

**Caterpillar C-13  
Engine Oil Test**

**Version** C13 VERSION 20050114 BETA

**Title / Validity Declaration Page  
Form 1**

**Conducted For**

TSTSPON1

TSTSPON2

LABVALID	V =	Valid; The Reference Oil / Non-Reference Oil was evaluated in accordance with the test procedure.
	I =	Invalid; The Reference / Non-Reference Oil was not evaluated in accordance with the test procedure.
	N =	Results cannot be interpreted as representative of oil performance (Non-Reference Oil) and shall not be used in determining average test results using Multiple Test Criteria.

TSTOIL	NR = Non-Reference Oil Test
	RO = Reference Oil Test

Test Number		
<b>Stand:</b> STAND	<b>Stand Run No.:</b> STRUN	
<b>End of Test Date:</b> DTCOMP	<b>End of Test Time:</b> EOTTIME	
<b>Oil Code / CMIR:</b> <sup>A</sup> OILCODE		
<b>Formulation / Stand Code:</b> <sup>B</sup> FORM		
<b>Altcode 1:</b> ALTCODE1	<b>Altcode 2:</b> ALTCODE2	<b>Altcode 3:</b> ALTCODE3

In my opinion the test OPVALID been conducted in a valid manner in accordance with Test Method D XXXX and the appropriate amendments through the information letter system. The remarks included in this report describe the anomalies associated with this test.

<sup>A</sup> CMIR or Non-Reference Oil Code <sup>B</sup> ACC-Registered Tests Only

Submitted By: SUBLAB  
Testing Laboratory

SUBSIGIM  
Signature

SUBTITLE  
Typed Name

SUBTITLE  
Title

**Caterpillar C-13  
Engine Oil Test**

**Form 2  
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**Caterpillar C-13  
Engine Oil Test**

**Form 3  
Summary of Test Method**

The CAT C-13 Engine Oil Test is an engine-dynamometer test which evaluates the ability of an engine oil to protect against ring sticking and loss of oil consumption.

The test engine is a CAT C-13 diesel engine with ACERT technology. It is an in-line six cylinder, four stroke, turbocharged engine with electronically controlled fuel injection.

<b>C-13 Test Conditions</b>	
<b>Parameter</b>	<b>Value</b>
Time, h	500
Speed, r/min	1800
Fuel Flow, g/min	1200
Inlet Manifold Temperature, °C	40
Coolant Out Temperature, °C	88
Fuel In Temperature, °C	40
Oil Gallery Temperature, °C	Record
Intake Air Temperature, ° C	25
Tailpipe Exhaust Temperature, °C	Record
Intake Air Restriction, kPa Absolute	95
Intake Manifold Pressure, kPa	280
Exhaust Back Pressure, kPa	6
Crankcase Pressure, kPa	Record
Coolant System Pressure, kPa	99 - 107
Power, kW	Record
Torque, Nm	Record
Oil Gallery Pressure, kPa	Record

**Caterpillar C-13  
Engine Oil Test**

**Test Results Summary  
Form 4**

<b>Laboratory:</b> LAB	<b>EOT Date:</b> DTCOMP	<b>EOT Time:</b> EOTTIME
<b>Test Number:</b> TESTNUM		
<b>Oil Code:</b> OILCODE		
<b>Formulation / Stand Code:</b> FORM		

<b>Start Date:</b> DTSTRT	<b>Start Time:</b> STRTTIME	<b>Test Length:</b> TESTLEN
<b>Laboratory Oil Code:</b> LABOCODE		<b>TMC Oil Code<sup>A</sup>:</b> IND
<b>Engine Number:</b> ENGINE	<b>Engine Hours:</b> ENHOURS	<b>Engine Serial No.:</b> ENSERIAL

Oil Consumption, g/hr		
100 – 150	450 – 500	% Inc.
AOCON1	AOCON2	OCONPINC

Piston No.	WD	TGC	TLC	TGF	IGF	IGC	AGF	Loss of Ring Side Clearance		
								Top	Int.	Oil
1	WD1	TGC1	TLC1	TGF1	IGF1	IGC1	AGF1	ALSCT1	LSCIA1	LSCOA1
2	WD2	TGC2	TLC2	TGF2	IGF2	IGC2	AGF2	ALSCT2	LSCIA2	LSCOA2
3	WD3	TGC3	TLC3	TGF3	IGF3	IGC3	AGF3	ALSCT3	LSCIA3	LSCOA3
4	WD4	TGC4	TLC4	TGF4	IGF4	IGC4	AGF4	ALSCT4	LSCIA4	LSCOA4
5	WD5	TGC5	TLC5	TGF5	IGF5	IGC5	AGF5	ALSCT5	LSCIA5	LSCOA5
6	WD6	TGC6	TLC6	TGF6	IGF6	IGC6	AGF6	ALSCT6	LSCIA6	LSCOA6
<b>Average</b>	AWD	ATGC	ATLC	TGFAVG	AIGF	AIGC	AAGF	ALSCT	ALSCI	ALSCO

Piston No.		Top	Int.	Oil	Crown	Skirt	Liner
1	Stuck Ring	STUCKTP1	STUCKIN1	STUCKOL1			
	Scuffed	SCUFFTP1	SCUFFIN1	SCUFFOL1	SCUFFCR1	SCUFFPS1	SCUFFLN1
2	Stuck Ring	STUCKTP2	STUCKIN2	STUCKOL2			
	Scuffed	SCUFFTP2	SCUFFIN2	SCUFFOL2	SCUFFCR2	SCUFFPS2	SCUFFLN2
3	Stuck Ring	STUCKTP3	STUCKIN3	STUCKOL3			
	Scuffed	SCUFFTP3	SCUFFIN3	SCUFFOL3	SCUFFCR3	SCUFFPS3	SCUFFLN3
4	Stuck Ring	STUCKTP4	STUCKIN4	STUCKOL4			
	Scuffed	SCUFFTP4	SCUFFIN4	SCUFFOL4	SCUFFCR4	SCUFFPS4	SCUFFLN4
5	Stuck Ring	STUCKTP5	STUCKIN5	STUCKOL5			
	Scuffed	SCUFFTP5	SCUFFIN5	SCUFFOL5	SCUFFCR5	SCUFFPS5	SCUFFLN5
6	Stuck Ring	STUCKTP6	STUCKIN6	STUCKOL6			
	Scuffed	SCUFFTP6	SCUFFIN6	SCUFFOL6	SCUFFCR6	SCUFFPS6	SCUFFLN6

<sup>A</sup> Reference Oil Tests Only

**Caterpillar C-13  
Engine Oil Test  
Operational Summary  
Form 5**

<b>Laboratory:</b> LAB	<b>EOT Date:</b> DTCOMP	<b>EOT Time:</b> EOTTIME
<b>Test Number:</b> TESTNUM		
<b>Oil Code:</b> OILCODE		
<b>Formulation / Stand Code:</b> FORM		

<b>Controlled Parameters</b>					
<b>Parameter</b>	<b>Units</b>	<b>Target</b>	<b>Tolerance</b>	<b>Average</b>	<b>Samples</b>
Engine Speed	r/min	1800	± 5	ARPM	NRPM
Fuel Flow	g/min	1200	± 6	AFFLO	NFFLO
<b>Temperature</b>					
Inlet Air	°C	25	± 2	AINAIRT	NINAIRT
Intake Manifold Air	°C	40	± 2	AINMANT	NINMANT
Fuel Inlet	°C	40	± 1	AFUEL	NFUEL
Coolant Outlet	°C	88	± 2	ACOLOUT	NCOLOUT
<b>Pressure</b>					
Inlet Air	kPa	95	± 3	AINAIRP	NINAIRP
Exhaust Stack	kPa	6	± 1	AEXHSTP	NEXHSTP
CCV Outlet	kPa	6.8	± 1	ACCVOUTP	NCCVOUTP
Intake Manifold	kPa	280	± 5	AINMANP	NINMANP
<b>Non-Controlled Parameters</b>					
<b>Parameter</b>	<b>Units</b>	<b>Target</b>	<b>Tolerance</b>	<b>Average</b>	<b>Samples</b>
Engine Torque	Nm	1800	Record	ALOAD	NLOAD
<b>Temperature</b>					
Oil Gallery	°C	TBD	Record	AOILGT	NOILGT

**Caterpillar C-13  
Engine Oil Test  
Rod Bearing Weight Loss  
Form 6**

<b>Laboratory:</b> LAB	<b>EOT Date:</b> DTCOMP	<b>EOT Time:</b> EOTTIME
<b>Test Number:</b> TESTNUM		
<b>Oil Code:</b> OILCODE		
<b>Formulation / Stand Code:</b> FORM		

Cylinder No.	Location	SOT Weight, g	EOT Weight, g	Weight Change, mg
1	Upper	BWSOTU1	BWEOTU1	BWLU1
2	Upper	BWSOTU2	BWEOTU2	BWLU2
3	Upper	BWSOTU3	BWEOTU3	BWLU3
4	Upper	BWSOTU4	BWEOTU4	BWLU4
5	Upper	BWSOTU5	BWEOTU5	BWLU5
6	Upper	BWSOTU6	BWEOTU6	BWLU6
Upper Bearing Average Weight Loss, mg				ABWLU
Upper Bearing Minimum Weight Loss, mg				IBWLU
Upper Bearing Maximum Weight Loss, mg				XBWLU

Cylinder No.	Location	SOT Weight, g	EOT Weight, g	Weight Change, mg
1	Lower	BWSOTL1	BWEOTL1	BWLL1
2	Lower	BWSOTL2	BWEOTL2	BWLL2
3	Lower	BWSOTL3	BWEOTL3	BWLL3
4	Lower	BWSOTL4	BWEOTL4	BWLL4
5	Lower	BWSOTL5	BWEOTL5	BWLL5
6	Lower	BWSOTL6	BWEOTL6	BWLL6
Lower Bearing Average Weight Loss, mg				ABWLL
Lower Bearing Minimum Weight Loss, mg				IBWLL
Lower Bearing Maximum Weight Loss, mg				XBWLL

**Caterpillar C-13  
Engine Oil Test  
Ring Weight Loss  
Form 7**

<b>Laboratory:</b> LAB	<b>EOT Date:</b> DTCOMP	<b>EOT Time:</b> EOTTIME
<b>Test Number:</b> TESTNUM		
<b>Oil Code:</b> OILCODE		
<b>Formulation / Stand Code:</b> FORM		

Cylinder No.	Top Ring SOT Weight, g	Top Ring EOT Weight, g	Weight Loss, mg
1	TRWSOT1	TRWEOT1	TRWL1
2	TRWSOT2	TRWEOT2	TRWL2
3	TRWSOT3	TRWEOT3	TRWL3
4	TRWSOT4	TRWEOT4	TRWL4
5	TRWSOT5	TRWEOT5	TRWL5
6	TRWSOT6	TRWEOT6	TRWL6
	Top Ring Average Weight Loss, mg		ATRWL
	Top Ring Weight Loss Std. Dev., mg		STRWL
	Top Ring Min. Weight Loss, mg		ITRWL
	Top Ring Max. Weight Loss, mg		XTRWL

