D 5966
Roller Follower Wear Test

Final Report Cover Sheet

Report Packet Version No.

RFWT VERSION 20040401 BETA

Conducted For:

TSTSPON1

TSTSPON2

LABVALID	V = Valid
	I = Invalid

Test Number			
Test Stand STAND	Stand Run RSTRUN STRUN	Engine ENGINE	Engine Run RENRUN ENRUN
Date Completed RDTCOMP DTCOMP		Time Completed REOTTIME EOTTIME	
Oil Code [A] OILCODE CMIR			
Formulation/Stand Code FORM			
Alternate Codes	ALTCODE1	ALTCODE2	ALTCODE3

In my opinion this test OPVALID been conducted in a valid manner in accordance with the Test Method D 5966 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: SUBLAB

Testing Laboratory

SUBSIGIM

Signature

SUBNAME

Typed Name

SUBTITLE

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
LAB	STAND	RSTRUN	ENGINE	RENRUN	LAB	STAND	STRUN	ENGINE	ENRUN
Start Date	Date Completed	End of Test Time	Test Length		Start Date	Date Completed	End of Test Time	Test Length	
RDTSTRT	RDTCOMP	REOTTIME	RTESTLEN		DTSTRT	DTCOMP	EOTTIME	TESTLEN	
CMIR	TMC Oil Code	Viscosity Grade			Oil Code			Viscosity Grade	
CMIR	IND	RSAEVISC			OILCODE			SAEVISC	
Laboratory Oil Code	RLABOCOD				Laboratory Oil Code	LABOCODE			
Engine Displacement	ENDISPL				Formulation Stand Code				
					FORM				
Average Wear (mils)					Average Wear (mils)	Severity Adjustment	Adjusted Average Wear		
RWEAR					WEAR	WEARSA	AWEARFNL		

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

Laboratory LAB	Date Completed	RDTCOMP	DTCOMP
Test Number TESTNUM			
Oil Code	OILCODE		CMIR
Formulation/Stand Code FORM			

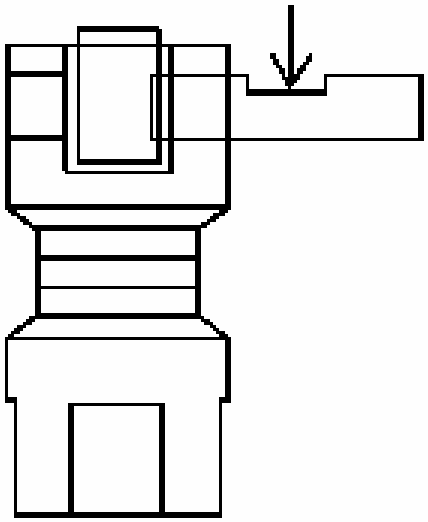
Lifter Part Number
LIFTPN1

Profilometer Wear Measurements in Mils

Lifter Number	Wear (Mils)	Lifter Number	Wear (Mils)
1L	WEAR1L	1R	WEAR1R
2L	WEAR2L	2R	WEAR2R
3L	WEAR3L	3R	WEAR3R
4L	WEAR4L	4R	WEAR4R
5L	WEAR5L	5R	WEAR5R
6L	WEAR6L	6R	WEAR6R
7L	WEAR7L	7R	WEAR7R
8L	WEAR8L	8R	WEAR8R

Wear Statistics			
Minimum	Maximum	Average	Std. Deviation
IWEAR	XWEAR	RWEAR WEAR	SWEAR

Wear is measured at location shown by arrow



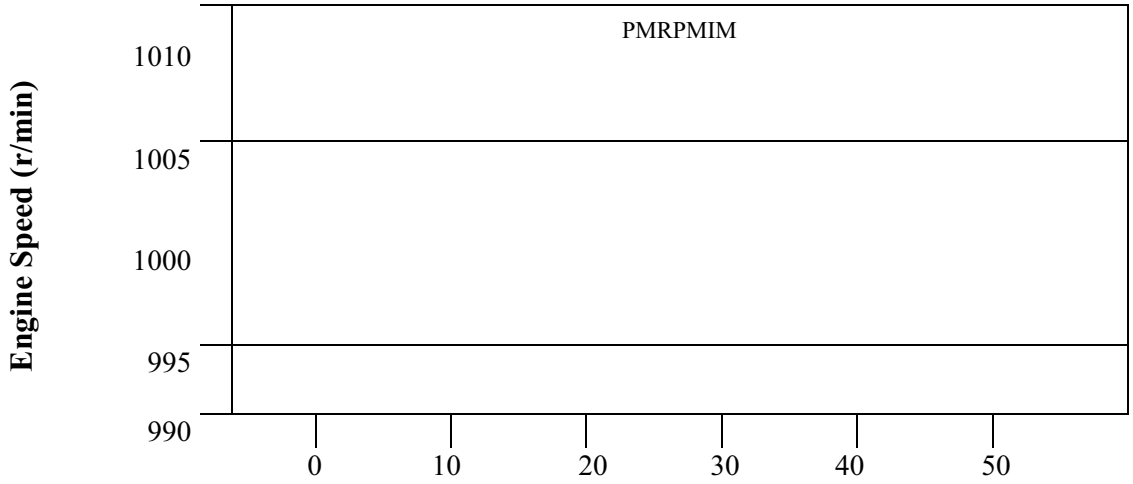
D 5966
Roller Follower Wear Test
Form 3
Operational Data Summary - Engine Speed

Laboratory	LAB	Date Completed	RDTCOMP DTCOMP
Test Number	TESTNUM		
Oil Code	OILCODE		CMIR
Formulation/Stand Code	FORM		

Engine Speed (r/min)

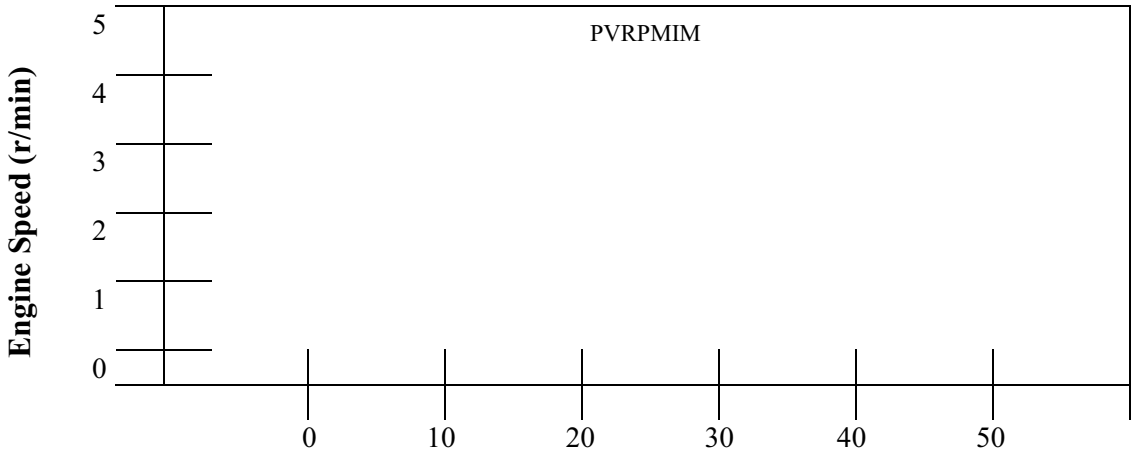
Process Mean

Xav = PMRPM



Process Variability (s)

