



**Roller Follower Wear Test**

Reference Oil Test						Non-Reference Oil Test					
Lab	Stand	Stand Run No.	Engine	Engine Run No.		Lab	Stand	Stand Run No.	Engine	Engine Run No.	
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				CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC		CCCCCC			
	Laboratory Oil Code						Laboratory Oil Code				
	Engine Displacement						Formulation Stand Code				
							CC-CCCCCCCCCCC-C-C-CCCCCCC-CC-CC-CCCC				
Average Wear (mils)						Average Wear (mils)	Severity Adjustment	Adjusted Average Wear			
S12.12						S12.12	S1.12	S12.12			

**FIG. A5.2 Test Lab Affidavit**



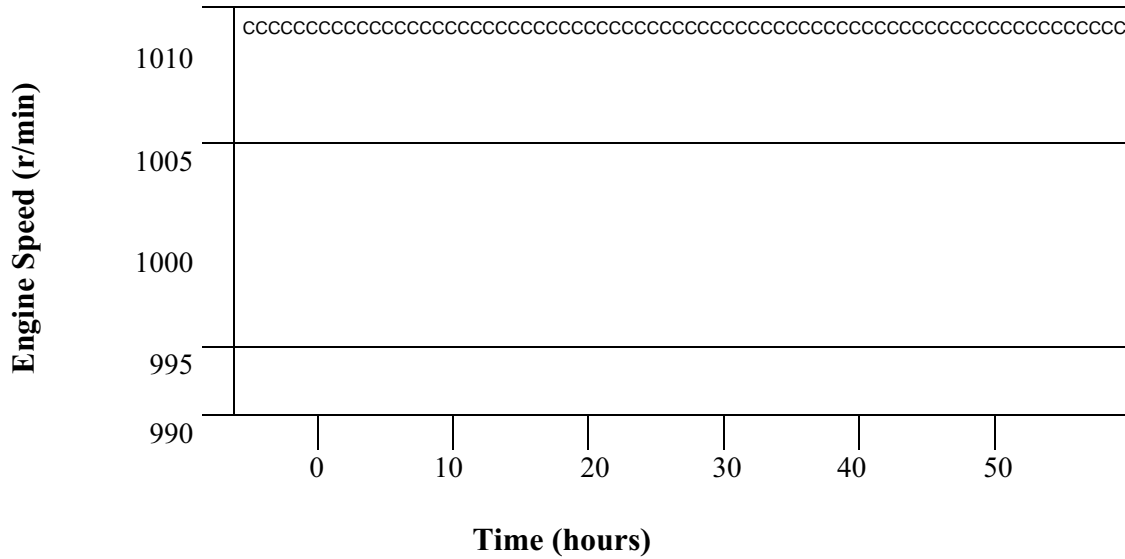
## Roller Follower Wear Test

<b>Laboratory:</b> CC	YYYYMMDD	YYYYMMDD
<b>Test Number:</b> CCCCC CCCC CCCC CCCCC CCCC CCCC		
<b>Oil Code:</b> CCC		CCCCCC
<b>Formulation/Stand Code:</b> CC-CCCCCCCCCC-C-C-C-C-C-C-C-C-C-C-C-C-C-C-C-C		