Cylinder No.	2 <sup>nd</sup> Ring SOT Weight, g	2 <sup>nd</sup> Ring EOT Weight, g	Weight Loss, mg
1	R2WSOT1	R2WEOT1	R2WL1
2	R2WSOT2	R2WEOT2	R2WL2
3	R2WSOT3	R2WEOT3	R2WL3
4	R2WSOT4	R2WEOT4	R2WL4
5	R2WSOT5	R2WEOT5	R2WL5
6	R2WSOT6	R2WEOT6	R2WL6
	2 <sup>nd</sup> Ring Average Weight Loss, mg		AR2WL
	2 <sup>nd</sup> Ring Weight Loss Std. Dev., mg		SR2WL
	2 <sup>nd</sup> Ring Min. Weight Loss, mg		IR2WL
	2 <sup>nd</sup> Ring Max. Weight Loss, mg		XR2WL

Cylinder No.	Oil Ring SOT Weight, g	Oil Ring EOT Weight, g	Weight Loss, mg
1	ORWSOT1	ORWEOT1	ORWL1
2	ORWSOT2	ORWEOT2	ORWL2
3	ORWSOT3	ORWEOT3	ORWL3
4	ORWSOT4	ORWEOT4	ORWL4
5	ORWSOT5	ORWEOT5	ORWL5
6	ORWSOT6	ORWEOT6	ORWL6
	Oil Ring Average Weight Loss, mg		AORWL
	Oil Ring Weight Loss Std. Dev., mg		SORWL
	Oil Ring Min. Weight Loss, mg		IORWL
	Oil Ring Max. Weight Loss, mg		XORWL

**Caterpillar C-13  
Engine Oil Test  
Ring Side Clearance  
Form 8**

<b>Laboratory:</b> LAB	<b>EOT Date:</b> DTCOMP	<b>EOT Time:</b> EOTTIME
<b>Test Number:</b> TESTNUM		
<b>Oil Code:</b> OILCODE		
<b>Formulation / Stand Code:</b> FORM		

	<b>Piston No. 1</b>						
	A	B	C	D	Avg.	Max	
<b>Top</b>	Pre-Test	SIDETSA1	SIDETSB1	SIDETSC1	SIDETSD1	ASIDETS1	
	Post-Test	SIDETEA1	SIDETEB1	SIDETEC1	SIDETED1	ASIDETE1	
	LSC	LSCTA1	LSCTB1	LSCTC1	LSCTD1	ALSCT1	
<b>Int.</b>	Pre-Test	SIDEISA1					
	Post-Test	SIDEIEA1					
	LSC	LSCIA1					
<b>Oil</b>	Pre-Test	SIDEOSA1					
	Post-Test	SIDEIEA1					
	LSC	LSCOA1					

	<b>Piston No. 2</b>						
	A	B	C	D	Avg.	Max	
<b>Top</b>	Pre-Test	SIDETSA2	SIDETSB2	SIDETSC2	SIDETSD2	ASIDETS2	
	Post-Test	SIDETEA2	SIDETEB2	SIDETEC2	SIDETED2	ASIDETE2	
	LSC	LSCTA2	LSCTB2	LSCTC2	LSCTD2	ALSCT2	
<b>Int.</b>	Pre-Test	SIDEISA2					
	Post-Test	SIDEIEA2					
	LSC	LSCIA2					
<b>Oil</b>	Pre-Test	SIDEOSA2					
	Post-Test	SIDEIEA2					
	LSC	LSCOA2					

	<b>Piston No. 3</b>						
	A	B	C	D	Avg.	Max	
<b>Top</b>	Pre-Test	SIDETSA3	SIDETSB3	SIDETSC3	SIDETSD3	ASIDETS3	
	Post-Test	SIDETEA3	SIDETEB3	SIDETEC3	SIDETED3	ASIDETE3	
	LSC	LSCTA3	LSCTB3	LSCTC3	LSCTD3	ALSCT3	
<b>Int.</b>	Pre-Test	SIDEISA3					
	Post-Test	SIDEIEA3					
	LSC	LSCIA3					
<b>Oil</b>	Pre-Test	SIDEOSA3					
	Post-Test	SIDEIEA3					
	LSC	LSCOA3					

	<b>Piston No. 4</b>						
	A	B	C	D	Avg.	Max	
<b>Top</b>	Pre-Test	SIDETSA4	SIDETSB4	SIDETSC4	SIDETSD4	ASIDETS4	
	Post-Test	SIDETEA4	SIDETEB4	SIDETEC4	SIDETED4	ASIDETE4	
	LSC	LSCTA4	LSCTB4	LSCTC4	LSCTD4	ALSCT4	
<b>Int.</b>	Pre-Test	SIDEISA4					
	Post-Test	SIDEIEA4					
	LSC	LSCIA4					
<b>Oil</b>	Pre-Test	SIDEOSA4					
	Post-Test	SIDEIEA4					
	LSC	LSCOA4					

	<b>Piston No. 5</b>						
	A	B	C	D	Avg.	Max	
<b>Top</b>	Pre-Test	SIDETSA5	SIDETSB5	SIDETSC5	SIDETSD5	ASIDETS5	
	Post-Test	SIDETEA5	SIDETEB5	SIDETEC5	SIDETED5	ASIDETE5	
	LSC	LSCTA5	LSCTB5	LSCTC5	LSCTD5	ALSCT5	
<b>Int.</b>	Pre-Test	SIDEISA5					
	Post-Test	SIDEIEA5					
	LSC	LSCIA5					
<b>Oil</b>	Pre-Test	SIDEOSA5					
	Post-Test	SIDEIEA5					
	LSC	LSCOA5					

	<b>Piston No. 6</b>						
	A	B	C	D	Avg.	Max	
<b>Top</b>	Pre-Test	SIDETSA6	SIDETSB6	SIDETSC6	SIDETSD6	ASIDETS6	
	Post-Test	SIDETEA6	SIDETEB6	SIDETEC6	SIDETED6	ASIDETE6	
	LSC	LSCTA6	LSCTB6	LSCTC6	LSCTD6	ALSCT6	
<b>Int.</b>	Pre-Test	SIDEISA6					
	Post-Test	SIDEIEA6					
	LSC	LSCIA6					
<b>Oil</b>	Pre-Test	SIDEOSA6					
	Post-Test	SIDEIEA6					
	LSC	LSCOA6					



**Caterpillar C-13**  
**Engine Oil Test Oil Analysis Summary - Form 9**

<b>Laboratory:</b> LAB	<b>EOT Date:</b> DTCOMP	<b>EOT Time:</b> EOTTIME
<b>Test Number:</b> TESTNUM		
<b>Oil Code:</b> OILCODE		
<b>Formulation / Stand Code:</b> FORM		

Hours	Soot Wt.% TGA	Viscosity @ 100°C cSt,D445	Viscosity @ 40°C cSt,D445	TBN D 4739	Base Number AV D 2896	TAN D 664	Integrated IR Oxidation	Fuel Dilution Wt. %, D 3524
TST_NEW	TGA_NEW	V100NEW	V40_NEW	TBN_NEW	AVT_NEW	TAN_NEW		
TST_H004	TGA_H004	V100H004	V40_H004	TBN_H004	AVT_H004	TAN_H004	IRINH004	FUELH004
TST_H050	TGA_H050	V100H050	V40_H050	TBN_H050	AVT_H050	TAN_H050	IRINH050	FUELH050
TST_H100	TGA_H100	V100H100	V40_H100	TBN_H100	AVT_H100	TAN_H100	IRINH100	FUELH100
TST_H150	TGA_H150	V100H150	V40_H150	TBN_H150	AVT_H150	TAN_H150	IRINH150	FUELH150
TST_H200	TGA_H200	V100H200	V40_H200	TBN_H200	AVT_H200	TAN_H200	IRINH200	FUELH200
TST_H250	TGA_H250	V100H250	V40_H250	TBN_H250	AVT_H250	TAN_H250	IRINH250	FUELH250
TST_H300	TGA_H300	V100H300	V40_H300	TBN_H300	AVT_H300	TAN_H300	IRINH300	FUELH300
TST_H350	TGA_H350	V100H350	V40_H350	TBN_H350	AVT_H350	TAN_H350	IRINH350	FUELH350
TST_H400	TGA_H400	V100H400	V40_H400	TBN_H400	AVT_H400	TAN_H400	IRINH400	FUELH400
TST_H450	TGA_H450	V100H450	V40_H450	TBN_H450	AVT_H450	TAN_H450	IRINH450	FUELH450
TST_H500	TGA_H500	V100H500	V40_H500	TBN_H500	AVT_H500	TAN_H500	IRINH500	FUELH500

Hours	Metal Elements (ppm)							
	Fe	Pb	Cu	Cr	Al	Si	Sn	Na
TST_NEW	FEWMNEW	PBWMNEW	CRWMNEW	CRWMNEW	ALWMNEW	SIWMNEW	SNWMNEW	NAWMNEW
TST_H004	FEWMH004	PBWMH004	CRWMH004	CRWMH004	ALWMH004	SIWMH004	SNWMH004	NAWMH004
TST_H050	FEWMH050	PBWMH050	CRWMH050	CRWMH050	ALWMH050	SIWMH050	SNWMH050	NAWMH050
TST_H100	FEWMH100	PBWMH100	CRWMH100	CRWMH100	ALWMH100	SIWMH100	SNWMH100	NAWMH100
TST_H150	FEWMH150	PBWMH150	CRWMH150	CRWMH150	ALWMH150	SIWMH150	SNWMH150	NAWMH150
TST_H200	FEWMH200	PBWMH200	CRWMH200	CRWMH200	ALWMH200	SIWMH200	SNWMH200	NAWMH200
TST_H250	FEWMH250	PBWMH250	CRWMH250	CRWMH250	ALWMH250	SIWMH250	SNWMH250	NAWMH250
TST_H300	FEWMH300	PBWMH300	CRWMH300	CRWMH300	ALWMH300	SIWMH300	SNWMH300	NAWMH300
TST_H350	FEWMH350	PBWMH350	CRWMH350	CRWMH350	ALWMH350	SIWMH350	SNWMH350	NAWMH350
TST_H400	FEWMH400	PBWMH400	CRWMH400	CRWMH400	ALWMH400	SIWMH400	SNWMH400	NAWMH400
TST_H450	FEWMH450	PBWMH450	CRWMH450	CRWMH450	ALWMH450	SIWMH450	SNWMH450	NAWMH450
TST_H500	FEWMH500	PBWMH500	CRWMH500	CRWMH500	ALWMH500	SIWMH500	SNWMH500	NAWMH500

**Caterpillar C-13  
Engine Oil Test  
Liner Wear Summary  
Form 10**

<b>Laboratory:</b> LAB	<b>EOT Date:</b> DTCOMP	<b>EOT Time:</b> EOTTIME
<b>Test Number:</b> TESTNUM		
<b>Oil Code:</b> OILCODE		
<b>Formulation / Stand Code:</b> FORM		