Sav = PVRPM

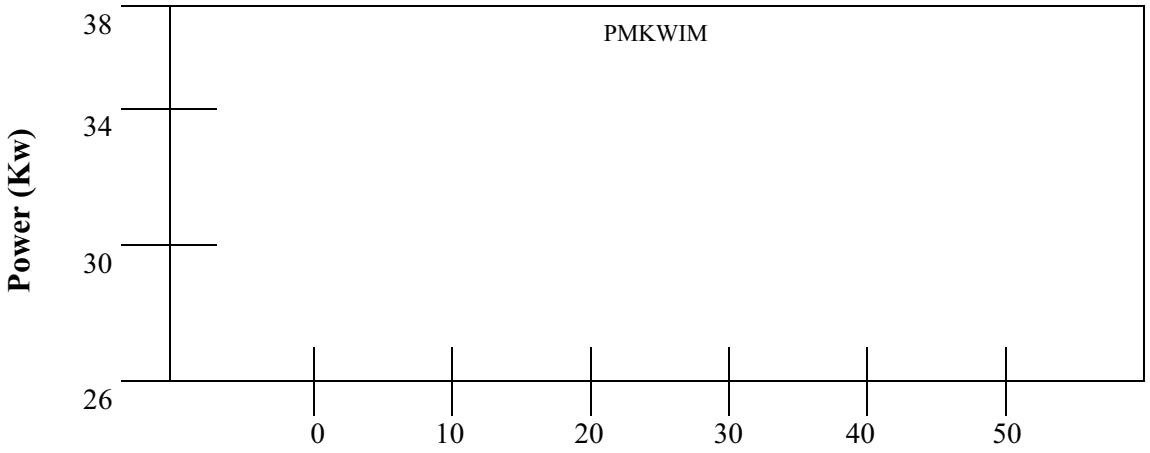


D 5966
Roller Follower Wear Test
Form 4
Operational Data Summary – Power

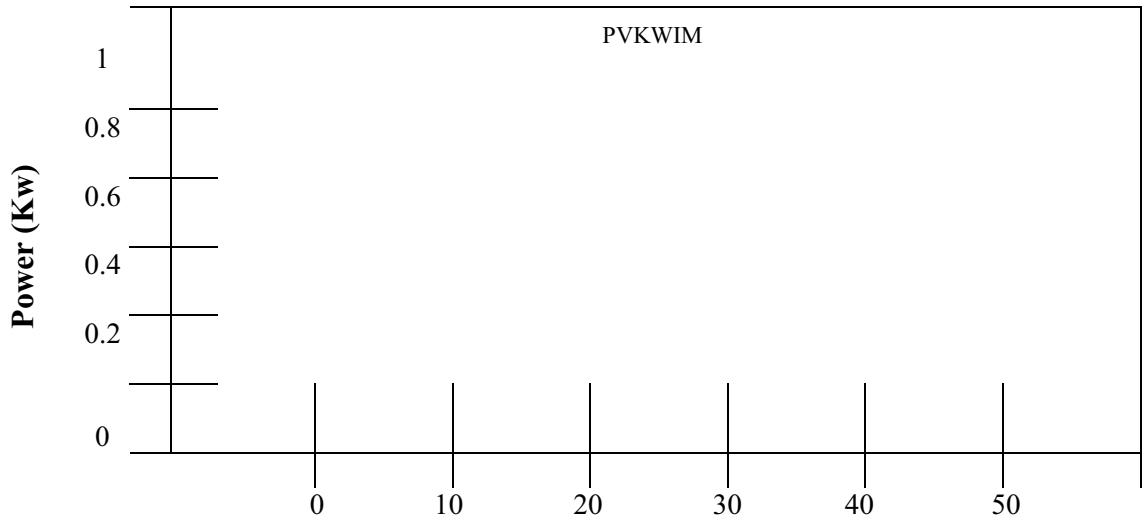
Laboratory LAB	Date Completed	RDTCOMP	DTCOMP
Test Number TESTNUM			
Oil Code	OILCODE		CMIR
Formulation/Stand Code FORM			

Power (kW)

Process Mean
Xav = PMKW



Process Variability (s)
Sav = PVKW

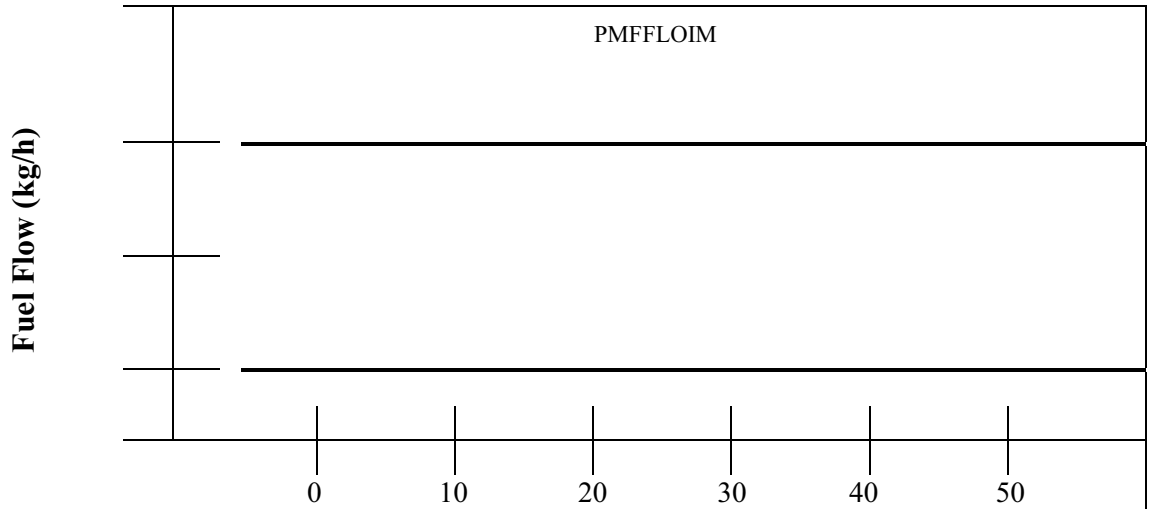


D 5966
Roller Follower Wear Test
Form 5
Operational Data Summary – Fuel Flow

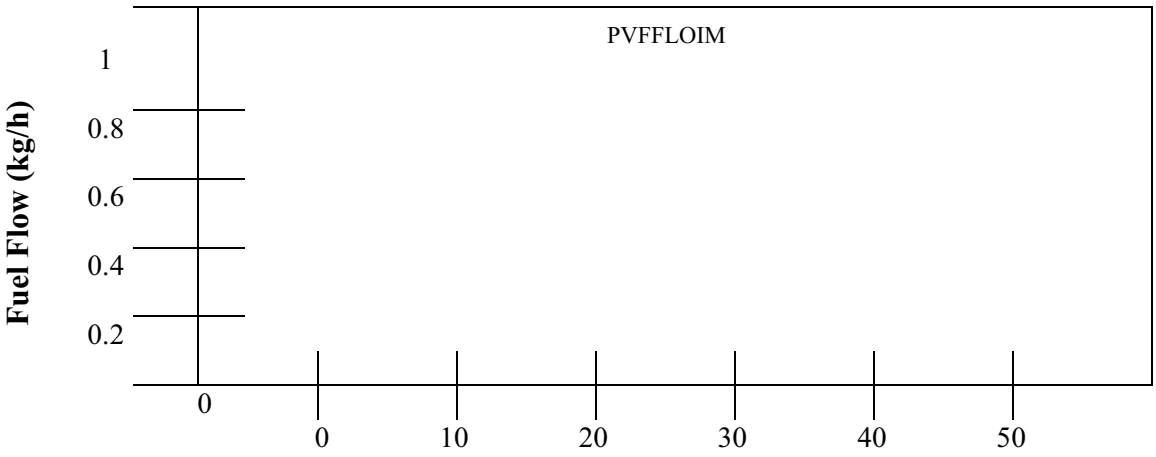
Laboratory LAB	Date Completed	RDTCOMP	DTCOMP
Test Number TESTNUM			
Oil Code	OILCODE		CMIR
Formulation/Stand Code FORM			

Fuel Flow (kg/h)

Process Mean
Xav = PMFFLO



Process Variability (s)
Sav = PVFFLO

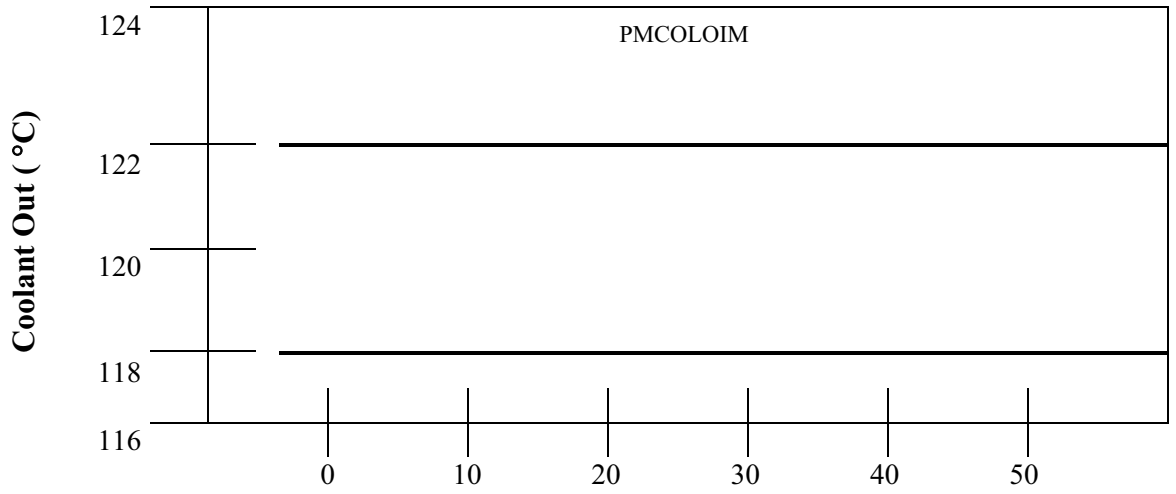


D 5966
Roller Follower Wear Test
Form 6
Operational Data Summary – Coolant Output Temperature