### Engine Speed (r/min)

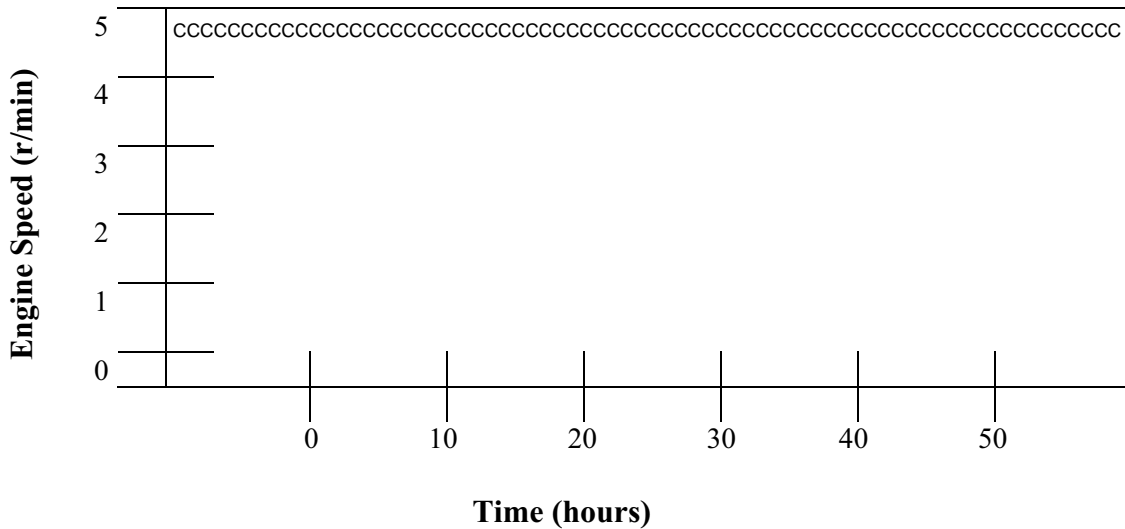
**Process Mean**

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



**Process Variability (s)**

$$S_{av} = S12.1$$



**FIG. A5.4 Operational Data Summary - Engine Speed**



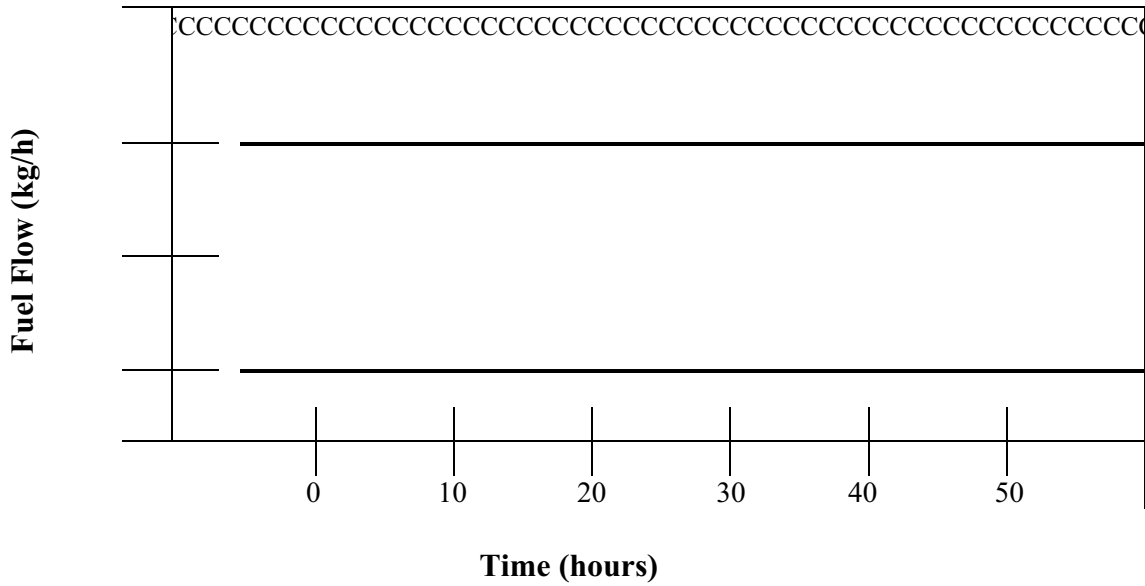
## Roller Follower Wear Test

<b>Laboratory:</b>	CC	YYYYMMDD	YYYYMMDD
<b>Test Number:</b>	CCCCC    CCCC    CCCC    CCCCCC    CCCC    CCCC		
<b>Oil Code:</b>	CC		CCCCCC
<b>Formulation/Stand Code:</b>	CC-CCCCCCCCC-C-C-CCCCC-CC-CC-CCCC		

### Fuel Flow (kg/h)

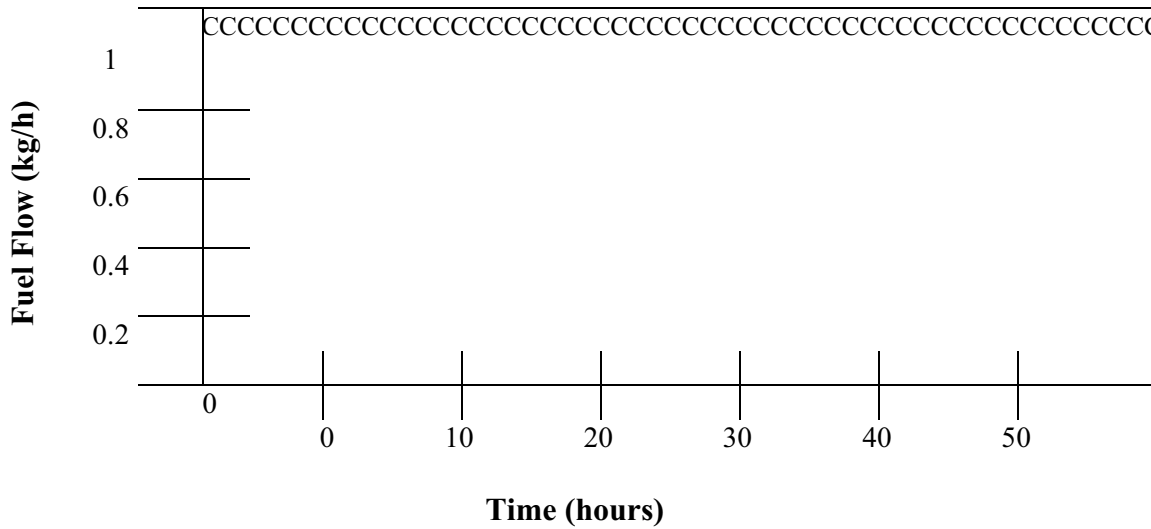
**Process Mean**

$X_{av} =$     S1.1



**Process Variability (s)**

$S_{av} =$     S1.1



**FIG. A5.6 Operational Data Summary – Fuel Flow**

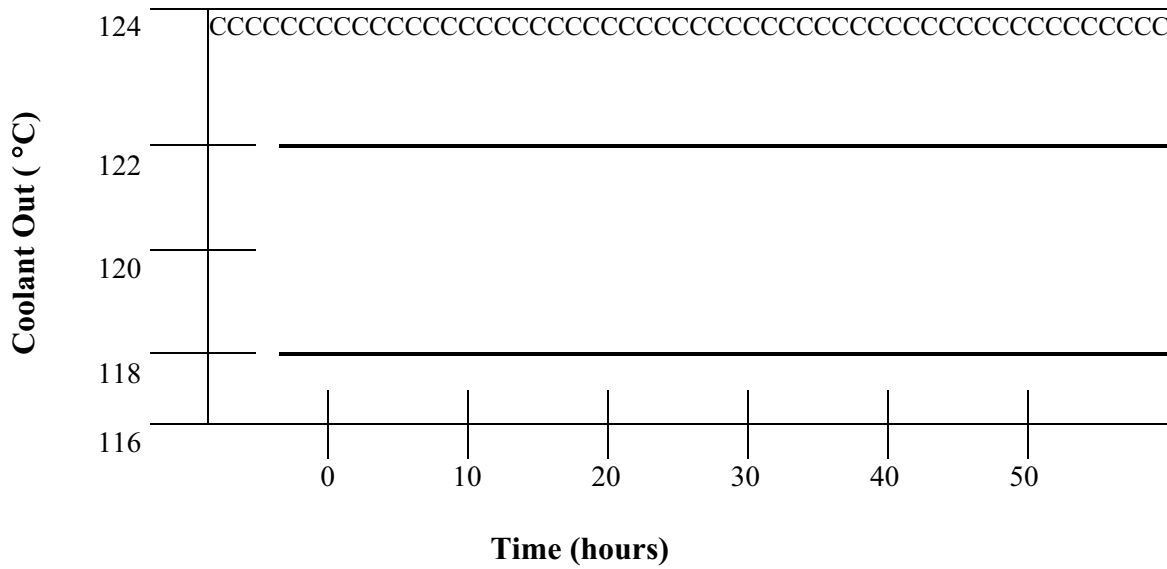
## Roller Follower Wear Test

<b>Laboratory:</b> CC	YYYYMMDD	YYYYMMDD
<b>Test Number:</b> CCCCC CCCC CCCC CCCCC CCCC CCCC		
<b>Oil Code:</b> CCC		CCCCCC
<b>Formulation/Stand Code:</b> CC-CCCCCCCCCC-C-C-CCCCCC-CC-CC-CCCCC		