<b>Position</b>	<b>Wear Step (µm)</b>						
	<b>Cylinder Number</b>						
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>Average</b>
3:00 (Thrust)	C1LW3	C2LW3	C3LW3	C4LW3	C5LW3	C6LW3	ALW3
6:00 (Rear)	C1LW6	C2LW6	C3LW6	C4LW6	C5LW6	C6LW6	ALW6
9:00 (Anti-Thrust)	C1LW9	C2LW9	C3LW9	C4LW9	C5LW9	C6LW9	ALW9
12:00 (Front)	C1LW12	C2LW12	C3LW12	C4LW12	C5LW12	C6LW12	ALW12
<b>Average</b>	C1ALW	C2ALW	C3ALW	C4ALW	C5ALW	C6ALW	ALW

<b>Summary</b>	<b>As Measured</b>
Average, µm	AMACLW
Minimum, µm	AMICLW
Maximum, µm	AMXCLW

**Caterpillar C-13  
Engine Oil Test  
Unscheduled Downtime & Maintenance Summary  
Form 11**

<b>Laboratory:</b> LAB	<b>EOT Date:</b> DTCOMP	<b>EOT Time:</b> EOTTIME
<b>Test Number:</b> TESTNUM		
<b>Oil Code:</b> OILCODE		
<b>Formulation / Stand Code:</b> 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	<b>Total Downtime</b>	

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

**Caterpillar C-13  
Engine Oil Test  
Unscheduled Downtime & Maintenance Summary  
Form 11A**

<b>Laboratory:</b> LAB	<b>EOT Date:</b> DTCOMP	<b>EOT Time:</b> EOTTIME
<b>Test Number:</b> TESTNUM		
<b>Oil Code:</b> OILCODE		
<b>Formulation / Stand Code:</b> 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	<b>Total Downtime</b>	

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

**Caterpillar C-13  
Engine Oil Test  
Unscheduled Downtime & Maintenance Summary  
Form 11B**

<b>Laboratory:</b> LAB	<b>EOT Date:</b> DTCOMP	<b>EOT Time:</b> EOTTIME
<b>Test Number:</b> TESTNUM		
<b>Oil Code:</b> OILCODE		
<b>Formulation / Stand Code:</b> 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	<b>Total Downtime</b>	

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

**Caterpillar C-13  
Engine Oil Test  
Test Fuel Analysis (Last Batch)  
Form 12**

<b>Laboratory:</b> LAB	<b>EOT Date:</b> DTCOMP	<b>EOT Time:</b> EOTTIME
<b>Test Number:</b> TESTNUM		
<b>Oil Code:</b> OILCODE		
<b>Formulation / Stand Code:</b> FORM		

Measurement	Specs.	Analysis		Test Method
		New	EOT	
<b>Total Sulfur, ppm</b>	<b>7 - 15</b>	FUELSNEW	FUELSEOT	<b>D 5453</b>
<b>Gravity, °API</b>	<b>34 - 37</b>	APIGRNEW	APIGREOT	<b>D 4052</b>
<b>Hydrocarbon Composition</b>				
<b>Aromatics, % Weight</b>	<b>26 – 31.5</b>	FUELAROM		<b>D 5186</b>
<b>Olefins, % Volume</b>	<b>Report</b>	FUELOLEF		<b>D 1319</b>
<b>Cetane Index</b>	<b>Report</b>	CETANEIN		<b>D 976</b>
<b>Cetane No.</b>	<b>43 – 47</b>	CETANENO		<b>D 613</b>
<b>Copper Strip Corrosion</b>	<b>1 Maximum</b>	FUELKU		<b>D 130</b>
<b>Flash Point, °C</b>	<b>54 Minimum</b>	FLASHPT		<b>D 93</b>
<b>Pour Point, °C</b>	<b>-18 Maximum</b>	FUELPOUR		<b>D 97</b>
<b>Carbon Residue on 10% Residuum, %</b>	<b>0.35 Maximum</b>	FUELGRES		<b>D 524 (10% Bottoms)</b>
<b>Water &amp; Sediment, % Volume</b>	<b>0.05 Maximum</b>	FUELH2O		<b>D 2709</b>
<b>Viscosity, cSt @ 40°C</b>	<b>2.0 – 2.6</b>	KINVIS		<b>D 445</b>
<b>Total Acid Number</b>	<b>0.05 Maximum</b>	FUEL TAN		<b>D 664</b>
<b>Strong Acid Number</b>	<b>0.00 Maximum</b>	FUEL SAN		<b>D 664</b>
<b>Accelerated Stability</b>	<b>1.5 max</b>	FUEL ACS		<b>D 2274</b>
<b>Ash, % Weight</b>	<b>0.005 Maximum</b>	FUELASH		<b>D 482</b>
<b>SLBOCLE, g</b>	<b>3100 min<sup>A</sup></b>	SLBOCLE		<b>D 6078<sup>A</sup></b>
<b>90% Distillation, °C</b>	<b>282 – 338</b>	FUEL90		<b>D 86</b>

<sup>A</sup> May be altered to be consistent with CARB or ASTM diesel fuel specifications.

**Caterpillar C-13  
Engine Oil Test  
Build-Up and Hardware Information  
Form 13**

<b>Laboratory:</b> LAB	<b>EOT Date:</b> DTCOMP	<b>EOT Time:</b> EOTTIME
<b>Test Number:</b> TESTNUM		
<b>Oil Code:</b> OILCODE		
<b>Formulation / Stand Code:</b> FORM		

<b>Hardware</b>	
<b>Part</b>	<b>Part Number</b>
Intake Valve	INTAKEPN
Exhaust Valve	EXHSTPN
Cylinder Head	CYLHDPN
Head Gasket	HDGASPN
Pistons	PISTONPN
Injectors	INJNOZPN
Rod Bearings	RODBRGPN
Liners	LINERPN
Top Ring	TOPRNGPN
2 <sup>nd</sup> Ring	SRINGPN
Oil Ring	OILRNGPN

**Caterpillar C-13  
Engine Oil Test  
Piston Deposit Rating Summary  
Form 14**

<b>Laboratory:</b> LAB	<b>EOT Date:</b> DTCOMP	<b>EOT Time:</b> EOTTIME
<b>Test Number:</b> TESTNUM		
<b>Oil Code:</b> OILCODE		
<b>Formulation / Stand Code:</b> FORM		

<b>Piston Number</b>							
<b>Parameter</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>Average</b>
<b>TLHC, %</b>	TLHC1	TLHC2	TLHC3	TLHC4	TLHC5	TLHC6	ATLHC
<b>TLC, %</b>	TLC1	TLC2	TLC3	TLC4	TLC5	TLC6	ATLC
<b>TGC, %</b>	TGC1	TGC2	TGC3	TGC4	TGC5	TGC6	ATGC
<b>AGF, %</b>	AGF1	AGF2	AGF3	AGF4	AGF5	AGF6	AAGF
<b>WD, Demerits</b>	WD1	WD2	WD3	WD4	WD5	WD6	AWD
<b>IGC, %</b>	IGC1	IGC2	IGC3	IGC4	IGC5	IGC6	AIGC
<b>2LC, %</b>	SLC1	SLC2	SLC3	SLC4	SLC5	SLC6	ASLC



**Caterpillar C-13  
Engine Oil Test  
Rating Summary: Piston No. 1  
Form 15**

<b>Laboratory:</b> LAB	<b>EOT Date:</b> DTCOMP	<b>EOT Time:</b> EOTTIME	
<b>Test Number:</b> TESTNUM		<b>Oil Code:</b> OILCODE	
<b>Formulation / Stand Code:</b> FORM			
<b>Date Rated:</b> DTRATE		<b>Rater Initials:</b> RINIT	
		<b>Verified By:</b> VRINIT	

Deposit Factor		Grooves				Lands				Deposit Factor	Groove				Lands				Oil Cooling Gallery		Under Crown	
		No. 1	No. 2	No. 1	No. 2	No. 1	No. 2	No. 1	No. 2		No. 3	No. 4	No. 3	No. 4	No. 3	No. 4						
A,%	DEM.	A,%	DEM.	A,%	DEM.	A,%	DEM.	A,%	DEM.	A,%	DEM.	A,%	DEM.	A,%	DEM.	A,%	DEM.	A,%	DEM.	A,%	DEM.	
C																						
A	HC - 1.0	G1HCA	G1HCD1	G2HCA1	G2HCD1	L1HCA1	L1HCD1	L2HCA1	L2HCD1	G3HCA1	G3HCD	L3HCA1	L3HCD	L4HCA1	L4HCD							
R	MC - 0.5	G1MCA	G1MCD1							G3MCA1	G3MCD											
B	LC - .25	G1LCA	G1LCD1	G2LCA1	G2LCD1	L1LCA1	L1LCD1	L2LCA1	L2LCD1	G3LCA1	G3LCD1	L3LCA1	L3LCD	L4LCA1	L4LCD					UCLCA1	UCLCD1	
O																						
N	Total	G1ACT1	G1DCTO	G2ACTC	G2DCTO1	L1ACTO	L1DCTO	L2ACTO	L2DCTO1	G3ACTO1	G3DCTC	L3ACTO	L3DCT1	L4ACTC	L4DCT1					UACTOT	UCDCTOT1	
	8 - 9	G1V9A	G1V9D1	G2V9A1	G2V9D1	L1V9A1	L1V9D1	L2V9A1	L2V9D1													
	7 - 7.9	G1V8A	G1V8D1	G2V8A1	G2V8D1	L1V8A1	L1V8D1	L2V8A1	L2V8D1	G3V75A1	G3V75L	L3V75A	L3V75I	L4V75A	L4V75I					UCV75A1	UCV75D1	
	6 - 6.9	G1V7A	G1V7D1	G2V7A1	G2V7D1	L1V7A1	L1V7D1	L2V7A1	L2V7D1													
V	5 - 5.9	G1V6A	G1V6D1	G2V6A1	G2V6D1	L1V6A1	L1V6D1	L2V6A1	L2V6D1	G3V45A1	G3V45L	L3V45A	L3V45I	L4V45A	L4V45I					UCV45A1	UCV45D1	
A	4 - 4.9	G1V5A	G1V5D1	G2V5A1	G2V5D1	L1V5A1	L1V5D1	L2V5A1	L2V5D1													
R	3 - 3.9	G1V4A	G1V4D1	G2V4A1	G2V4D1	L1V4A1	L1V4D1	L2V4A1	L2V4D1													
N	2 - 2.9	G1V3A	G1V3D1	G2V3A1	G2V3D1	L1V3A1	L1V3D1	L2V3A1	L2V3D1													
I	1 - 1.9	G1V2A	G1V2D1	G2V2A1	G2V2D1	L1V2A1	L1V2D1	L2V2A1	L2V2D1	G3V15A1	G3V15L	L3V15A	L3V15I	L4V15A	L4V15I					UCV15A1	UCV15D1	
S	>0 - 0.9	G1V1A	G1V1D1	G2V1A1	G2V1D1	L1V1A1	L1V1D1	L2V1A1	L2V1D1													
H	Clean	G1VCL1	0	G2VCLN	0	L1VCLN	0	L2VCLN	0	G3VCLNA	0	L3VCLN	0	L4VCLN	0					UCVCLNA	0	
	Total	G1AVT	G1DVTOT	G2AVTC	G2DVTOT1	L1AVTO	L1DVTOT	L2AVTO	L2DVTOT1	G3AVTO1	G3DVTCT	L3AVTO	L3DVT1	L4AVTC	L4DVT					UCAVTOT	UCDVTOT	
Rating		G1UWD1	G2UWD1	G2UWD1	G2UWD1	L1UWD1	L1UWD1	L2UWD1	L2UWD1	G3UWD1	G3UWD1	L3UWD1	L3UWD1	L4UWD1	L4UWD1					UCUWD1		
Location Factor	2		3			1		3		20		20		60							1	
Ind.Rating	G1WD1	G1WD1	G2WD1	G2WD1	G2WD1	L1WD1	L1WD1	L2WD1	L2WD1	G3WD1	G3WD1	L3WD1	L3WD1	L4WD1	L4WD1					UCWD1		
<b>WDP</b>						<b>TGC</b>	<b>TGC</b>	<b>TLC</b>	<b>TLC</b>	<b>Unweighted Deposits</b>				<b>Top Land Flaked Carbon %</b>								
WD1	WD1					TGC1	TGC1	TLC1	TLC1	UWD1				TLFC1								
<b>TGF</b>						<b>IGF %</b>	<b>IGF %</b>	<b>TLHC %</b>	<b>TLHC %</b>	<b>Acc. Groove Fill %</b>												
TGF1	TGF1					IGF1	IGF1	TLHC1	TLHC1	AGF1												

