean

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	CCCCC	CCCC	CCCC	CCCCC
Oil Code	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC			CCCCC
Formulation/Stand Code	CC-CCCCCCCCC-C-C-CCCCC-CC-CC-CCCC			

* Test Number is: STAND – STAND RUN NO. – ENGINE NO. – ENGINE RUN NUMBER

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	CCCC	CCCC	CCCC	CCCC
Oil Code	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC			CCCC
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	CCCCC	CCCC	CCCC	CCCCC
Oil Code	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC			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	CCCCCCCCC	
Fuel In.	CCCCCCCCCCCC	CCCCCCCCCCCC	CCC	CCCCCCC	CCCCCCC	CCCCCCCCC	
Intake Air	CCCCCCCCCCCC	CCCCCCCCCCCC	CCC	CCCCCCC	CCCCCCC	CCCCCCCCC	
Oil Sump	CCCCCCCCCCCC	CCCCCCCCCCCC	CCC	CCCCCCC	CCCCCCC	CCCCCCCCC	
Exhaust	CCCCCCCCCCCC	CCCCCCCCCCCC	CCC	CCCCCCC	CCCCCCC	CCCCCCCCC	
Cool. Out	CCCCCCCCCCCC	CCCCCCCCCCCC	CCC	CCCCCCC	CCCCCCC	CCCCCCCCC	
Other							
Fuel Flow	CCCCCCCCCCCC	CCCCCCCCCCCC	CCC	CCCCCCC	CCCCCCC	CCCCCCCCC	CCCCCCCCC
Engine Rpm	CCCCCCCCCCCC	CCCCCCCCCCCC	CCC	CCCCCCC	CCCCCCC	CCCCCCCCC	CCCCCCCCC
Load	CCCCCCCCCCCC	CCCCCCCCCCCC	CCC	CCCCCCC	CCCCCCC	CCCCCCCCC	CCCCCCCCC
Intake Pres.	CCCCCCCCCCCC	CCCCCCCCCCCC	CCC	CCCCCCC	CCCCCCC	CCCCCCCCC	CCCCCCCCC
Exh. Press.	CCCCCCCCCCCC	CCCCCCCCCCCC	CCC	CCCCCCC	CCCCCCC	CCCCCCCCC	CCCCCCCCC
Oil Gal Pres	CCCCCCCCCCCC	CCCCCCCCCCCC	CCC	CCCCCCC	CCCCCCC	CCCCCCCCC	CCCCCCCCC

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