### Coolant Out Temperature

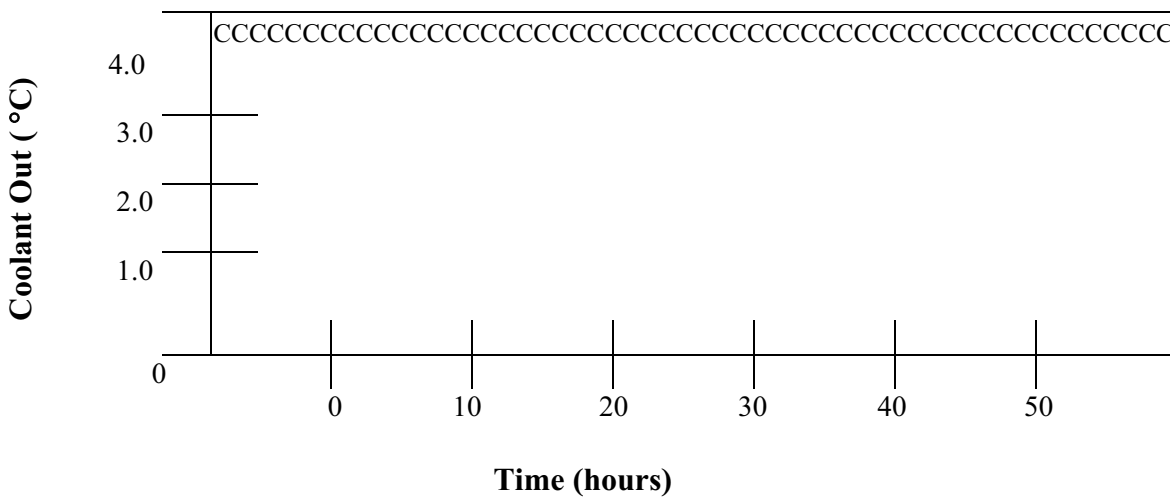
#### Process Mean

$X_{av} = S123.1$



#### Process Variability (s)

$S_{av} = S12.1$



**FIG. A5.7 Operational Data Summary – Coolant Output Temperature**

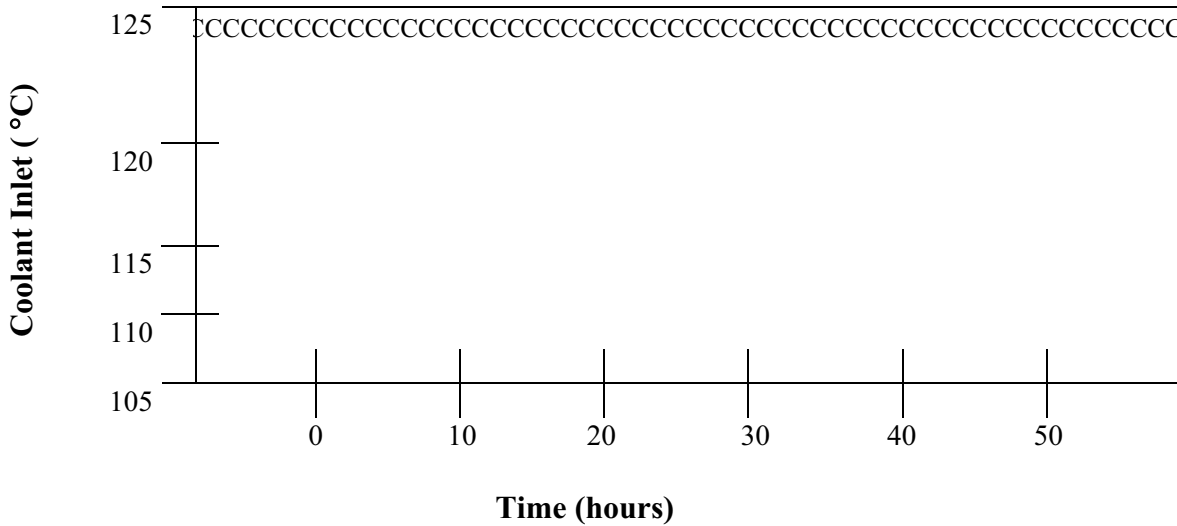
## Roller Follower Wear Test

<b>Laboratory:</b>	CC	YYYYMMDD	YYYYMMDD
<b>Test Number:</b>	CCCCC CCCC CCCC CCCCC CCCC CCCC		
<b>Oil Code:</b>	CC		CCCCCC
<b>Formulation/Stand Code:</b>	CC-CCCCCCCCC-C-C-CCCCC-CC-CC-CCCC		