**Caterpillar C-13  
Engine Oil Test  
Rating Summary: Piston No. 2  
Form I6**

<b>Laboratory:</b> LAB	<b>EOT Date:</b> DTCOMP	<b>EOT Time:</b> EOTTIME	
<b>Test Number:</b> TESTNUM		<b>Oil Code:</b> OILCODE	
<b>Formulation / Stand Code:</b> FORM			
<b>Date Rated:</b> DTRATE	<b>Rater Initials:</b> RINIT		
<b>Verified By:</b> VRINIT			

Total Piston Ratings Summary																	
Deposit Factor	Grooves				Lands				Deposit Factor	Lands				Oil Cooling Gallery	Under Crown		
	No. 1 A,% DEM.	No. 2 A,% DEM.	No. 1 A,% DEM.	No. 2 A,% DEM.	No. 1 A,% DEM.	No. 2 A,% DEM.	No. 1 A,% DEM.	No. 2 A,% DEM.		No. 3 A,% DEM.	No. 4 A,% DEM.	No. 3 A,% DEM.	No. 4 A,% DEM.				
C																	
A	G1HCA; G1HCD2	G2HCA; G2HCD2	L1HCA2	L1HCD2	L2HCA2	L2HCD2											
R	G1MCA	G1MCD2															
B	G1LCA2	G1LCD2	L1LCA2	L1LCD2	L2LCA2	L2LCD2											
O																	
N	G1ACT	G1DCTO	G2ACT	G2DCTO	L1ACTO	L1DCTO	L2ACTC	L2DCTO									
8 - 9	G1V9A2	G1V9D2	G2V9A2	G2V9D2	L1V9A2	L1V9D2	L2V9A2	L2V9D2									
7 - 7.9	G1V8A2	G1V8D2	G2V8A2	G2V8D2	L1V8A2	L1V8D2	L2V8A2	L2V8D2	7.5								
6 - 6.9	G1V7A2	G1V7D2	G2V7A2	G2V7D2	L1V7A2	L1V7D2	L2V7A2	L2V7D2									
5 - 5.9	G1V6A2	G1V6D2	G2V6A2	G2V6D2	L1V6A2	L1V6D2	L2V6A2	L2V6D2									
A	G1V5A2	G1V5D2	G2V5A2	G2V5D2	L1V5A2	L1V5D2	L2V5A2	L2V5D2									
R	G1V4A2	G1V4D2	G2V4A2	G2V4D2	L1V4A2	L1V4D2	L2V4A2	L2V4D2	4.5								
N	G1V3A2	G1V3D2	G2V3A2	G2V3D2	L1V3A2	L1V3D2	L2V3A2	L2V3D2									
I	G1V2A2	G1V2D2	G2V2A2	G2V2D2	L1V2A2	L1V2D2	L2V2A2	L2V2D2	1.5								
S	G1V1A2	G1V1D2	G2V1A2	G2V1D2	L1V1A2	L1V1D2	L2V1A2	L2V1D2									
H	G1VCLN	0	G2VCLN	0	L1VCLN	0	L2VCLN	0									
Total	G1AVTC	G1DVTO	G2AVTC	G2DVTO	L1AVTC	L1DVTO	L2AVTC	L2DVTO									
Rating	G1UWD2	G2UWD2	G1UWD2	L1UWD2	L2UWD2	L2UWD2											
Location Factor	2	3	3	1	3												
Ind. Rating	G1WD2	G2WD2	G2WD2	L1WD2	L2WD2	L2WD2											
<b>WDP</b>			<b>TGC</b>		<b>TLC</b>				<b>Unweighted Deposits</b>				<b>Top Land Flaked Carbon %</b>				
WD2			TGC2		TLC2				UWD2				TLFC2				
<b>TGF</b>			<b>IGF %</b>		<b>TLHC %</b>				<b>Acc. Groove Fill %</b>								
TGF2			IGF2		TLHC2				AGF2								

**Caterpillar C-13  
Engine Oil Test  
Rating Summary: Piston No. 3  
Form 17**

<b>Laboratory:</b> LAB	<b>EOT Date:</b> DTCOMP	<b>EOT Time:</b> EOTIME	
<b>Test Number:</b> TESTNUM	<b>Oil Code:</b> OILCODE		
<b>Formulation / Stand Code:</b> FORM			
<b>Date Rated:</b> DTRATE	<b>Rater Initials:</b> RINIT	<b>Verified By:</b> VRINIT	

Total Piston Ratings Summary														
	Grooves			Lands			Deposit Factor	Groove		Lands		Oil Cooling Gallery		Under Crown
	No. 1 A,% DEM.	No. 2 A,% DEM.	No. 1 A,% DEM.	No. 1 A,% DEM.	No. 2 A,% DEM.	No. 1 A,% DEM.		No. 2 A,% DEM.	No. 3 A,% DEM.	No. 4 A,% DEM.	No. 3 A,% DEM.	No. 4 A,% DEM.		
C														
A	HC - 1.0	GIHCA: GIHCD3	G2HCA: G2HCD3	LIHCA3	LIHCD3	L2HCA3	L2HCD3	G3HCA3	G3HCD3	L3HCA3	L3HCD3	L4HCA3	L4HCD3	
R	MC - 0.5	GIMCA: GIMCD3						G3MCA3	G3MCD3					
B	LC - .25	GILCA: GILCD3	G2LCA: G2LCD3	LILCA3	LILCD3	L2LCA3	L2LCD3	G3LCA3	G3LCD3	L3LCA3	L3LCD3	L4LCA3	L4LCD3	UCLCA3 UCLCD3
O														
N	Total	GIACT: GIDCTO	G2ACT: G2DCTO	LIACTO	LIDCTO	L2ACTO	L2DCTO	G3ACTOT	G3DCTC	L3ACTO	L3DCTC	L4ACTO	L4DCTC	UCLCA3 UCLCD3 UCLCTOT: UCDCCTOT:
	8 - 9	GIV9A3	GIV9D3	LIV9A3	LIV9D3	L2V9A3	L2V9D3							
	7 - 7.9	GIV8A3	GIV8D3	LIV8A3	LIV8D3	L2V8A3	L2V8D3	G3V75A3	G3V75C	L3V75A	L3V75I	L4V75A	L4V75C	UCV75A3 UCV75D3
	6 - 6.9	GIV7A3	GIV7D3	LIV7A3	LIV7D3	L2V7A3	L2V7D3							
V	5 - 5.9	GIV6A3	GIV6D3	LIV6A3	LIV6D3	L2V6A3	L2V6D3	G3V45A3	G3V45C	L3V45A	L3V45I	L4V45A	L4V45C	UCV45A3 UCV45D3
A	4 - 4.9	GIV5A3	GIV5D3	LIV5A3	LIV5D3	L2V5A3	L2V5D3							
R	3 - 3.9	GIV4A3	GIV4D3	LIV4A3	LIV4D3	L2V4A3	L2V4D3							
N	2 - 2.9	GIV3A3	GIV3D3	LIV3A3	LIV3D3	L2V3A3	L2V3D3							
I	1 - 1.9	GIV2A3	GIV2D3	LIV2A3	LIV2D3	L2V2A3	L2V2D3	G3V15A3	G3V15C	L3V15A	L3V15I	L4V15A	L4V15C	UCV15A3 UCV15D3
S	>0 - 0.9	GIV1A3	GIV1D3	LIV1A3	LIV1D3	L2V1A3	L2V1D3							
H	Clean	GIVCL1	0	LIVCLN	0	L2VCLN	0	G3VCLN/	0	L3VCLN	0	L4VCLN	0	UCVCLNA 0
	Total	GIAVT: GIDVTO	G2AVT: G2DVTO	LIAVTO	LIDVTC	L2AVTO	L2DVTO	G3AVTOT	G3DVTOT	L3AVTO	L3DVTOT	L4AVTOT	L4DVTOT	UCAVTOT: UCDCVTOT:
Rating	G1UWD3	G2UWD3	L1UWD3	L2UWD3				G3UWD3	L3UWD3	L4UWD3				UCUWD3
Location Factor	2	3	1	3				20	20	60				1
Ind. Rating	G1WD3	G2WD3	L1WD3	L2WD3				G3WD3	L3WD3	L4WD3				UCWD3
<b>WDP</b>	<b>TGC</b>			<b>TLC</b>			<b>Unweighted Deposits</b>			<b>Top Land Flaked Carbon %</b>				
WD3	TGC3			TLC3			UWD3			TLFC3				
<b>TGF</b>	<b>IGF %</b>			<b>TLHC %</b>			<b>Acc. Groove Fill %</b>							
TGF3	IGF3			TLHC3			AGF3							

**Caterpillar C-13  
Engine Oil Test  
Rating Summary: Piston No. 4  
Form 18**

<b>Laboratory:</b> LAB	<b>EOT Date:</b> DTCOMP	<b>EOT Time:</b> EOTTIME	
<b>Test Number:</b> TESTNUM	<b>Oil Code:</b> OILCODE		
<b>Formulation / Stand Code:</b> FORM			
<b>Date Rated:</b> DTRATE	<b>Rater Initials:</b> RINIT	<b>Verified By:</b> VRINIT	