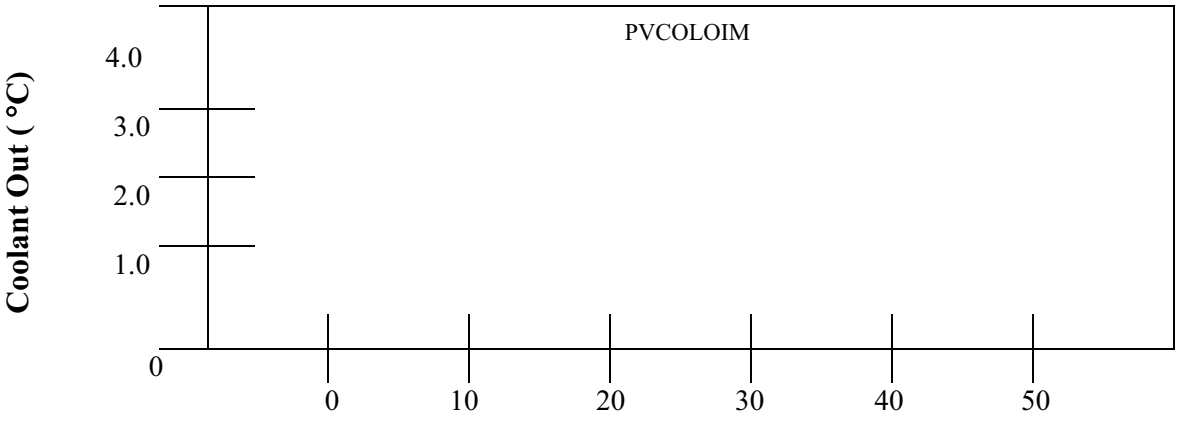
Laboratory LAB		Date Completed RDTCOMP	DTCOMP
Test Number TESTNUM			
Oil Code	OILCODE		CMIR
Formulation/Stand Code FORM			

Coolant Out Temperature

Process Mean
Xav = PMCOLOUT



Process Variability (s)
Sav = PVCOLOUT



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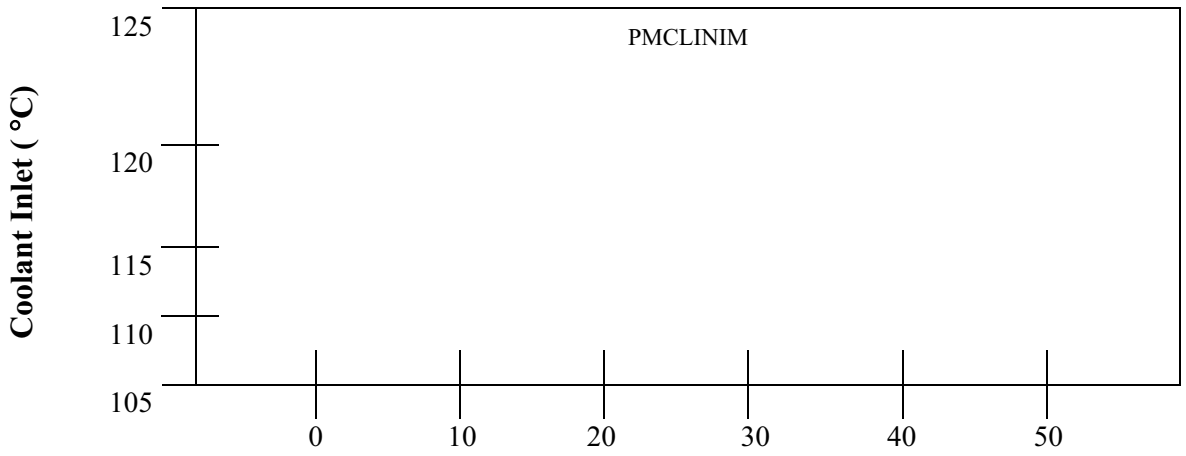
Roller Follower Wear Test
Form 7
Operational Data Summary – Coolant Inlet Temperature

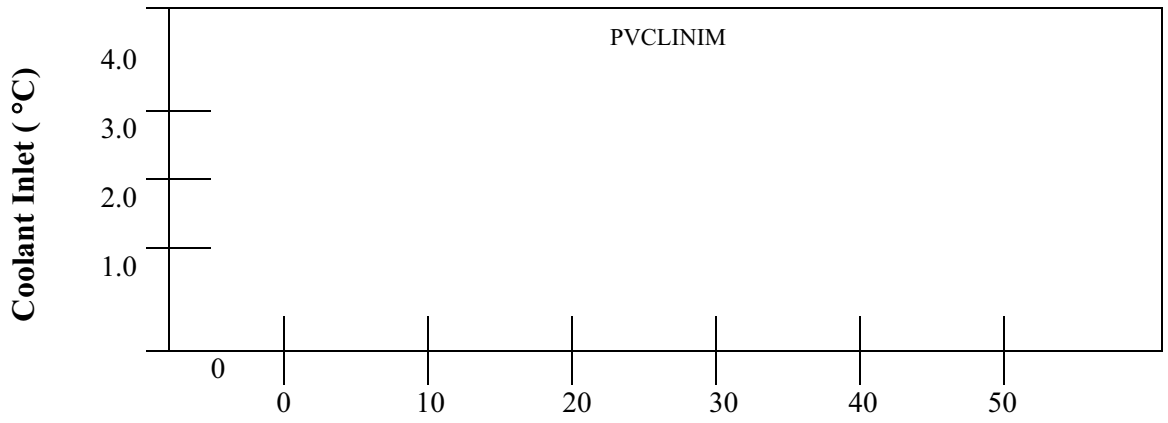
Laboratory LAB	Date Completed	RDTCOMP	DTCOMP
Test Number TESTNUM			
Oil Code	OILCODE		CMIR
Formulation/Stand Code FORM			

Coolant Inlet Temperature

Process Mean
Xav = PMCOLIN



Process Variability (s)
Sav = PVCOLIN

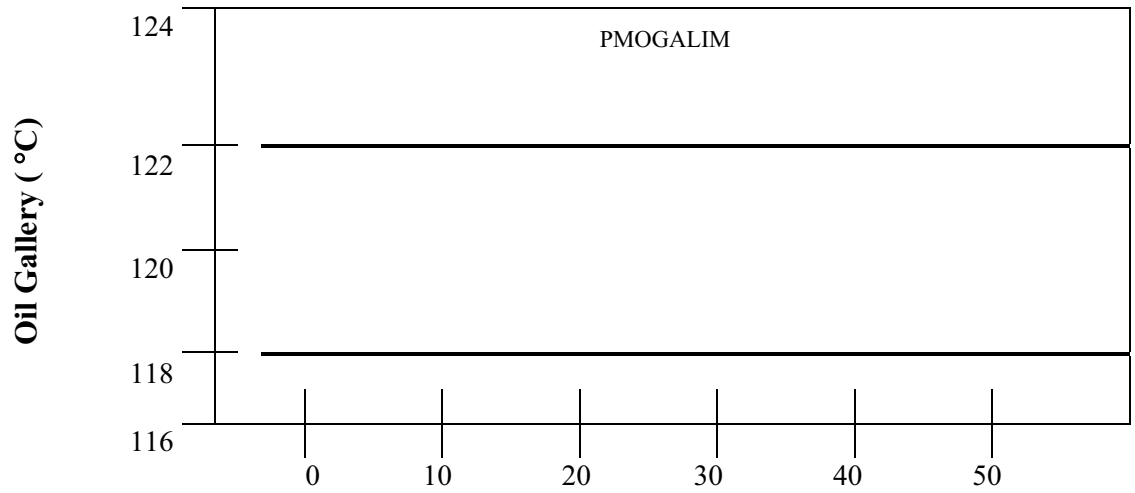


D 5966
Roller Follower Wear Test
Form 8
Operational Data Summary – Oil Gallery Temperature