### Coolant Inlet Temperature

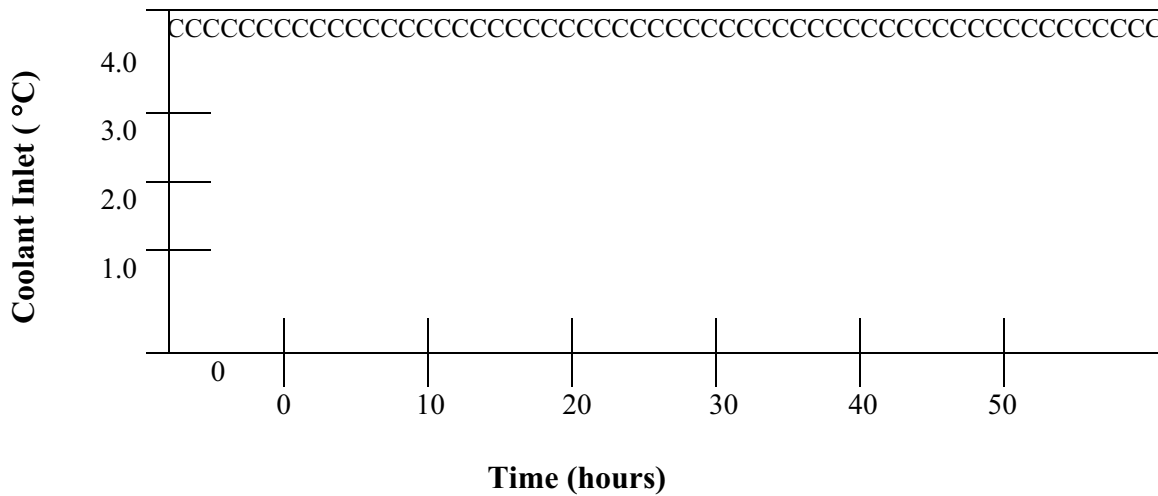
**Process Mean**

$X_{av} = S123.1$



**Process Variability (s)**

$S_{av} = S12.1$



**FIG. A5.8 Operational Data Summary – Coolant Inlet Temperature**





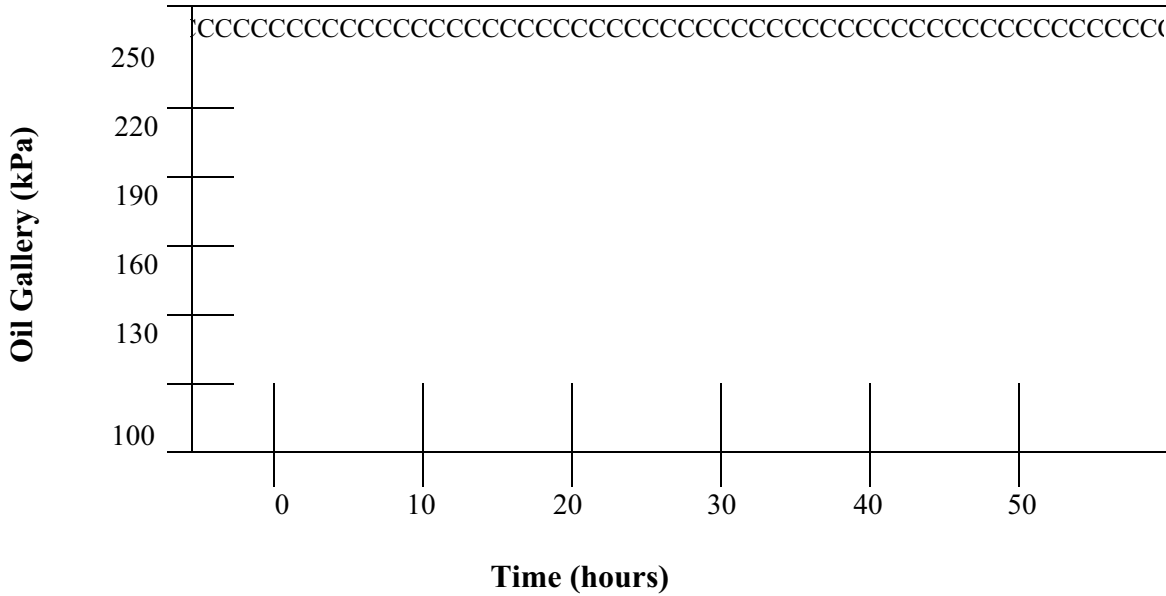
## Roller Follower Wear Test

<b>Laboratory:</b>	CC	YYYYMMDD	YYYYMMDD
<b>Test Number:</b>	CCCCC	CCCC	CCCC
<b>Oil Code:</b>	CC		CCCCCC
<b>Formulation/Stand Code:</b>	CC-CCCCCCCCC-C-C-CCCCC-CC-CC-CCCC		