Total Piston Ratings Summary																		
Deposit Factor	Grooves				Lands				Deposit Factor	Groove		Lands		Oil Cooling Gallery		Under Crown		
	No. 1 A,% DEM.	No. 2 A,% DEM.	No. 1 A,% DEM.	No. 2 A,% DEM.	No. 1 A,% DEM.	No. 2 A,% DEM.	No. 1 A,% DEM.	No. 2 A,% DEM.		No. 3 A,% DEM.	No. 4 A,% DEM.	No. 3 A,% DEM.	No. 4 A,% DEM.	Cooling Gallery	A,%	DEM.	A,%	DEM.
C																		
A	HC - 1.0	G1HCA G1HCD4	G2HCA4 G2HCD4	L1HCA4 L1HCD4	L2HCA4 L2HCD4					G3HCA4 G3HCD4	L3HCA4 L3HCD4	L4HCA4 L4HCD4						
R	MC - 0.5	G1MCA G1MCD4								G3MCA4 G3MCD4								
B	LC - .25	G1LCA G1LCD4	G2LCA4 G2LCD4	L1LCA4 L1LCD4	L2LCA4 L2LCD4					G3LCA4 G3LCD4	L3LCA4 L3LCD4	L4LCA4 L4LCD4				UCLCA4	UCLCD4	
O																		
N	Total	G1ACT G1DCTO	G2ACT G2DCTO	L1ACTO L1DCTO	L2ACTO L2DCTO					G3ACTO G3DCTO	L3ACTC L3DCTO	L4ACTC L4DCTO				UCLCA4	UCLDCTO	
	8 - 9	G1V9A G1V9D4	G2V9A4 G2V9D4	L1V9A4 L1V9D4	L2V9A4 L2V9D4													
	7 - 7.9	G1V8A G1V8D4	G2V8A4 G2V8D4	L1V8A4 L1V8D4	L2V8A4 L2V8D4				7.5	G3V75A4 G3V75E	L3V75A4 L3V75E	L4V75A4 L4V75E				UCV75A4	UCV75D4	
	6 - 6.9	G1V7A G1V7D4	G2V7A4 G2V7D4	L1V7A4 L1V7D4	L2V7A4 L2V7D4													
V	5 - 5.9	G1V6A G1V6D4	G2V6A4 G2V6D4	L1V6A4 L1V6D4	L2V6A4 L2V6D4				4.5	G3V45A4 G3V45E	L3V45A4 L3V45E	L4V45A4 L4V45E				UCV45A4	UCV45D4	
A	4 - 4.9	G1V5A G1V5D4	G2V5A4 G2V5D4	L1V5A4 L1V5D4	L2V5A4 L2V5D4													
R	3 - 3.9	G1V4A G1V4D4	G2V4A4 G2V4D4	L1V4A4 L1V4D4	L2V4A4 L2V4D4													
N	2 - 2.9	G1V3A G1V3D4	G2V3A4 G2V3D4	L1V3A4 L1V3D4	L2V3A4 L2V3D4													
I	1 - 1.9	G1V2A G1V2D4	G2V2A4 G2V2D4	L1V2A4 L1V2D4	L2V2A4 L2V2D4				1.5	G3V15A4 G3V15E	L3V15A4 L3V15E	L4V15A4 L4V15E				UCV15A4	UCV15D4	
S	>0 - 0.9	G1V1A G1V1D4	G2V1A4 G2V1D4	L1V1A4 L1V1D4	L2V1A4 L2V1D4													
H	Clean	G1VCL 0	G2VCLN 0	L1VCLN 0	L2VCLN 0					G3VCLN/ 0	L3VCLN 0	L4VCLN 0				UCVCLNA	0	
	Total	G1AVT G1DVTOT	G2AVTC G2DVTOT	L1AVTO L1DVTOT	L2AVTC L2DVTOT					G3AVTO G3DVTOT	L3AVTC L3DVTOT	L4AVTC L4DVTOT				UCAVTO	UCDVTOT	
Rating		G1UWD4	G2UWD4	L1UWD4	L2UWD4					G3UWD4	L3UWD4	L4UWD4				UCUWD4		
Location Factor	2	3	3	1	3					20	20	60				1		
Ind. Rating	G1WD4	G2WD3	G2WD3	L1WD4	L2WD4					G3WD4	L3WD4	L4WD4				UCWD4		
<b>WDP</b>				<b>TGC</b>	<b>TLC</b>					<b>Unweighted Deposits</b>				<b>Top Land Flaked Carbon %</b>				
WD4				TGC4	TLC4					UWD4				TLFC4				
<b>TGF</b>				<b>IGF %</b>	<b>TLHC %</b>					<b>Acc. Groove Fill %</b>								
TGF4				IGF4	TLHC4					AGF4								

**Caterpillar C-13  
Engine Oil Test  
Rating Summary: Piston No. 5  
Form 19**

<b>Laboratory:</b> LAB	<b>EOT Date:</b> DTCOMP	<b>EOT Time:</b> EOTTIME	
<b>Test Number:</b> TESTNUM	<b>Oil Code:</b> OILCODE		
<b>Formulation / Stand Code:</b> FORM			
<b>Date Rated:</b> DTRATE	<b>Rater Initials:</b> RINIT	<b>Verified By:</b> VRINIT	

Total Piston Ratings Summary																		
Deposit Factor	Grooves			Lands			Deposit Factor	Groove			Lands			Oil Cooling Gallery		Under Crown		
	No. 1 A,% DEM.	No. 2 A,% DEM.	No. 1 A,% DEM.	No. 1 A,% DEM.	No. 2 A,% DEM.	No. 2 A,% DEM.		No. 3 A,% DEM.	No. 3 A,% DEM.	No. 4 A,% DEM.	No. 3 A,% DEM.	No. 3 A,% DEM.	No. 4 A,% DEM.	Cooling Gallery	A,%	DEM.	A,%	DEM.
C	GIHCA	GIHCD	G2HCA5	G2HCD5	L1HCA5	L1HCD5	L2HCA5	L2HCD5	G3HCA5	G3HCD5	L3HCA5	L3HCD5	L4HCA5	L4HCD5				
A	GIMCA	GIMCD							G3MCA5	G3MCD5								
R	GILCA	GILCD5	G2LCA5	G2LCD5	L1LCA5	L1LCD5	L2LCA5	L2LCD5	G3LCA5	G3LCD5	L3LCA5	L3LCD5	L4LCA5	L4LCD5			UCLCA5	UCLCD5
B																		
O																		
N	GIACT	GIDCTC	G2ACTC	G2DCTO	L1ACTO	L1DCTO	L2ACTO	L2DCTO	G3ACTOT	G3DCTC	L3ACTO	L3DCTC	L4ACTC	L4DCTC			UCACTOT	UCDCTOT
8 - 9	G1V9A5	G1V9D5	G2V9A5	G2V9D5	L1V9A5	L1V9D5	L2V9A5	L2V9D5										
7 - 7.9	G1V8A5	G1V8D5	G2V8A5	G2V8D5	L1V8A5	L1V8D5	L2V8A5	L2V8D5	G3V75A5	G3V75I	L3V75A5	L3V75I	L4V75A5	L4V75I			UCV75A5	UCV75D5
6 - 6.9	G1V7A5	G1V7D5	G2V7A5	G2V7D5	L1V7A5	L1V7D5	L2V7A5	L2V7D5										
5 - 5.9	G1V6A5	G1V6D5	G2V6A5	G2V6D5	L1V6A5	L1V6D5	L2V6A5	L2V6D5	G3V45A5	G3V45I	L3V45A5	L3V45I	L4V45A5	L4V45I			UCV45A5	UCV45D5
4 - 4.9	G1V5A5	G1V5D5	G2V5A5	G2V5D5	L1V5A5	L1V5D5	L2V5A5	L2V5D5										
3 - 3.9	G1V4A5	G1V4D5	G2V4A5	G2V4D5	L1V4A5	L1V4D5	L2V4A5	L2V4D5										
2 - 2.9	G1V3A5	G1V3D5	G2V3A5	G2V3D5	L1V3A5	L1V3D5	L2V3A5	L2V3D5										
1 - 1.9	G1V2A5	G1V2D5	G2V2A5	G2V2D5	L1V2A5	L1V2D5	L2V2A5	L2V2D5	G3V15A5	G3V15I	L3V15A5	L3V15I	L4V15A5	L4V15I			UCV15A5	UCV15D5
>0 - 0.9	G1V1A5	G1V1D5	G2V1A5	G2V1D5	L1V1A5	L1V1D5	L2V1A5	L2V1D5										
H Clean	G1VCL5	0	G2VCLN	0	L1VCLN	0	L2VCLN	0	G3VCLNA	0	L3VCLN	0	L4VCLN	0			UCVCLNA	0
Total	GIAVT	GIDVTG	G2AVTC	G2DVTO	L1AVTO	L1DVTO	L2AVTO	L2DVTO	G3AVTO	G3DVTG	L3AVTC	L3DVTG	L4AVTC	L4DVTG			UCAVTO	UCDVTOT
Rating	G1UWD5	G2UWD5	G2UWD5	G2UWD5	L1UWD5	L2UWD5	L2UWD5	L2UWD5	G3UWD5	G3UWD5	L3UWD5	L4UWD5	L4UWD5	L4UWD5			UCUWD5	
Location Factor	2	3	3	3	1	1	3	3	20	20	20	60	60	1			1	
Ind. Rating	G1WD5	G2WD5	G2WD5	G2WD5	L1WD5	L2WD5	L2WD5	L2WD5	G3WD5	G3WD5	L3WD5	L4WD5	L4WD5	L4WD5			UCWD5	
<b>WDP</b>	<b>TGC</b>			<b>TLC</b>			<b>Unweighted Deposits</b>			<b>Top Land Flaked Carbon %</b>								
WD5	TGC5			TLC5			UWD5			TLFC5								
<b>TGF</b>	<b>IGF %</b>			<b>TLHC %</b>			<b>Acc. Groove Fill %</b>											
TGF5	IGF5			TLHC5			AGF5											

**Caterpillar C-13  
Engine Oil Test  
Rating Summary: Piston No. 6  
Form 20**

<b>Laboratory:</b> LAB	<b>EOT Date:</b> DTCOMP	<b>EOT Time:</b> EOTTIME	
<b>Test Number:</b> TESTNUM	<b>Oil Code:</b> OILCODE		
<b>Formulation / Stand Code:</b> FORM			
<b>Date Rated:</b> DTRATE	<b>Rater Initials:</b> RINIT	<b>Verified By:</b> VRINIT	