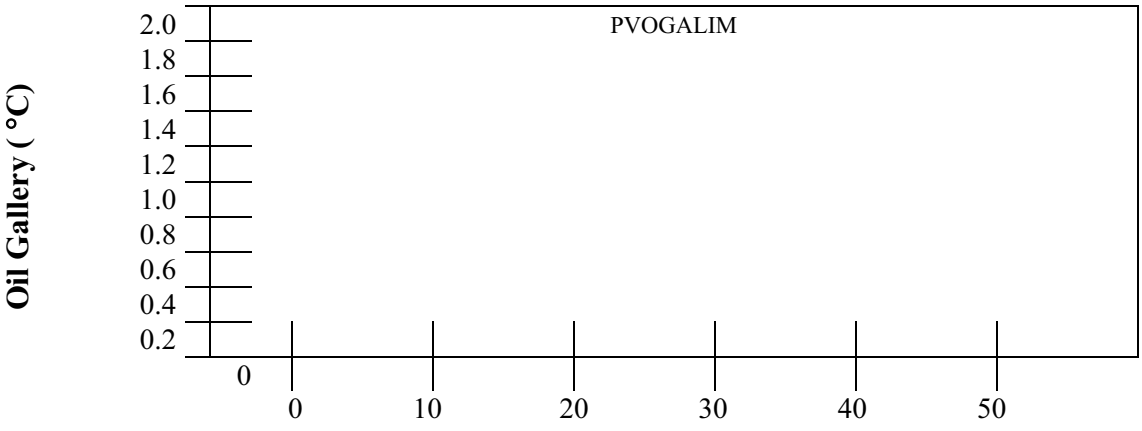
Laboratory LAB	Date Completed	RDTCOMP	DTCOMP
Test Number TESTNUM			
Oil Code	OILCODE		CMIR
Formulation/Stand Code FORM			

Oil Gallery Temperature

Process Mean
Xav = PMOILGAL



Process Variability (s)
Sav = PVOILGAL

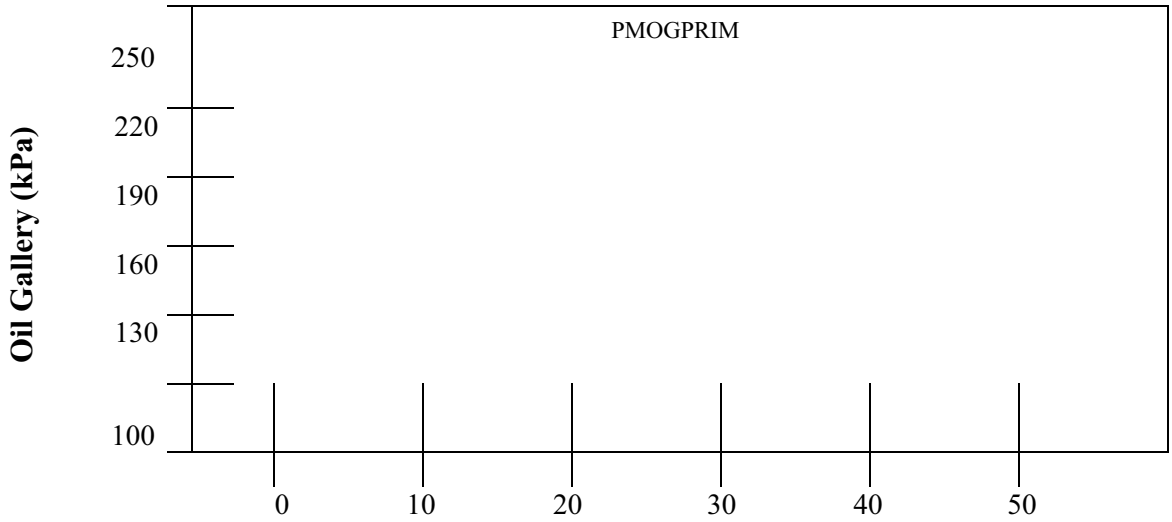


D 5966
Roller Follower Wear Test
Form 9
Operational Data Summary – Oil Gallery Pressure

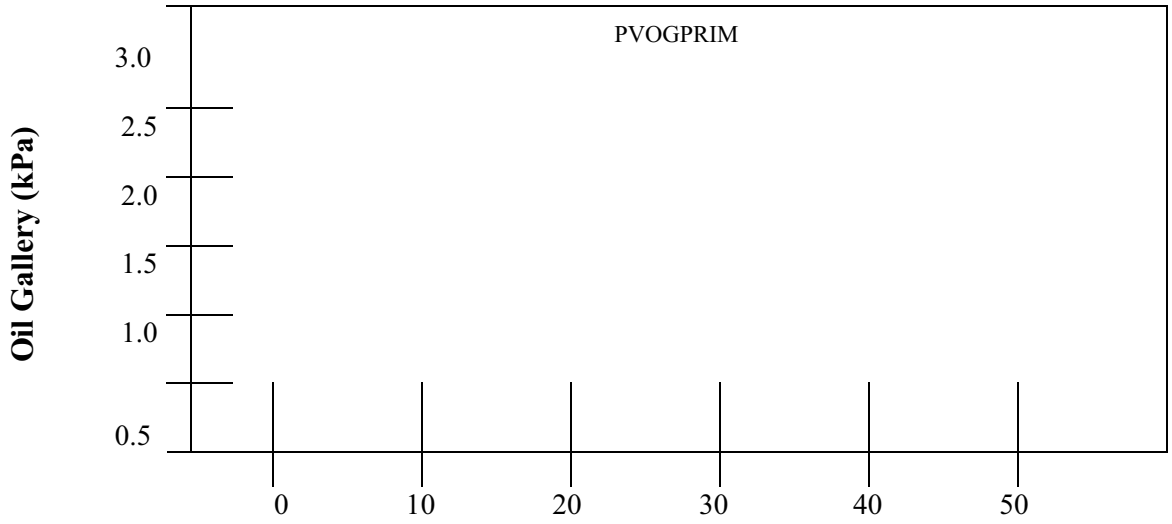
Laboratory LAB	Date Completed	RDTCOMP	DTCOMP
Test Number TESTNUM			
Oil Code	OILCODE		CMIR
Formulation/Stand Code FORM			

Oil Gallery Pressure

Process Mean
Xav = PMOILGPR



Process Variability (s)
Sav = PVOILGPR

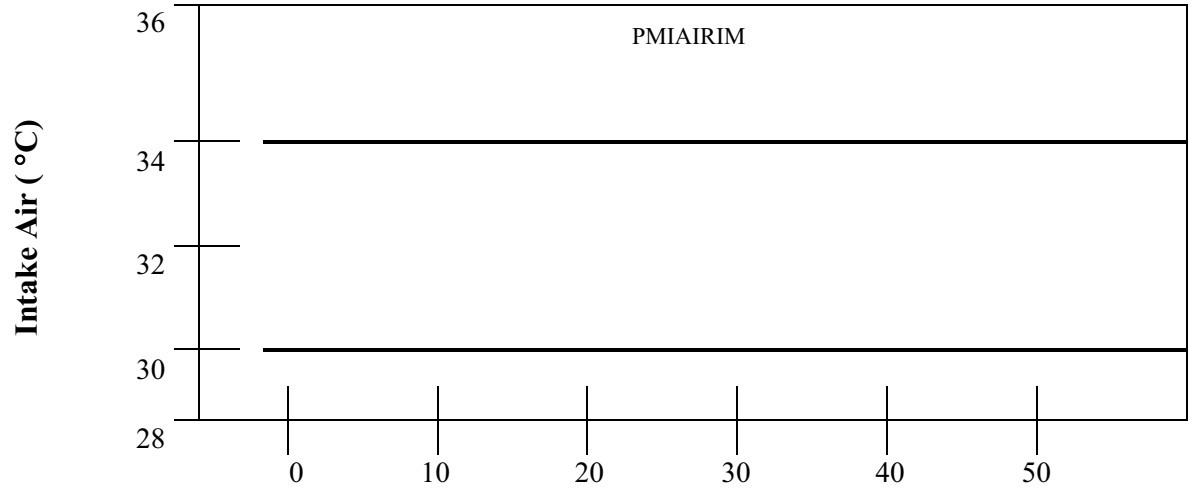


D 5966
Roller Follower Wear Test
Form 10
Operational Data Summary – Intake Air Temperature