### Oil Gallery Pressure

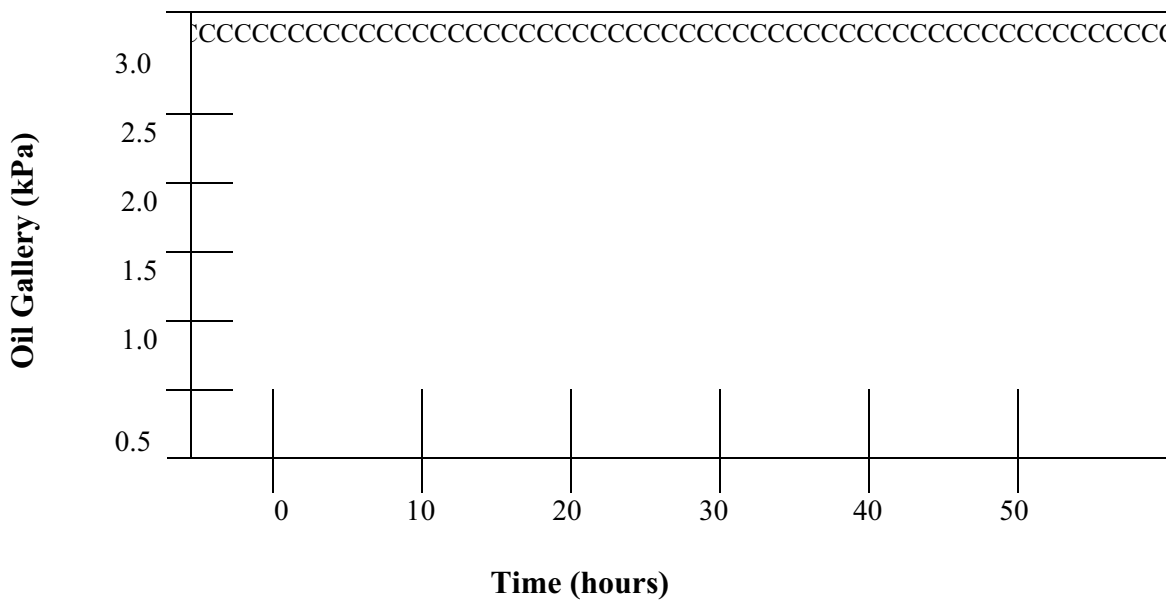
#### Process Mean

$X_{av} = S12.1$



#### Process Variability (s)

$S_{av} = S12.1$



**FIG. A5.10 Operational Data Summary – Oil Gallery Pressure**

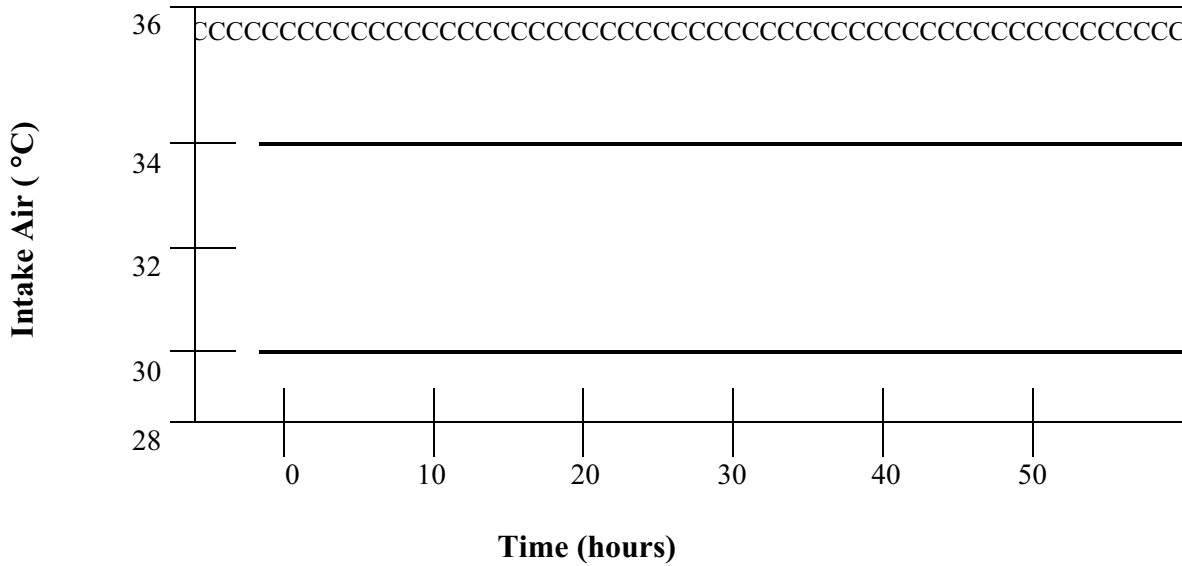
## Roller Follower Wear Test

<b>Laboratory:</b>	CC	YYYYMMDD	YYYYMMDD
<b>Test Number:</b>	CCCCC	CCCC	CCCC
<b>Oil Code:</b>	CC		CCCCCC
<b>Formulation/Stand Code:</b>	CC-CCCCCCCCC-C-C-CCCCC-CC-CC-CCCC		

### Intake Air Temperature

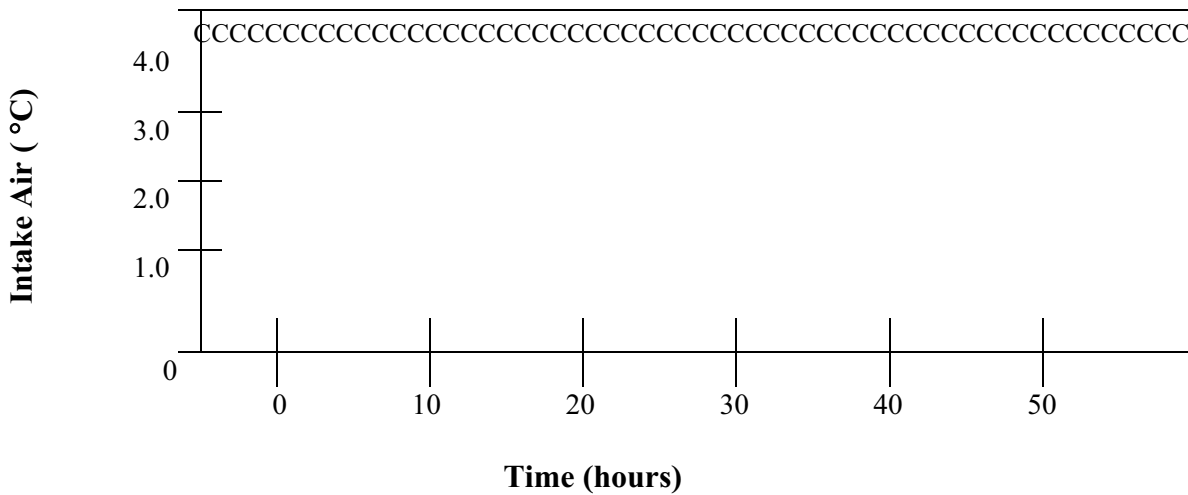
#### Process Mean

$X_{av} = S12.1$



#### Process Variability (s)

$S_{av} = S12.1$



**FIG. A5.11 Operational Data Summary – Intake Air Temperature**

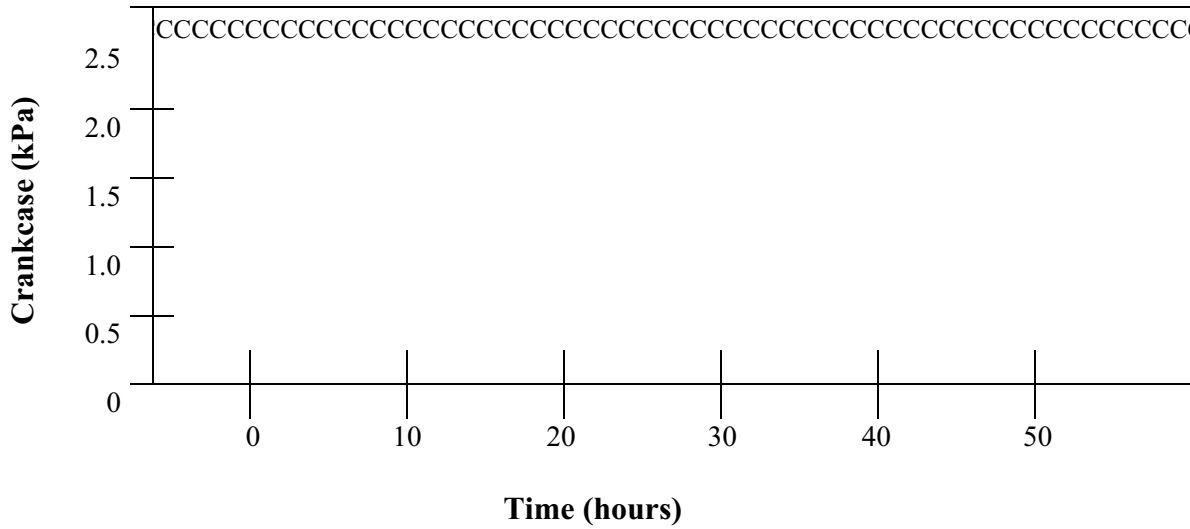
## Roller Follower Wear Test

<b>Laboratory:</b> CC	YYYYMMDD	YYYYMMDD
<b>Test Number:</b> CCCCC CCCC CCCC CCCCC CCCC CCCC		
<b>Oil Code:</b> CCC		CCCCCC
<b>Formulation/Stand Code:</b> CC-CCCCCCCCCC-C-C-CCCCCC-CC-CC-CCCCC		