Total Piston Ratings Summary																		
Deposit Factor	Grooves			Lands			Deposit Factor	Groove			Lands			Oil Cooling Gallery		Under Crown		
	A,%	DEM.	No. 2	A,%	DEM.	No. 1		A,%	DEM.	No. 2	A,%	DEM.	No. 3	A,%	DEM.	No. 4	A,%	DEM.
C																		
A	G1HCA	G1HCD6	G2HCA6	G2HCD6	L1HCA6	L1HCD6	L2HCA6	L2HCD6	G3HCA6	G3HCD6	L3HCA6	L3HCD6	L4HCA6	L4HCD6				
R	G1MCA	G1MCD6			L1LCA6	L1LCD6	L2LCA6	L2LCD6	G3MCA6	G3MCD6								
B	G1LCA	G1LCD6	G2LCA6	G2LCD6	L1LCA6	L1LCD6	L2LCA6	L2LCD6	G3LCA6	G3LCD6	L3LCA6	L3LCD6	L4LCA6	L4LCD6				
O																		
N	G1ACT	G1DCTO	G2ACTC	G2DCTO	L1ACTO	L1DCTO	L2ACTO	L2DCTO	G3ACTOT	G3DCTC	L3ACTO	L3DCTC	L4ACTC	L4DCTC				
8 - 9	G1V9A	G1V9D6	G2V9A6	G2V9D6	L1V9A6	L1V9D6	L2V9A6	L2V9D6										
7 - 7.9	G1V8A	G1V8D6	G2V8A6	G2V8D6	L1V8A6	L1V8D6	L2V8A6	L2V8D6	G3V75A6	G3V75D	L3V75A6	L3V75D	L4V75A	L4V75D				
6 - 6.9	G1V7A	G1V7D6	G2V7A6	G2V7D6	L1V7A6	L1V7D6	L2V7A6	L2V7D6										
5 - 5.9	G1V6A	G1V6D6	G2V6A6	G2V6D6	L1V6A6	L1V6D6	L2V6A6	L2V6D6										
4 - 4.9	G1V5A	G1V5D6	G2V5A6	G2V5D6	L1V5A6	L1V5D6	L2V5A6	L2V5D6	G3V45A6	G3V45D	L3V45A6	L3V45D	L4V45A	L4V45D				
3 - 3.9	G1V4A	G1V4D6	G2V4A6	G2V4D6	L1V4A6	L1V4D6	L2V4A6	L2V4D6										
2 - 2.9	G1V3A	G1V3D6	G2V3A6	G2V3D6	L1V3A6	L1V3D6	L2V3A6	L2V3D6										
1 - 1.9	G1V2A	G1V2D6	G2V2A6	G2V2D6	L1V2A6	L1V2D6	L2V2A6	L2V2D6	G3V15A6	G3V15D	L3V15A6	L3V15D	L4V15A	L4V15D				
>0 - 0.9	G1V1A	G1V1D6	G2V1A6	G2V1D6	L1V1A6	L1V1D6	L2V1A6	L2V1D6										
H Clean	G1VCL	0	G2VCLN	0	L1VCLN	0	L2VCLN	0	G3VCLNA	0	L3VCLN	0		0				
	L1AVTOT	L1DVTOT	L2AVTOT	L2DVTOT	L1AVTOT	L1DVTOT	L2AVTOT	L2DVTOT	L3AVTOT	L3DVTOT	L4AVTOT	L4DVTOT						
Total																		
Rating	G1UWD6		G2UWD6		L1UWD6		L2UWD6		G3UWD6		L3UWD6		L4UWD6					
Location Factor	2		3		1		3		20		20		60					
Ind. Rating	G1WD6		G2WD6		L1WD6		L2WD6		G3WD6		L3WD6		L4WD6					
<b>WDP</b>				<b>TGC</b>			<b>TLC</b>			<b>Unweighted Deposits</b>			<b>Top Land Flaked Carbon %</b>					
WD6				TGC6			TLC6			UWD6			TLFC6					
<b>TGF</b>				<b>IGF %</b>			<b>TLHC %</b>			<b>Acc. Groove Fill %</b>								
TGF6				IGF6			TLHC6			AGF6								

**Caterpillar C-13  
Engine Oil Test  
Supplemental Rating Summary: Piston No. 1  
Form 21**

<b>Laboratory:</b> LAB	<b>EOT Date:</b> DTCOMP	<b>EOT Time:</b> EOTTIME
<b>Test Number:</b> TESTNUM		
<b>Oil Code:</b> OILCODE		
<b>Formulation / Stand Code:</b> FORM		

Deposit		Carbon			Varnish										
		HC	MC	LC	9.0-8	7.9-7	6.9-6	5.9-5	4.9-4	3.9-3	2.9-2	1.9-1	0.9-0	Clean	
Groove Top And Bottom	1	T	G1THCA1	G1TMCA	G1TLCA1	G1T9A1	G1T8A1	G1T7A1	G1T6A1	G1T5A1	G1T4A1	G1T3A1	G1T2A1	G1T1A1	G1TCLNA
		B	G1BHCA1	G1BMCA	G1BLCA1	G1B9A1	G1B8A1	G1B7A1	G1B6A1	G1B5A1	G1B4A1	G1B3A1	G1B2A1	G1B1A1	G1BCLNA
	2	T	G2THCA1	G2TMCA	G2TLCA1	G2T9A1	G2T8A1	G2T7A1	G2T6A1	G2T5A1	G2T4A1	G2T3A1	G2T2A1	G2T1A1	G2TCLNA
		B	G2BHCA1	G2BMCA	G2BLCA1	G2B9A1	G2B8A1	G2B7A1	G2B6A1	G2B5A1	G2B4A1	G2B3A1	G2B2A1	G2B1A1	G2BCLNA
	3	T	G3THCA1	G3TMCA	G3TLCA1	G3T9A1	G3T8A1	G3T7A1	G3T6A1	G3T5A1	G3T4A1	G3T3A1	G3T2A1	G3T1A1	G3TCLNA
		B	G3BHCA1	G3BMCA	G3BLCA1	G3B9A1	G3B8A1	G3B7A1	G3B6A1	G3B5A1	G3B4A1	G3B3A1	G3B2A1	G3B1A1	G3BCLNA
Top Bottom And Back Of Rings	1	T	R1THCA1	R1TMCA	R1TLCA1	R1T9A1	R1T8A1	R1T7A1	R1T6A1	R1T5A1	R1T4A1	R1T3A1	R1T2A1	R1T1A1	R1TCLNA
		B	R1BHCA1	R1BMCA	R1BLCA1	R1B9A1	R1B8A1	R1B7A1	R1B6A1	R1B5A1	R1B4A1	R1B3A1	R1B2A1	R1B1A1	R1BCLNA
		BK	R1BKHCA1	R1BKMCA	R1BKLCA1	R1BK9A1	R1BK8A1	R1BK7A1	R1BK6A1	R1BK5A1	R1BK4A1	R1BK3A1	R1BK2A1	R1BK1A1	R1BKCLN
	2	T	R2THCA1	R2TMCA	R2TLCA1	R2T9A1	R2T8A1	R2T7A1	R2T6A1	R2T5A1	R2T4A1	R2T3A1	R2T2A1	R2T1A1	R2TCLNA
		B	R2BHCA1	R2BMCA	R2BLCA1	R2B9A1	R2B8A1	R2B7A1	R2B6A1	R2B5A1	R2B4A1	R2B3A1	R2B2A1	R2B1A1	R2BCLNA
		BK	R2BKHCA1	R2BKMCA	R2BKLCA1	R2BK9A1	R2BK8A1	R2BK7A1	R2BK6A1	R2BK5A1	R2BK4A1	R2BK3A1	R2BK2A1	R2BK1A1	R2BKCLN
	3	T	R3THCA1	R3TMCA	R3TLCA1	R3T9A1	R3T8A1	R3T7A1	R3T6A1	R3T5A1	R3T4A1	R3T3A1	R3T2A1	R3T1A1	R3TCLNA
		B	R3BHCA1	R3BMCA	R3BLCA1	R3B9A1	R3B8A1	R3B7A1	R3B6A1	R3B5A1	R3B4A1	R3B3A1	R3B2A1	R3B1A1	R3BCLNA
		BK	R3BKHCA1	R3BKMCA	R3BKLCA1	R3BK9A1	R3BK8A1	R3BK7A1	R3BK6A1	R3BK5A1	R3BK4A1	R3BK3A1	R3BK2A1	R3BK1A1	R3BKCLN
Top Ring Stuck			STUCKTP1	TKTPER	%										
Top Ring Scuffed			SCUFFTP1	CFTPER	%										
Second Ring Stuck			STUCKIN1	TK2PER	%										
Second Ring Scuffed			SCUFFIN1	CF2PER	%										
Oil Ring Stuck			STUCKOL1	TKOPER	%										
Oil Ring Scuffed			SCUFFOL1	CFOPER	%										
Crown Scuffed			SCUFFCR1	CFCRWN	%										
Skirt Scuffed			SCUFFPS1	CFSKRT	%										
Liner Scuffed			SCUFFLN1	SCFLNR1	%										

**Caterpillar C-13  
Engine Oil Test  
Supplemental Rating Summary: Piston No. 2  
Form 22**

<b>Laboratory:</b> LAB	<b>EOT Date:</b> DTCOMP	<b>EOT Time:</b> EOTTIME
<b>Test Number:</b> TESTNUM		
<b>Oil Code:</b> OILCODE		
<b>Formulation / Stand Code:</b> FORM		

Carbon				Varnish											
Deposit		HC	MC	LC	9.0-8	7.9-7	6.9-6	5.9-5	4.9-4	3.9-3	2.9-2	1.9-1	0.9-0	Clean	
Groove Top And Bottom	1	T	G1THCA2	G1TMCA2	G1TLCA2	G1T9A2	G1T8A2	G1T7A2	G1T6A2	G1T5A2	G1T4A2	G1T3A2	G1T2A2	G1T1A2	G1TCLNA
		B	G1BHCA2	G1BMCA2	G1BLCA2	G1B9A2	G1B8A2	G1B7A2	G1B6A2	G1B5A2	G1B4A2	G1B3A2	G1B2A2	G1B1A2	G1BCLNA
	2	T	G2THCA2	G2TMCA2	G2TLCA2	G2T9A2	G2T8A2	G2T7A2	G2T6A2	G2T5A2	G2T4A2	G2T3A2	G2T2A2	G2T1A2	G2TCLNA
		B	G2BHCA2	G2BMCA2	G2BLCA2	G2B9A2	G2B8A2	G2B7A2	G2B6A2	G2B5A2	G2B4A2	G2B3A2	G2B2A2	G2B1A2	G2BCLNA
	3	T	G3THCA2	G3TMCA2	G3TLCA2	G3T9A2	G3T8A2	G3T7A2	G3T6A2	G3T5A2	G3T4A2	G3T3A2	G3T2A2	G3T1A2	G3TCLNA
		B	G3BHCA2	G3BMCA2	G3BLCA2	G3B9A2	G3B8A2	G3B7A2	G3B6A2	G3B5A2	G3B4A2	G3B3A2	G3B2A2	G3B1A2	G3BCLNA
Top Bottom And Back Of Rings	1	T	R1THCA2	R1TMCA2	R1TLCA2	R1T9A2	R1T8A2	R1T7A2	R1T6A2	R1T5A2	R1T4A2	R1T3A2	R1T2A2	R1T1A2	R1TCLNA
		B	R1BHCA2	R1BMCA2	R1BLCA2	R1B9A2	R1B8A2	R1B7A2	R1B6A2	R1B5A2	R1B4A2	R1B3A2	R1B2A2	R1B1A2	R1BCLNA
		BK	R1BKHCA2	R1BKMC A2	R1BKLC A2	R1BK9A2	R1BK8A2	R1BK7A2	R1BK6A2	R1BK5A2	R1BK4A2	R1BK3A2	R1BK2A2	R1BK1A2	R1BKCLN
	2	T	R2THCA2	R2TMCA2	R2TLCA2	R2T9A2	R2T8A2	R2T7A2	R2T6A2	R2T5A2	R2T4A2	R2T3A2	R2T2A2	R2T1A2	R2TCLNA
		B	R2BHCA2	R2BMCA2	R2BLCA2	R2B9A2	R2B8A2	R2B7A2	R2B6A2	R2B5A2	R2B4A2	R2B3A2	R2B2A2	R2B1A2	R2BCLNA
		BK	R2BKHCA2	R2BKMC A2	R2BKLC A2	R2BK9A2	R2BK8A2	R2BK7A2	R2BK6A2	R2BK5A2	R2BK4A2	R2BK3A2	R2BK2A2	R2BK1A2	R2BKCLN
	3	T	R3THCA2	R3TMCA2	R3TLCA2	R3T9A2	R3T8A2	R3T7A2	R3T6A2	R3T5A2	R3T4A2	R3T3A2	R3T2A2	R3T1A2	R3TCLNA
		B	R3BHCA2	R3BMCA2	R3BLCA2	R3B9A2	R3B8A2	R3B7A2	R3B6A2	R3B5A2	R3B4A2	R3B3A2	R3B2A2	R3B1A2	R3BCLNA
		BK	R3BKHCA2	R3BKMC A2	R3BKLC A2	R3BK9A2	R3BK8A2	R3BK7A2	R3BK6A2	R3BK5A2	R3BK4A2	R3BK3A2	R3BK2A2	R3BK1A2	R3BKCLN
Top Ring Stuck			STUCKTP2	TKTPER	%										
Top Ring Scuffed			SCUFFTP2	CFTPER	%										
Second Ring Stuck			STUCKIN2	TK2PER	%										
Second Ring Scuffed			SCUFFIN2	CF2PER	%										
Oil Ring Stuck			STUCKOL2	TKOPER	%										
Oil Ring Scuffed			SCUFFOL2	CFOPER	%										
Crown Scuffed			SCUFFCR2	CFCRWN	%										
Skirt Scuffed			SCUFFPS2	CFSKRT	%										
Liner Scuffed			SCUFFLN2	SCFLNR2	%										