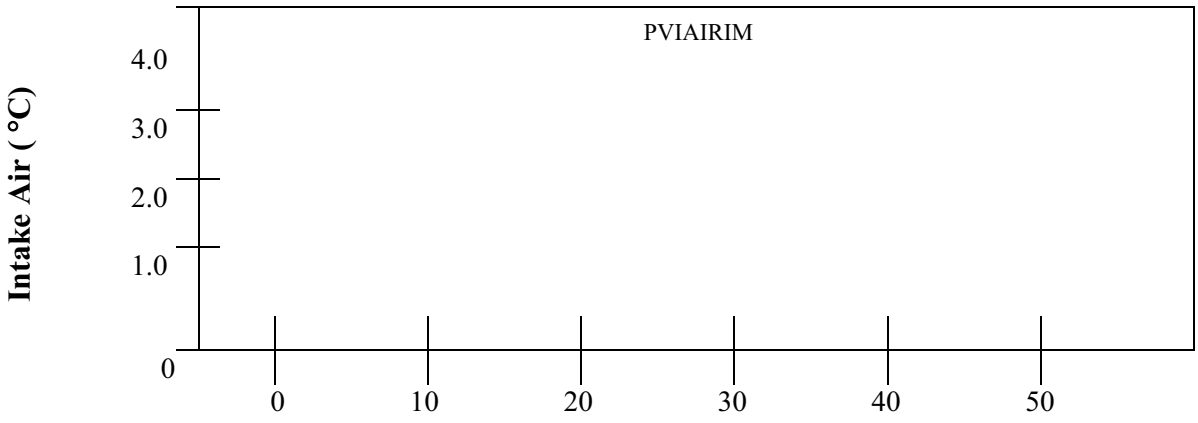
Laboratory	LAB	Date Completed	RDTCOMP	DTCOMP
Test Number	TESTNUM			
Oil Code		OILCODE		CMIR
Formulation/Stand Code	FORM			

Intake Air Temperature

Process Mean
Xav = PMINAIR



Process Variability (s)
Sav = PVINAIR

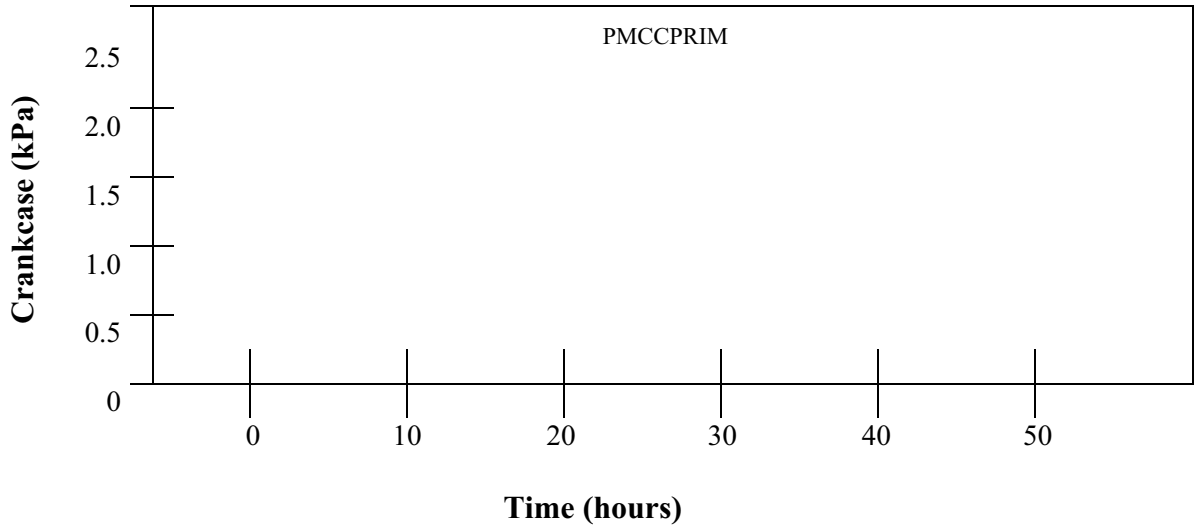


D 5966
Roller Follower Wear Test
Form 11
Operational Data Summary – Crankcase Pressure

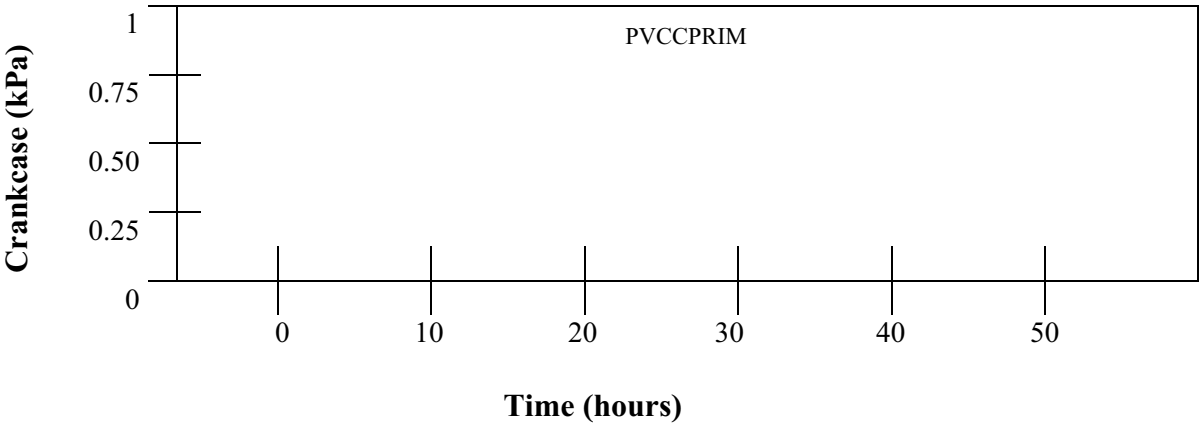
Laboratory LAB	Date Completed	RDTCOMP	DTCOMP
Test Number TESTNUM			
Oil Code	OILCODE		CMIR
Formulation/Stand Code FORM			

Crankcase Pressure

Process Mean
Xav = PMCCPR



Process Variability (s)
Sav = PVCCPR

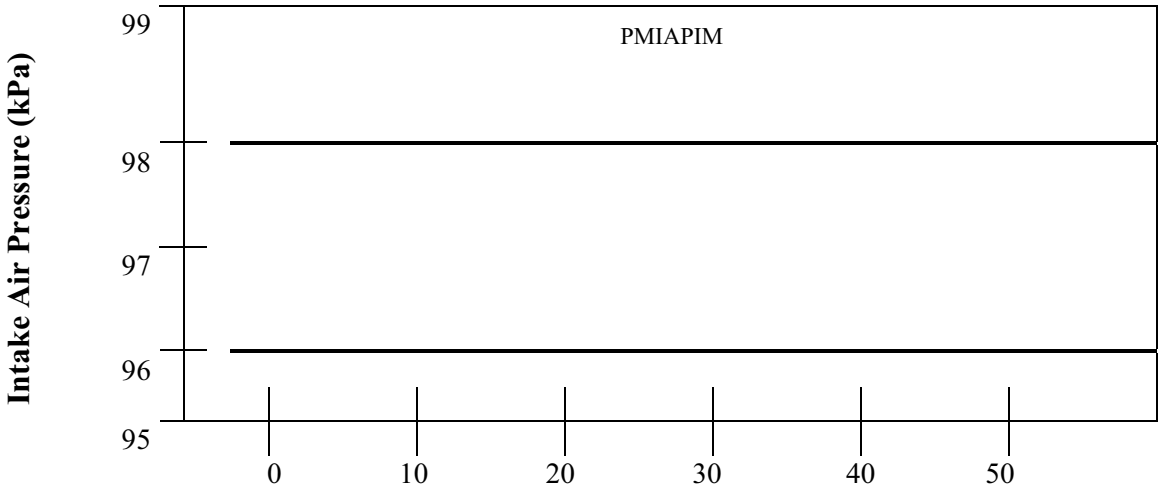


D 5966
Roller Follower Wear Test
Form 12
Operational Data Summary – Intake Air Pressure

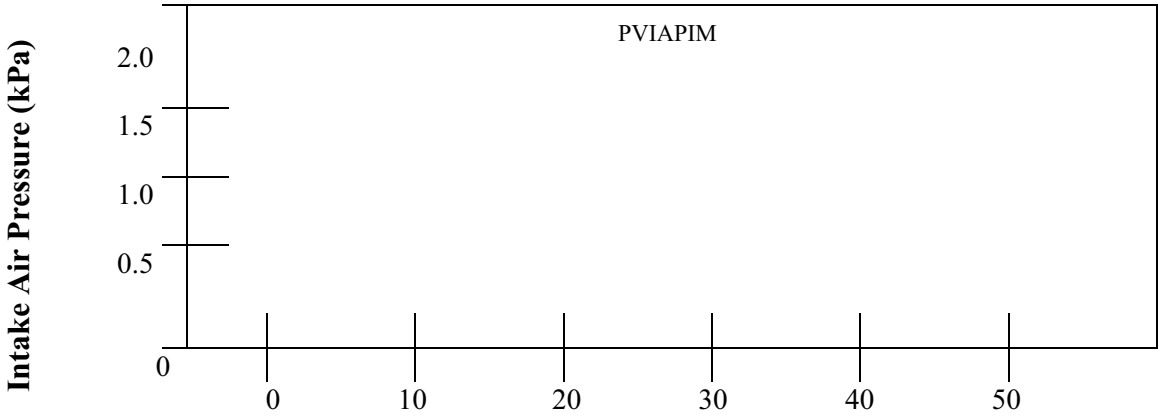
Laboratory	LAB	Date Completed	RDTCOMP DTCOMP
Test Number	TESTNUM		
Oil Code	OILCODE		CMIR
Formulation/Stand Code	FORM		