### Crankcase Pressure

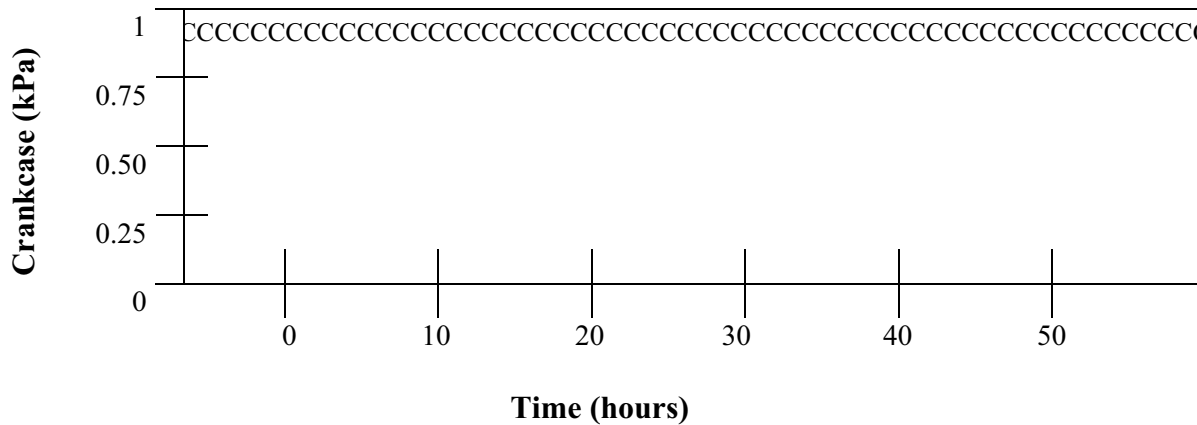
#### Process Mean

$X_{av} =$  S1.1



#### Process Variability (s)

$S_{av} =$  S1.1



**FIG. A5.12 Operational Data Summary – Crankcase Pressure**

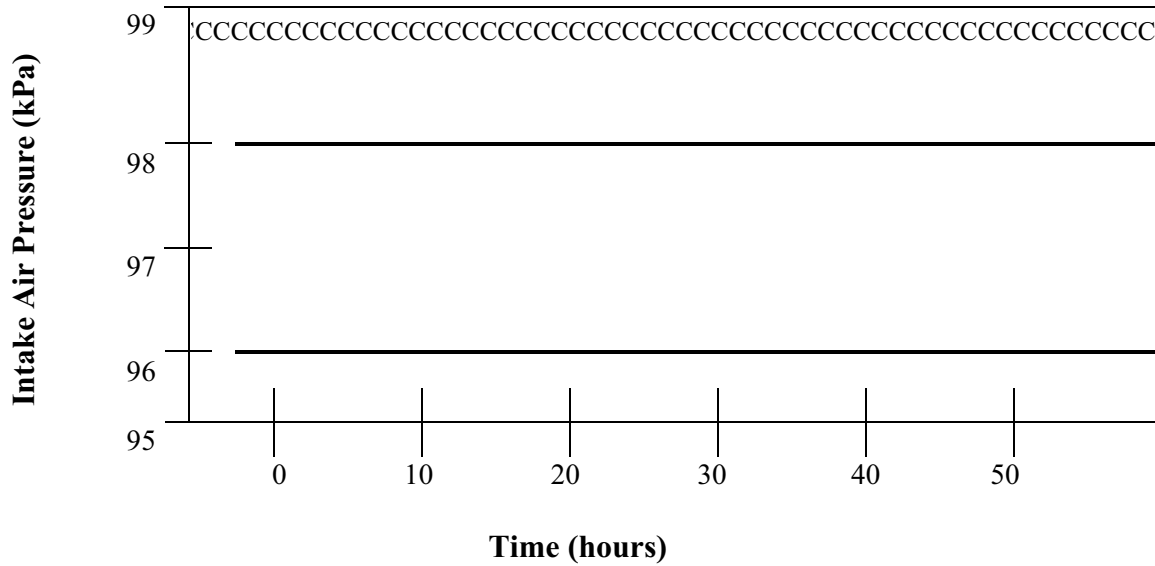
## Roller Follower Wear Test

<b>Laboratory:</b>	CC	YYYYMMDD	YYYYMMDD
<b>Test Number:</b>	CCCCC	CCCC	CCCC
<b>Oil Code:</b>	CC		CCCCC
<b>Formulation/Stand Code:</b>	CC-CCCCCCCCC-C-C-CCCCC-CC-CC-CCCC		