**Caterpillar C-13  
Engine Oil Test  
Supplemental Rating Summary: Piston No. 3  
Form 23**

<b>Laboratory:</b> LAB	<b>EOT Date:</b> DTCOMP	<b>EOT Time:</b> EOTTIME
<b>Test Number:</b> TESTNUM		
<b>Oil Code:</b> OILCODE		
<b>Formulation / Stand Code:</b> FORM		

Carbon				Varnish											
Deposit		HC	MC	LC	9.0-8	7.9-7	6.9-6	5.9-5	4.9-4	3.9-3	2.9-2	1.9-1	0.9-0	Clean	
Groove Top And Bottom	1	T	G1THCA	G1TMCA	G1TLCA	G1T9A3	G1T8A3	G1T7A3	G1T6A3	G1T5A3	G1T4A3	G1T3A3	G1T2A3	G1T1A3	G1TCLN
		B	G1BHCA	G1BMCA	G1BLCA	G1B9A3	G1B8A3	G1B7A3	G1B6A3	G1B5A3	G1B4A3	G1B3A3	G1B2A3	G1B1A3	G1BCLN
	2	T	G2THCA	G2TMCA	G2TLCA	G2T9A3	G2T8A3	G2T7A3	G2T6A3	G2T5A3	G2T4A3	G2T3A3	G2T2A3	G2T1A3	G2TCLN
		B	G2BHCA	G2BMCA	G2BLCA	G2B9A3	G2B8A3	G2B7A3	G2B6A3	G2B5A3	G2B4A3	G2B3A3	G2B2A3	G2B1A3	G2BCLN
	3	T	G3THCA	G3TMCA	G3TLCA	G3T9A3	G3T8A3	G3T7A3	G3T6A3	G3T5A3	G3T4A3	G3T3A3	G3T2A3	G3T1A3	G3TCLN
		B	G3BHCA	G3BMCA	G3BLCA	G3B9A3	G3B8A3	G3B7A3	G3B6A3	G3B5A3	G3B4A3	G3B3A3	G3B2A3	G3B1A3	G3BCLN
Top Bottom And Back Of Rings	1	T	R1THCA	R1TMCA	R1TLCA	R1T9A3	R1T8A3	R1T7A3	R1T6A3	R1T5A3	R1T4A3	R1T3A3	R1T2A3	R1T1A3	R1TCLN
		B	R1BHCA	R1BMCA	R1BLCA	R1B9A3	R1B8A3	R1B7A3	R1B6A3	R1B5A3	R1B4A3	R1B3A3	R1B2A3	R1B1A3	R1BCLN
		BK	R1BKHC	R1BKMC	R1BKLC	R1BK9A	R1BK8A	R1BK7A	R1BK6A	R1BK5A	R1BK4A	R1BK3A	R1BK2A	R1BK1A	R1BKCL
	2	T	R2THCA	R2TMCA	R2TLCA	R2T9A3	R2T8A3	R2T7A3	R2T6A3	R2T5A3	R2T4A3	R2T3A3	R2T2A3	R2T1A3	R2TCLN
		B	R2BHCA	R2BMCA	R2BLCA	R2B9A3	R2B8A3	R2B7A3	R2B6A3	R2B5A3	R2B4A3	R2B3A3	R2B2A3	R2B1A3	R2BCLN
		BK	R2BKHC	R2BKMC	R2BKLC	R2BK9A	R2BK8A	R2BK7A	R2BK6A	R2BK5A	R2BK4A	R2BK3A	R2BK2A	R2BK1A	R2BKCL
	3	T	R3THCA	R3TMCA	R3TLCA	R3T9A3	R3T8A3	R3T7A3	R3T6A3	R3T5A3	R3T4A3	R3T3A3	R3T2A3	R3T1A3	R3TCLN
		B	R3BHCA	R3BMCA	R3BLCA	R3B9A3	R3B8A3	R3B7A3	R3B6A3	R3B5A3	R3B4A3	R3B3A3	R3B2A3	R3B1A3	R3BCLN
		BK	R3BKHC	R3BKMC	R3BKLC	R3BK9A	R3BK8A	R3BK7A	R3BK6A	R3BK5A	R3BK4A	R3BK3A	R3BK2A	R3BK1A	R3BKCL
Top Ring Stuck			STUCKTP3	STKTPE	%										
Top Ring Scuffed			SCUFFTP3	SCFTPE	%										
Second Ring Stuck			STUCKIN3	STK2PE	%										
Second Ring Scuffed			SCUFFIN3	SCF2PE	%										
Oil Ring Stuck			STUCKOL3	STKOPE	%										
Oil Ring Scuffed			SCUFFOL3	SCFOPE	%										
Crown Scuffed			SCUFFCR3	SCFCRV	%										
Skirt Scuffed			SCUFFPS3	SCFSKR	%										
Liner Scuffed			SCUFFLN3	SCFLNR	%										

**Caterpillar C-13  
Engine Oil Test  
Supplemental Rating Summary: Piston No. 4  
Form 24**

<b>Laboratory:</b> LAB	<b>EOT Date:</b> DTCOMP	<b>EOT Time:</b> EOTTIME
<b>Test Number:</b> TESTNUM		
<b>Oil Code:</b> OILCODE		
<b>Formulation / Stand Code:</b> FORM		

Deposit		Carbon			Varnish										
		HC	MC	LC	9.0-8	7.9-7	6.9-6	5.9-5	4.9-4	3.9-3	2.9-2	1.9-1	0.9-0	Clean	
Groove Top And Bottom	1	T	G1THCA4	G1TMCA4	G1TLCA4	G1T9A4	G1T8A4	G1T7A4	G1T6A4	G1T5A4	G1T4A4	G1T3A4	G1T2A4	G1T1A4	G1TCLNA
		B	G1BHCA4	G1BMCA4	G1BLCA4	G1B9A4	G1B8A4	G1B7A4	G1B6A4	G1B5A4	G1B4A4	G1B3A4	G1B2A4	G1B1A4	G1BCLNA
	2	T	G2THCA4	G2TMCA4	G2TLCA4	G2T9A4	G2T8A4	G2T7A4	G2T6A4	G2T5A4	G2T4A4	G2T3A4	G2T2A4	G2T1A4	G2TCLNA
		B	G2BHCA4	G2BMCA4	G2BLCA4	G2B9A4	G2B8A4	G2B7A4	G2B6A4	G2B5A4	G2B4A4	G2B3A4	G2B2A4	G2B1A4	G2BCLNA
	3	T	G3THCA4	G3TMCA4	G3TLCA4	G3T9A4	G3T8A4	G3T7A4	G3T6A4	G3T5A4	G3T4A4	G3T3A4	G3T2A4	G3T1A4	G3TCLNA
		B	G3BHCA4	G3BMCA4	G3BLCA4	G3B9A4	G3B8A4	G3B7A4	G3B6A4	G3B5A4	G3B4A4	G3B3A4	G3B2A4	G3B1A4	G3BCLNA
Top Bottom And Back Of Rings	1	T	R1THCA4	R1TMCA4	R1TLCA4	R1T9A4	R1T8A4	R1T7A4	R1T6A4	R1T5A4	R1T4A4	R1T3A4	R1T2A4	R1T1A4	R1TCLNA
		B	R1BHCA4	R1BMCA4	R1BLCA4	R1B9A4	R1B8A4	R1B7A4	R1B6A4	R1B5A4	R1B4A4	R1B3A4	R1B2A4	R1B1A4	R1BCLNA
		BK	R1BKHA4	R1BKMA4	R1BKLA4	R1BK9A4	R1BK8A4	R1BK7A4	R1BK6A4	R1BK5A4	R1BK4A4	R1BK3A4	R1BK2A4	R1BK1A4	R1BKCLNA
	2	T	R2THCA4	R2TMCA4	R2TLCA4	R2T9A4	R2T8A4	R2T7A4	R2T6A4	R2T5A4	R2T4A4	R2T3A4	R2T2A4	R2T1A4	R2TCLNA
		B	R2BHCA4	R2BMCA4	R2BLCA4	R2B9A4	R2B8A4	R2B7A4	R2B6A4	R2B5A4	R2B4A4	R2B3A4	R2B2A4	R2B1A4	R2BCLNA
		BK	R2BKHA4	R2BKMA4	R2BKLA4	R2BK9A4	R2BK8A4	R2BK7A4	R2BK6A4	R2BK5A4	R2BK4A4	R2BK3A4	R2BK2A4	R2BK1A4	R2BKCLNA
	3	T	R3THCA4	R3TMCA4	R3TLCA4	R3T9A4	R3T8A4	R3T7A4	R3T6A4	R3T5A4	R3T4A4	R3T3A4	R3T2A4	R3T1A4	R3TCLNA
		B	R3BHCA4	R3BMCA4	R3BLCA4	R3B9A4	R3B8A4	R3B7A4	R3B6A4	R3B5A4	R3B4A4	R3B3A4	R3B2A4	R3B1A4	R3BCLNA
		BK	R3BKHA4	R3BKMA4	R3BKLA4	R3BK9A4	R3BK8A4	R3BK7A4	R3BK6A4	R3BK5A4	R3BK4A4	R3BK3A4	R3BK2A4	R3BK1A4	R3BKCLNA
Top Ring Stuck			STUCKTP4	TKTPER	%										
Top Ring Scuffed			SCUFFTP4	CFTPER	%										
Second Ring Stuck			STUCKIN4	TK2PER	%										
Second Ring Scuffed			SCUFFIN4	CF2PER	%										
Oil Ring Stuck			STUCKOL4	TKOPER	%										
Oil Ring Scuffed			SCUFFOL4	CFOPER	%										
Crown Scuffed			SCUFFCR4	CFCRWN	%										
Skirt Scuffed			SCUFFPS4	CFSKRT	%										
Liner Scuffed			SCUFFLN4	SCFLNR	%										