Intake Air Pressure

Process Mean
Xav = PMINAIRP



Process Variability (s)
Sav = PVINAIRP

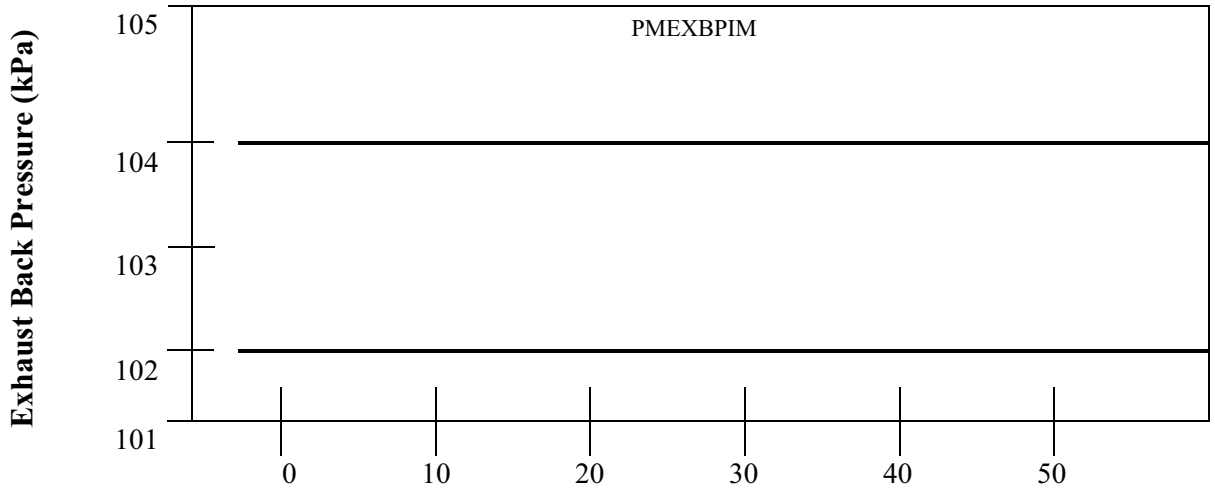


D 5966
Roller Follower Wear Test
Form 13
Operational Data Summary – Exhaust Back Pressure

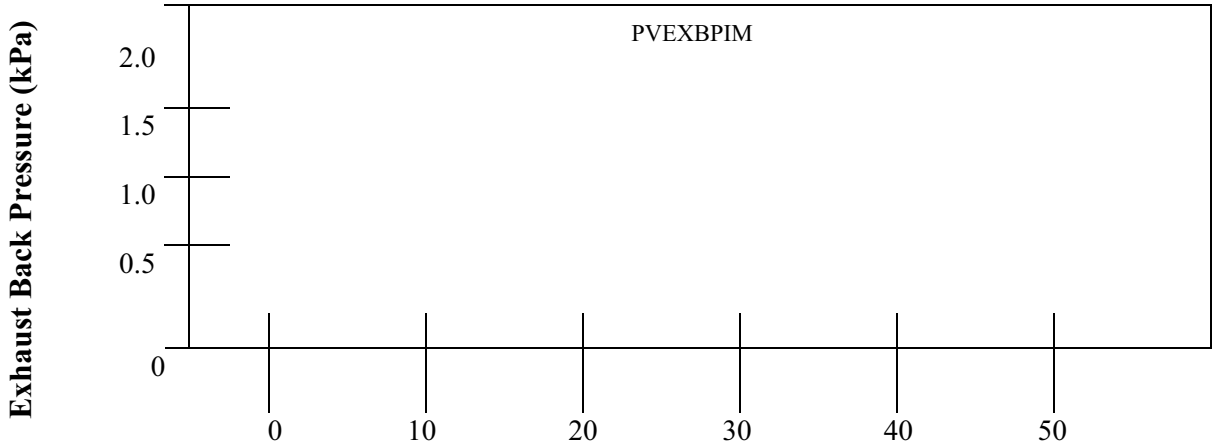
Laboratory LAB		Date Completed RDTCOMP	DTCOMP
Test Number TESTNUM			
Oil Code	OILCODE		CMIR
Formulation/Stand Code FORM			

Exhaust Back Pressure

Process Mean
Xav = PMEXHBP



Process Variability (s)
Sav = PVEXHBP

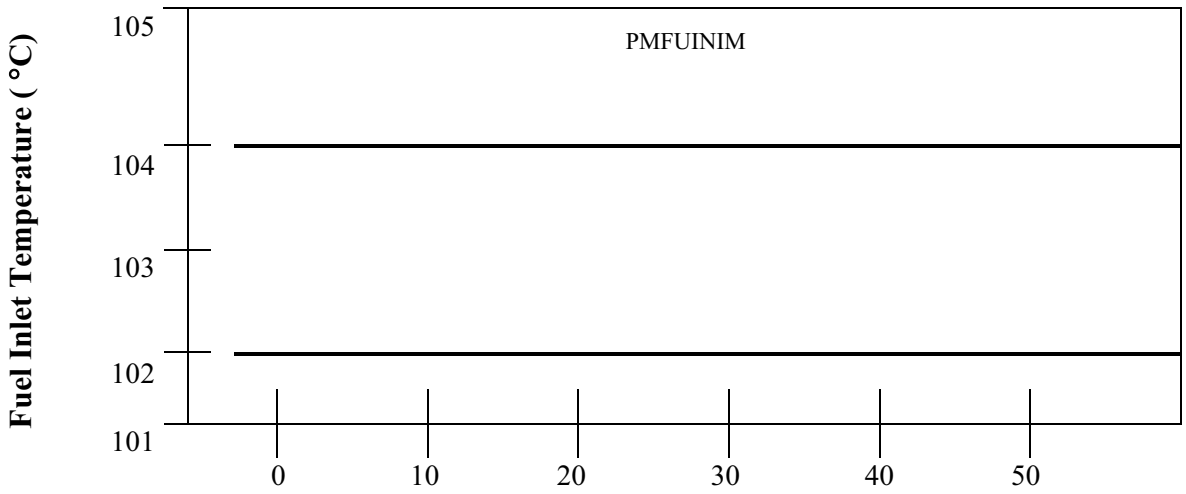


D 5966
Roller Follower Wear Test
Form 14
Operational Data Summary – Fuel Inlet Temperature

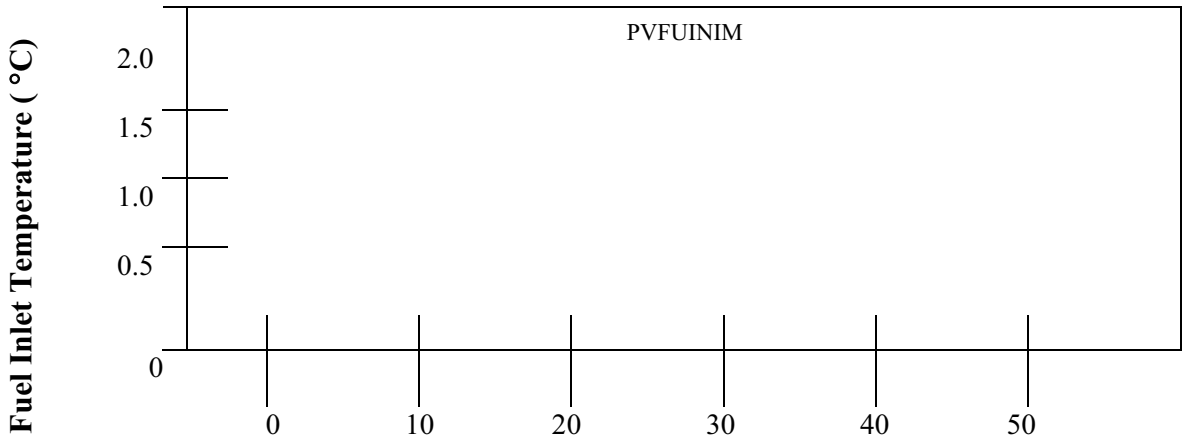
Laboratory LAB	Date Completed	RDTCOMP	DTCOMP
Test Number TESTNUM			
Oil Code	OILCODE		CMIR
Formulation/Stand Code FORM			