### Intake Air Pressure

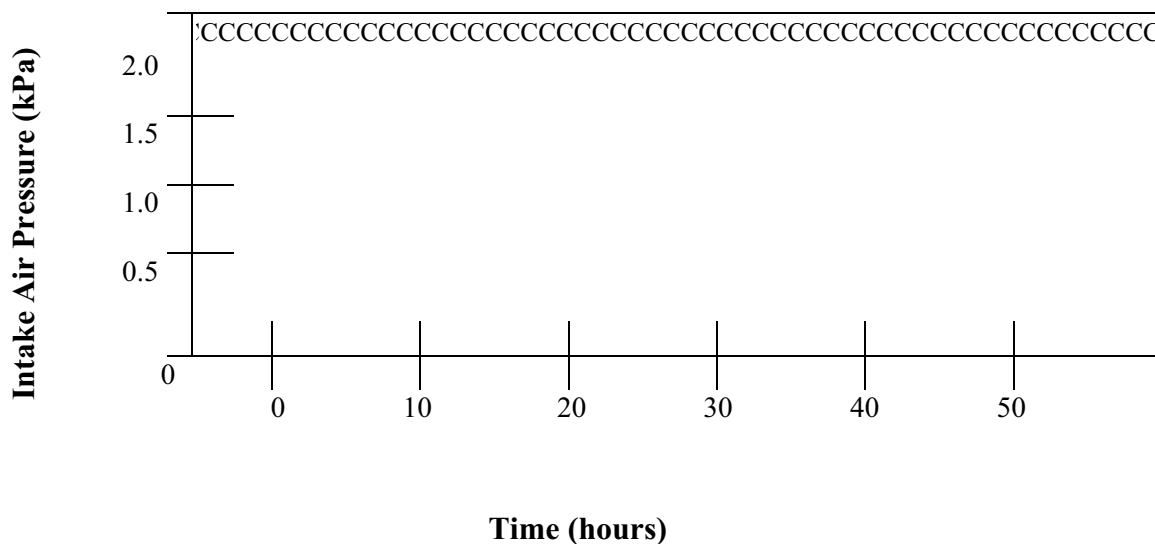
#### Process Mean

$X_{av} =$  S12.1



#### Process Variability (s)

$S_{av} =$  S12.1



**FIG. A5.13 Operational Data Summary – Intake Air Pressure**

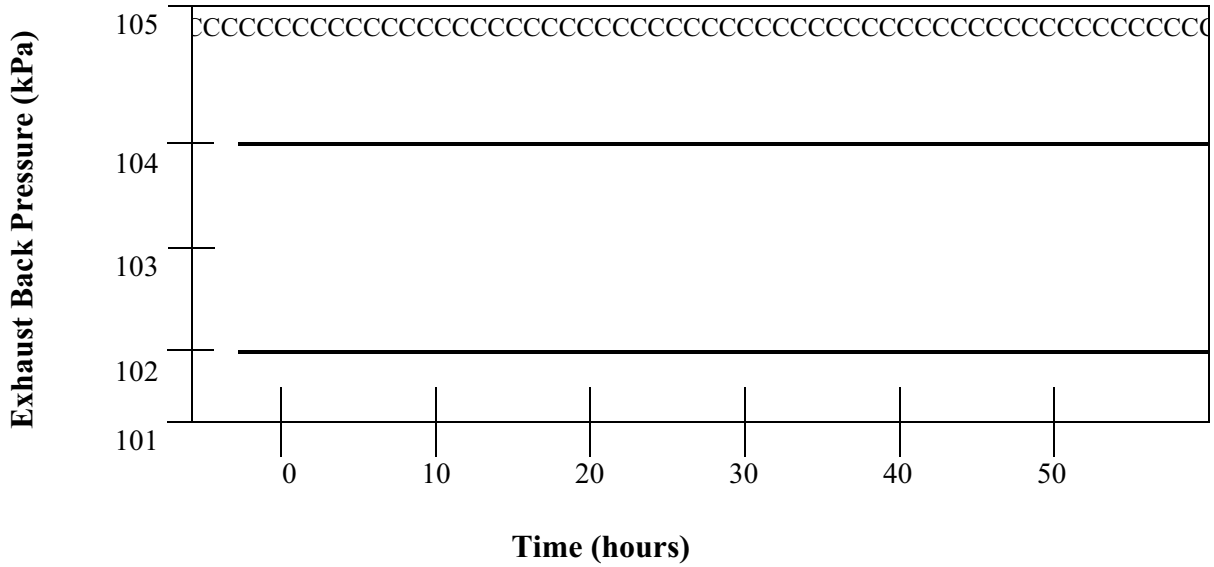
## Roller Follower Wear Test

<b>Laboratory:</b>	CC	YYYYMMDD	YYYYMMDD
<b>Test Number:</b>	CCCCC	CCCC	CCCC
<b>Oil Code:</b>	CC		CCCCC
<b>Formulation/Stand Code:</b>	CC-CCCCCCCCC-C-C-CCCCC-CC-CC-CCCC		