**Caterpillar C-13  
Engine Oil Test  
Supplemental Rating Summary: Piston No. 5  
Form 25**

<b>Laboratory:</b> LAB	<b>EOT Date:</b> DTCOMP	<b>EOT Time:</b> EOTTIME
<b>Test Number:</b> TESTNUM		
<b>Oil Code:</b> OILCODE		
<b>Formulation / Stand Code:</b> FORM		

Carbon				Varnish											
Deposit		HC	MC	LC	9.0-8	7.9-7	6.9-6	5.9-5	4.9-4	3.9-3	2.9-2	1.9-1	0.9-0	Clean	
Groove Top And Bottom	1	T	G1THCA5	G1TMCA5	G1TLCA5	G1T9A5	G1T8A5	G1T7A5	G1T6A5	G1T5A5	G1T4A5	G1T3A5	G1T2A5	G1T1A5	G1TCLNA
		B	G1BHCA5	G1BMCA5	G1BLCA5	G1B9A5	G1B8A5	G1B7A5	G1B6A5	G1B5A5	G1B4A5	G1B3A5	G1B2A5	G1B1A5	G1BCLNA
	2	T	G2THCA5	G2TMCA5	G2TLCA5	G2T9A5	G2T8A5	G2T7A5	G2T6A5	G2T5A5	G2T4A5	G2T3A5	G2T2A5	G2T1A5	G2TCLNA
		B	G2BHCA5	G2BMCA5	G2BLCA5	G2B9A5	G2B8A5	G2B7A5	G2B6A5	G2B5A5	G2B4A5	G2B3A5	G2B2A5	G2B1A5	G2BCLNA
	3	T	G3THCA5	G3TMCA5	G3TLCA5	G3T9A5	G3T8A5	G3T7A5	G3T6A5	G3T5A5	G3T4A5	G3T3A5	G3T2A5	G3T1A5	G3TCLNA
		B	G3BHCA5	G3BMCA5	G3BLCA5	G3B9A5	G3B8A5	G3B7A5	G3B6A5	G3B5A5	G3B4A5	G3B3A5	G3B2A5	G3B1A5	G3BCLNA
Top Bottom And Back Of Rings	1	T	R1THCA5	R1TMCA5	R1TLCA5	R1T9A5	R1T8A5	R1T7A5	R1T6A5	R1T5A5	R1T4A5	R1T3A5	R1T2A5	R1T1A5	R1TCLNA
		B	R1BHCA5	R1BMCA5	R1BLCA5	R1B9A5	R1B8A5	R1B7A5	R1B6A5	R1B5A5	R1B4A5	R1B3A5	R1B2A5	R1B1A5	R1BCLNA
		BK	R1BKHA5	R1BKMA5	R1BKLA5	R1BK9A5	R1BK8A5	R1BK7A5	R1BK6A5	R1BK5A5	R1BK4A5	R1BK3A5	R1BK2A5	R1BK1A5	R1BKCLN
	2	T	R2THCA5	R2TMCA5	R2TLCA5	R2T9A5	R2T8A5	R2T7A5	R2T6A5	R2T5A5	R2T4A5	R2T3A5	R2T2A5	R2T1A5	R2TCLNA
		B	R2BHCA5	R2BMCA5	R2BLCA5	R2B9A5	R2B8A5	R2B7A5	R2B6A5	R2B5A5	R2B4A5	R2B3A5	R2B2A5	R2B1A5	R2BCLNA
		BK	R2BKHA5	R2BKMA5	R2BKLA5	R2BK9A5	R2BK8A5	R2BK7A5	R2BK6A5	R2BK5A5	R2BK4A5	R2BK3A5	R2BK2A5	R2BK1A5	R2BKCLN
	3	T	R3THCA5	R3TMCA5	R3TLCA5	R3T9A5	R3T8A5	R3T7A5	R3T6A5	R3T5A5	R3T4A5	R3T3A5	R3T2A5	R3T1A5	R3TCLNA
		B	R3BHCA5	R3BMCA5	R3BLCA5	R3B9A5	R3B8A5	R3B7A5	R3B6A5	R3B5A5	R3B4A5	R3B3A5	R3B2A5	R3B1A5	R3BCLNA
		BK	R3BKHA5	R3BKMA5	R3BKLA5	R3BK9A5	R3BK8A5	R3BK7A5	R3BK6A5	R3BK5A5	R3BK4A5	R3BK3A5	R3BK2A5	R3BK1A5	R3BKCLN
Top Ring Stuck			STUCKTP5	TKTPER	%										
Top Ring Scuffed			SCUFFTP5	CFTPER	%										
Second Ring Stuck			STUCKIN5	TK2PER	%										
Second Ring Scuffed			SCUFFIN5	CF2PER	%										
Oil Ring Stuck			STUCKOL5	TKOPER	%										
Oil Ring Scuffed			SCUFFOL5	CFOPER	%										
Crown Scuffed			SCUFFCR5	CFCRWN	%										
Skirt Scuffed			SCUFFPS5	CFSKRT	%										
Liner Scuffed			SCUFFLN5	SCFLNR5	%										

**Caterpillar C-13  
Engine Oil Test  
Supplemental Rating Summary: Piston No. 6  
Form 26**

<b>Laboratory:</b> LAB	<b>EOT Date:</b> DTCOMP	<b>EOT Time:</b> EOTTIME
<b>Test Number:</b> TESTNUM		
<b>Oil Code:</b> OILCODE		
<b>Formulation / Stand Code:</b> FORM		

Carbon				Varnish											
Deposit		HC	MC	LC	9.0-8	7.9-7	6.9-6	5.9-5	4.9-4	3.9-3	2.9-2	1.9-1	0.9-0	Clean	
Groove Top And Bottom	1	T	G1THCA6	G1TMCA6	G1TLCA6	G1T9A6	G1T8A6	G1T7A6	G1T6A6	G1T5A6	G1T4A6	G1T3A6	G1T2A6	G1T1A6	G1TCLNA6
		B	G1BHCA6	G1BMCA6	G1BLCA6	G1B9A6	G1B8A6	G1B7A6	G1B6A6	G1B5A6	G1B4A6	G1B3A6	G1B2A6	G1B1A6	G1BCLNA6
	2	T	G2THCA6	G2TMCA6	G2TLCA6	G2T9A6	G2T8A6	G2T7A6	G2T6A6	G2T5A6	G2T4A6	G2T3A6	G2T2A6	G2T1A6	G2TCLNA6
		B	G2BHCA6	G2BMCA6	G2BLCA6	G2B9A6	G2B8A6	G2B7A6	G2B6A6	G2B5A6	G2B4A6	G2B3A6	G2B2A6	G2B1A6	G2BCLNA6
	3	T	G3THCA6	G3TMCA6	G3TLCA6	G3T9A6	G3T8A6	G3T7A6	G3T6A6	G3T5A6	G3T4A6	G3T3A6	G3T2A6	G3T1A6	G3TCLNA6
		B	G3BHCA6	G3BMCA6	G3BLCA6	G3B9A6	G3B8A6	G3B7A6	G3B6A6	G3B5A6	G3B4A6	G3B3A6	G3B2A6	G3B1A6	G3BCLNA6
Top Bottom And Back Of Rings	1	T	R1THCA6	R1TMCA6	R1TLCA6	R1T9A6	R1T8A6	R1T7A6	R1T6A6	R1T5A6	R1T4A6	R1T3A6	R1T2A6	R1T1A6	R1TCLNA6
		B	R1BHCA6	R1BMCA6	R1BLCA6	R1B9A6	R1B8A6	R1B7A6	R1B6A6	R1B5A6	R1B4A6	R1B3A6	R1B2A6	R1B1A6	R1BCLNA6
		BK	R1BKHCA6	R1BKMC6	R1BKLCA6	R1BK9A6	R1BK8A6	R1BK7A6	R1BK6A6	R1BK5A6	R1BK4A6	R1BK3A6	R1BK2A6	R1BK1A6	R1BKCLNA6
	2	T	R2THCA6	R2TMCA6	R2TLCA6	R2T9A6	R2T8A6	R2T7A6	R2T6A6	R2T5A6	R2T4A6	R2T3A6	R2T2A6	R2T1A6	R2TCLNA6
		B	R2BHCA6	R2BMCA6	R2BLCA6	R2B9A6	R2B8A6	R2B7A6	R2B6A6	R2B5A6	R2B4A6	R2B3A6	R2B2A6	R2B1A6	R2BCLNA6
		BK	R2BKHCA6	R2BKMC6	R2BKLCA6	R2BK9A6	R2BK8A6	R2BK7A6	R2BK6A6	R2BK5A6	R2BK4A6	R2BK3A6	R2BK2A6	R2BK1A6	R2BKCLNA6
	3	T	R3THCA6	R3TMCA6	R3TLCA6	R3T9A6	R3T8A6	R3T7A6	R3T6A6	R3T5A6	R3T4A6	R3T3A6	R3T2A6	R3T1A6	R3TCLNA6
		B	R3BHCA6	R3BMCA6	R3BLCA6	R3B9A6	R3B8A6	R3B7A6	R3B6A6	R3B5A6	R3B4A6	R3B3A6	R3B2A6	R3B1A6	R3BCLNA6
		BK	R3BKHCA6	R3BKMC6	R3BKLCA6	R3BK9A6	R3BK8A6	R3BK7A6	R3BK6A6	R3BK5A6	R3BK4A6	R3BK3A6	R3BK2A6	R3BK1A6	R3BKCLNA6
Top Ring Stuck			STUCKTP6	TKTPER	%										
Top Ring Scuffed			SCUFFTP6	CFTPER	%										
Second Ring Stuck			STUCKIN6	TK2PER	%										
Second Ring Scuffed			SCUFFIN6	CF2PER	%										
Oil Ring Stuck			STUCKOL6	TKOPER	%										
Oil Ring Scuffed			SCUFFOL6	CFOPER	%										
Crown Scuffed			SCUFFCR6	CFCRWN	%										
Skirt Scuffed			SCUFFPS6	CFSKRT	%										
Liner Scuffed			SCUFFLN6	SCFLNR6	%										

**Caterpillar C-13  
Engine Oil Test  
Oil Consumption Plot  
Form 27**

<b>Laboratory:</b> LAB	<b>EOT Date:</b> DTCOMP	<b>EOT Time:</b> EOTTIME
<b>Test Number:</b> TESTNUM		
<b>Oil Code:</b> OILCODE		
<b>Formulation / Stand Code:</b> FORM		



**100 – 150 h  
Oil  
Consumption:**

AOCON1

**450 – 500 h  
Oil  
Consumption:**

AOCON2

**% Increase:**

OCONPINC

Test Hours