Fuel Inlet Temperature

Process Mean
Xav = PMFUELIN



Process Variability (s)
Sav = PVFUELIN



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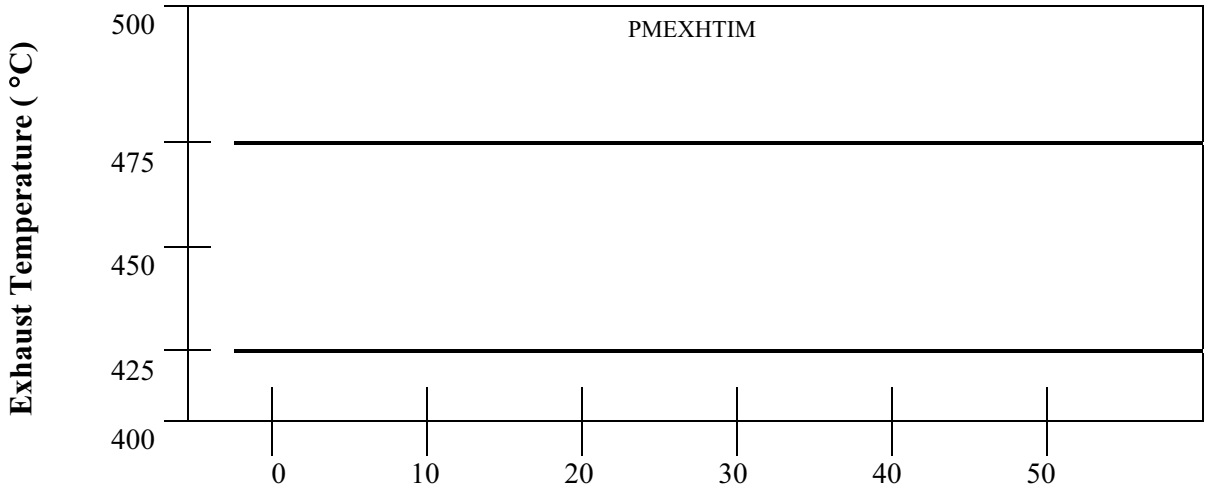
Roller Follower Wear Test
Form 15
Operational Data Summary – Exhaust Temperature

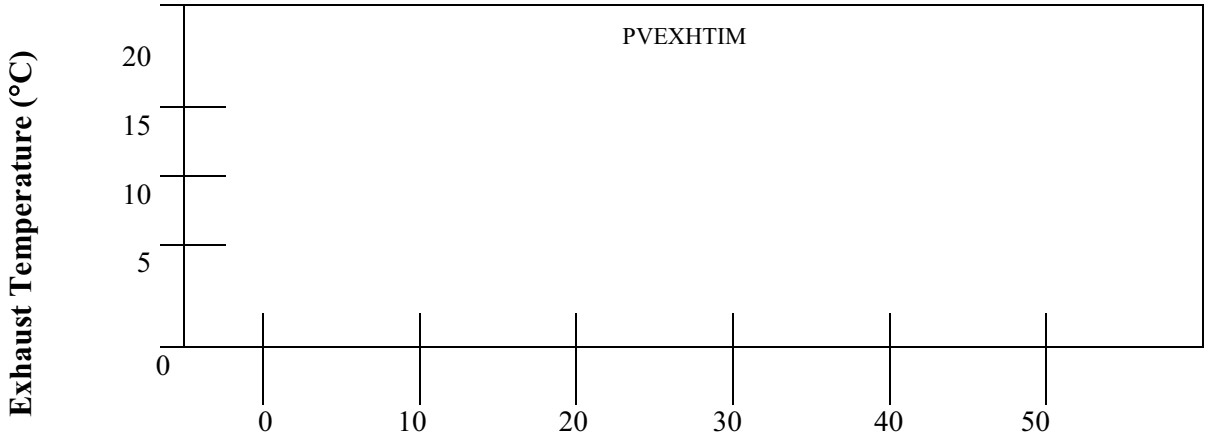
Laboratory LAB	Date Completed	RDTCOMP	DTCOMP
Test Number TESTNUM			
Oil Code	OILCODE		CMIR
Formulation/Stand Code FORM			

Exhaust Temperature

Process Mean
Xav = PMEXHT



Process Variability (s)
Sav = PVEXHT



D 5966
Roller Follower Wear Test
Form 16
Operational Summary

Laboratory LAB	Date Completed	RDTCOMP	DTCOMP
Test Number TESTNUM			
Oil Code	OILCODE		CMIR
Formulation/Stand Code FORM			

Specification						
Test Parameter	**6.2L Engine**	**6.5L Engine**	**Average**	**Std. Dev.**	**Minimum**	**Maximum**
Engine Speed, r/min	1000 ± 5	1000 ± 5	ARPM	SRPM	IRPM	XRPM
Torque, N-m	Record	Record	ALOAD	SLOAD	ILOAD	XLOAD
Fuel Flow, kg/h	9.0 ± 0.1	9.4 ± 0.1	AFFLO	SFFLO	IFFLO	XFFLO
Total Oil Consumption, kg	Record	Record	TOTOCON			

Temperatures	**Specification**	**Average**	**Std. Dev.**	**Minimum**	**Maximum**
Coolant Out, °C	120 ± 2	ACOLOUT	SCOLOUT	ICOLOUT	XCOLOUT
Coolant In, °C	Report Only	ACOLIN	SCOLIN	ICOLIN	XCOLIN
Main Oil Gallery, °C	120 ± 2	AOILTEM	SOILTEM	IOILTEM	XOILTEM
Fuel In, °C	35 ± 2	AFUELIN	SFUELIN	IFUELIN	XFUELIN
Intake Air, °C	32 ± 2	AINAIRT	SINAIRT	IINAIRT	XINAIRT
Oil Sump, °C	Report	ASUMPT	SSUMPT	ISUMPT	XSUMPT
Exhaust, °C	Report	AEXHT	SEXHT	IEXHT	XEXHT

Pressures	**Specification**	**Average**	**Std. Dev.**	**Minimum**	**Maximum**
Crankcase, kPa	Report	ACCASEP	SCCASEP	ICCASEP	XCCASEP
Back Pressure, kPa	103 ± 1	AEXP	SEXP	IEXP	XEXP
Intake Air, kPa	97 ± 1	AINPRES	SINPRES	IINPRES	XINPRES

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Roller Follower Wear Test
Form 17
Oil Analysis

Laboratory	LAB	Date Completed	RDTCOMP	DTCOMP
Test Number	TESTNUM			
Oil Code	OILCODE			CMIR
Formulation/Stand Code	FORM			

Hours	Viscosity, cSt @ 100°C	% Soot
TST_NEW	VIS1NEW	TGA_NEW
TST_H025	VIS1H025	TGA_H025
TST_H050	VIS1H050	TGA_H050

Hours	Elements						
	Al	Cr	Cu	Fe	Pb	Si	Sn
TST_NEW	AL__NEW	CR__NEW	CU__NEW	FE__NEW	PB__NEW	SI__NEW	SN__NEW
TST_H050	AL__H050	CR__H050	CU__H050	FE__H050	PB__H050	SI__H050	SN__H050

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Roller Follower Wear Test
Form 18
Unscheduled Downtime & Maintenance Summary

Laboratory	LAB	Date Completed	RDTCOMP	DTCOMP
Test Number	TESTNUM			
Oil Code	OILCODE			CMIR
Formulation/Stand Code	FORM			

Number of Downtime Occurrences		DWNOCR	
Test Hours	**Date**	**Downtime**	**Reasons**
DOWNR001	DDATR001	DTIMR001	DREAR001
DOWNR002	DDATR002	DTIMR002	DREAR002
DOWNR003	DDATR003	DTIMR003	DREAR003
DOWNR004	DDATR004	DTIMR004	DREAR004
DOWNR005	DDATR005	DTIMR005	DREAR005
DOWNR006	DDATR006	DTIMR006	DREAR006
DOWNR007	DDATR007	DTIMR007	DREAR007
DOWNR008	DDATR008	DTIMR008	DREAR008
DOWNR009	DDATR009	DTIMR009	DREAR009
DOWNR010	DDATR010	DTIMR010	DREAR010
DOWNR011	DDATR011	DTIMR011	DREAR011
DOWNR012	DDATR012	DTIMR012	DREAR012
DOWNR013	DDATR013	DTIMR013	DREAR013
DOWNR014	DDATR014	DTIMR014	DREAR014
DOWNR015	DDATR015	DTIMR015	DREAR015
		TOTLDOWN	**Total Downtime**