### Exhaust Back Pressure

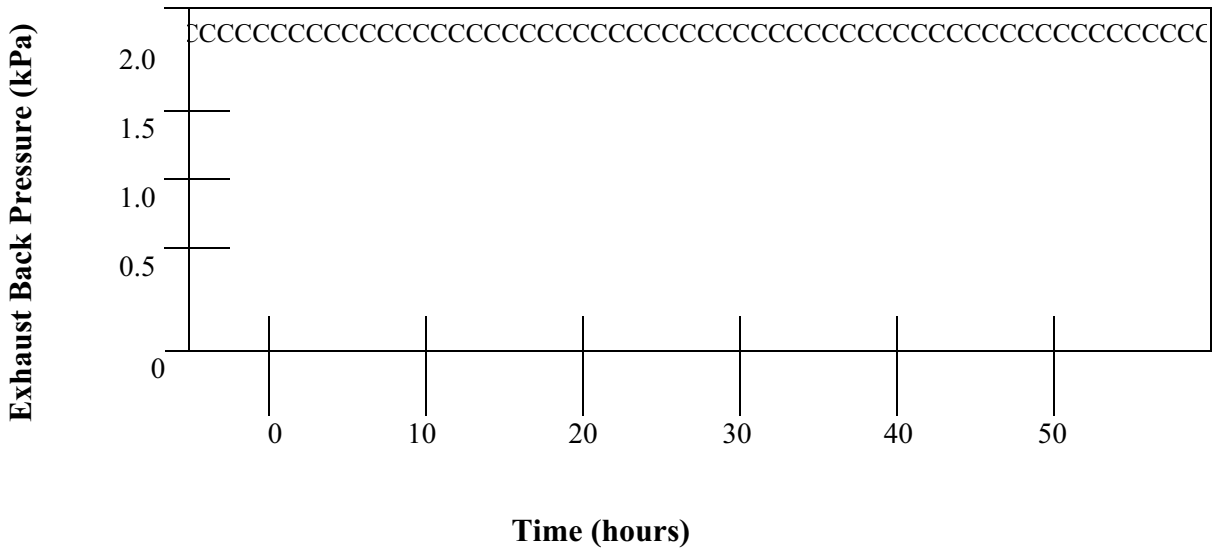
**Process Mean**

$X_{av} =$  S12.1



**Process Variability (s)**

$S_{av} =$  S12.1



**FIG. A5.14 Operational Data Summary – Exhaust Back Pressure**

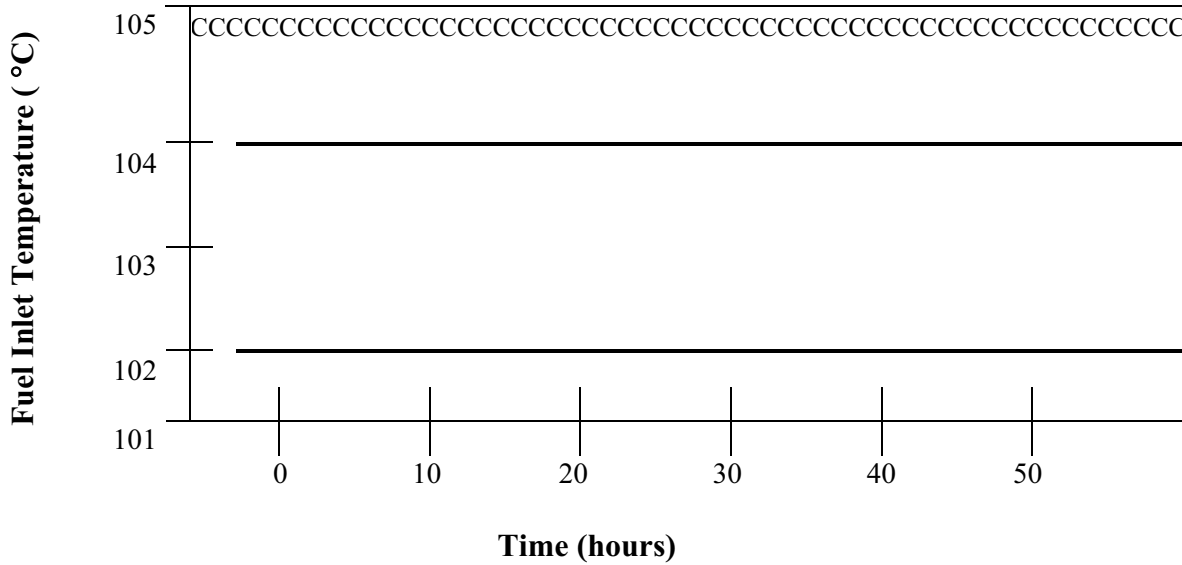
## Roller Follower Wear Test

<b>Laboratory:</b>	CC	YYYYMMDD	YYYYMMDD
<b>Test Number:</b>	CCCCC	CCCC	CCCC
<b>Oil Code:</b>	CC		CCCCCC
<b>Formulation/Stand Code:</b>	CC-CCCCCCCCC-C-C-CCCCC-CC-CC-CCCC		

### Fuel Inlet Temperature

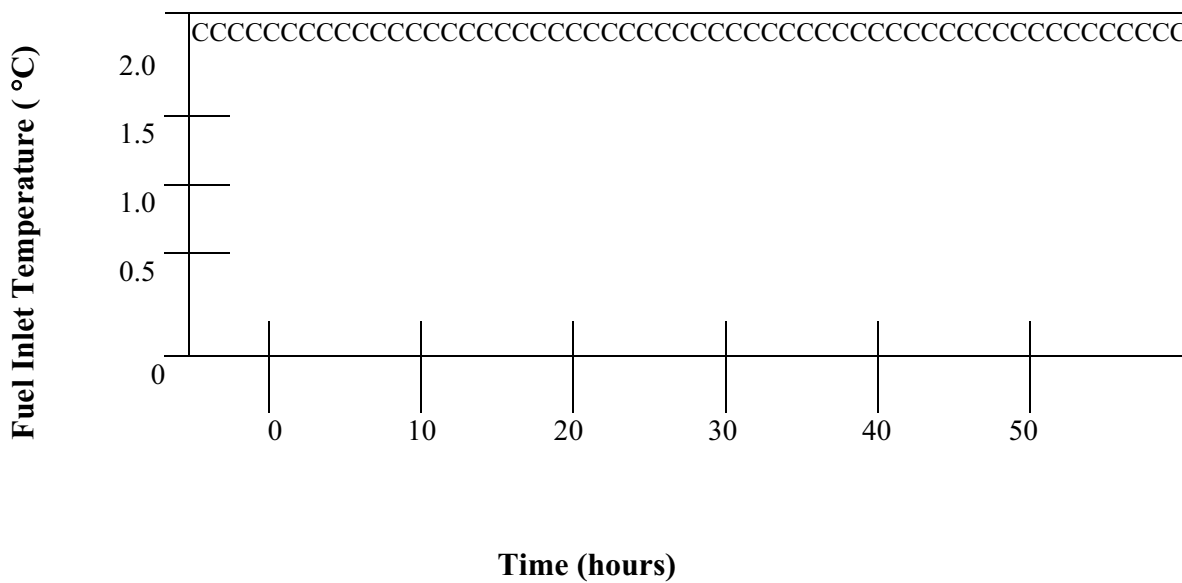
**Process Mean**

$$\bar{X}_{av} = S12.1$$



**Process Variability (s)**

$$S_{av} = S12.1$$



**FIG. A5.15 Operational Data Summary – Fuel Inlet Temperature**





### Roller Follower Wear Test

<b>Laboratory:</b> CC	YYYYMMDD	YYYYMMDD
<b>Test Number:</b> CCCCC CCCC CCCC CCCCC CCCC CCCC		
<b>Oil Code:</b> CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC		CCCCCC
<b>Formulation/Stand Code:</b> 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

**FIG. A5.17 Operational Summary**









### Roller Follower Wear Test

<b>Laboratory:</b>	CC	YYYYMMDD	YYYYMMDD
<b>Test Number:</b>	CCCCC CCCC CCCC CCCCC CCCC CCCC		
<b>Oil Code:</b>	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC		CCCCCC
<b>Formulation/Stand Code:</b>	CC-CCCCCCCCC-C-C-CCCCC-CC-CC-CCCC		

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

**FIG. A5.20 Test Fuel Analysis (Last batch)**