Other Comments	
Number of Comment Lines	TOTCOM
OCOMR001	
OCOMR002	
OCOMR003	
OCOMR004	
OCOMR005	
OCOMR006	
OCOMR007	
OCOMR008	
OCOMR009	
OCOMR010	
OCOMR011	
OCOMR012	
OCOMR013	
OCOMR014	
OCOMR015	

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Roller Follower Wear Test
Form 19
Unscheduled Downtime & Maintenance Summary

Laboratory	LAB	Date Completed	RDTCOMP	DTCOMP
Test Number	TESTNUM			
Oil Code		OILCODE		CMIR
Formulation/Stand Code	FORM			

Number of Downtime Occurrences		DWNOCR	
Test Hours	**Date**	**Downtime**	**Reasons**
DOWNR016	DDATR016	DTIMR016	DREAR016
DOWNR017	DDATR017	DTIMR017	DREAR017
DOWNR018	DDATR018	DTIMR018	DREAR018
DOWNR019	DDATR019	DTIMR019	DREAR019
DOWNR020	DDATR020	DTIMR020	DREAR020
DOWNR021	DDATR021	DTIMR021	DREAR021
DOWNR022	DDATR022	DTIMR022	DREAR022
DOWNR023	DDATR023	DTIMR023	DREAR023
DOWNR024	DDATR024	DTIMR024	DREAR024
DOWNR025	DDATR025	DTIMR025	DREAR025
DOWNR026	DDATR026	DTIMR026	DREAR026
DOWNR027	DDATR027	DTIMR027	DREAR027
DOWNR028	DDATR028	DTIMR028	DREAR028
DOWNR029	DDATR029	DTIMR029	DREAR029
DOWNR030	DDATR030	DTIMR030	DREAR030
		TOTLDOWN	**Total Downtime**

Other Comments	
Number of Comment Lines	TOTCOM
OCOMR016	
OCOMR017	
OCOMR018	
OCOMR019	
OCOMR020	
OCOMR021	
OCOMR022	
OCOMR023	
OCOMR024	
OCOMR025	
OCOMR026	
OCOMR027	
OCOMR028	
OCOMR029	
OCOMR030	

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Roller Follower Wear Test
Form 20
Unscheduled Downtime & Maintenance Summary

Laboratory	LAB	Date Completed	RDTCOMP	DTCOMP
Test Number	TESTNUM			
Oil Code		OILCODE		CMIR
Formulation/Stand Code	FORM			

Number of Downtime Occurrences		DWNOCR	
Test Hours	**Date**	**Downtime**	**Reasons**
DOWNR031	DDATR031	DTIMR031	DREAR031
DOWNR032	DDATR032	DTIMR032	DREAR032
DOWNR033	DDATR033	DTIMR033	DREAR033
DOWNR034	DDATR034	DTIMR034	DREAR034
DOWNR035	DDATR035	DTIMR035	DREAR035
DOWNR036	DDATR036	DTIMR036	DREAR036
DOWNR037	DDATR037	DTIMR037	DREAR037
DOWNR038	DDATR038	DTIMR038	DREAR038
DOWNR039	DDATR039	DTIMR039	DREAR039
DOWNR040	DDATR040	DTIMR040	DREAR040
DOWNR041	DDATR041	DTIMR041	DREAR041
DOWNR042	DDATR042	DTIMR042	DREAR042
DOWNR043	DDATR043	DTIMR043	DREAR043
DOWNR044	DDATR044	DTIMR044	DREAR044
DOWNR045	DDATR045	DTIMR045	DREAR045
		TOTLDOWN	**Total Downtime**

Other Comments	
Number of Comment Lines	TOTCOM
OCOMR031	
OCOMR032	
OCOMR033	
OCOMR034	
OCOMR035	
OCOMR036	
OCOMR037	
OCOMR038	
OCOMR039	
OCOMR040	
OCOMR041	
OCOMR042	
OCOMR043	
OCOMR044	
OCOMR045	

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

Laboratory LAB	Date Completed	RDTCOMP	DTCOMP
Test Number TESTNUM			
Oil Code	OILCODE		CMIR
Formulation/Stand Code FORM			

Supplier FUELSUP	Batch Identifiers FUELBTID

Measurement	Specs.	Analysis	Test Method
Total Sulfur, % Weight	0.03 - 0.05	FUELSULF	D 2622
Gravity, °API	32 – 36	APIGRAV	D 287 or D 4052
Hydrocarbon Composition			
Aromatics % Vol.	28 – 35	FUELAROM	D 1319
Olefin	Report	FUELOLEF	D 1319
Saturates	Report	FUELSATU	D 1319
Cetane Index	Report	CETANEIN	D 4737
Cetane No.	42 - 48	CETANENO	D 613
Copper Strip Corrosion	3 Maximum	FUELCU	D 130
Flash Point, °C	54 Minimum	FLASHPT	D 93
Cloud Point, °C	-12 Maximum	FUELCLOU	D 2500
Pour Point, °C	-18 Maximum	FUELPOUR	D 97
Carbon Residue on 10% Residium, %	0.35 Maximum	FUELCRES	D 524 (10 % Bottoms)
Water & Sediment, % Vol	0.05 Maximum	FUELH2O	D 2709
Ash, % Wgt.	0.01 Maximum	FUELASH	D 482
Viscosity, cSt @ 40°C	2.0 - 3.2	KINVIS	D 445
Distillation, °C			
IBP	177 - 199	FUELIBP	D 86
10%	210 - 232	FUEL10	D 86
50%	249 - 277	FUEL50	D 86
90%	299 - 327	FUEL90	D 86
EP	327 - 360	FUELEP	D 86

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

Laboratory LAB		Date Completed RDTCOMP	DTCOMP
Test Number TESTNUM			
Oil Code	OILCODE		CMIR
Formulation/Stand Code FORM			

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.	OGTSENS	OGTCALF	OGTRECD	OGTOBSF	OGTRECF	OGTLOGF	
Fuel In.	FTEMSENS	FTEMCALF	TEMRECI	FTEMOBSF	FTEMRECF	FTEMLOGF	
Intake Air	AITSENS	AITCALF	AITRECD	AITOBSF	AITRECF	AITLOGF	
Oil Sump	OSTSENS	OSTCALF	OSTRECD	OSTOBSF	OSTRECF	OSTLOGF	
Exhaust	EXMWSENS	EXMWCALF	XMWREC	EXMWOBSF	EXMWRECF	EXMWLOGF	
Cool. Out	COTSENS	COTCALF	COTRECD	COTOBSF	COTRECF	COTLOGF	
Other							
Fuel Flow	FFLOSENS	FFLOCALF	FLORECI	FFLOOBSF	FFLORECF	FFLOLOGF	FFLOSYSR
Engine Rpm	RPMSENS	RPMCALF	RPMRECD	RPMOBSF	RPMRECF	RPMLOGF	RPMSYSR
Load	LOADSENS	LOADCALF	OADRECI	LOADOBSF	LOADRECF	LOADLOGF	LOADSYSR
Intake Pres.	INTVSENS	INTVCALF	NTVRECI	INTVOBSF	INTVRECF	INTVLOGF	INTVSYSR
Exh. Press.	EXPRSENS	EXPRCALF	XPRRECI	EXPROBSF	EXPRRECF	EXPRLOGF	EXPRSYSR
Oil Gal Pres	OILGSENS	OILGCALF	ILGRECI	OILGOBSF	OILGRECF	OILGLOGF	OILGSYSR

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		SUBLAB			
Test Sponsor		TSTSPON1			
Formulation / Stand Code		FORM			
Test Number		TESTNUM			
Start Date	DTSTRT	Start Time	STRTTIME	Time Zone	TZONE

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 YESRQME No NORQME*

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 YESFULL No NOFULL*

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 YESNODE* No NONODE

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

Check The Appropriate Conclusion

INCLUDE	Operational review of this test indicates that the results should be included in the Multiple Test Acceptance Criteria calculations.
NOTINC	*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
ACCCOMM1
ACCCOMM2
ACCCOMM3
ACCCOMM4

SUBSIGIM _____ SUBDATE _____
Signature Date

SUBNAME _____ SUBTITLE _____
Typed Name Title