

IP – D 6681
Final Report Cover Sheet

Method METHOD
Version IP VERSION 2003 1105 BETA
Conducted For
TSTSPON1
TSTSPON2

LABVALID	V = Valid
	I = Invalid
N = Results Cannot be Interpreted as Representative of Oil Performance (Non-Reference Oil) and Shall Not be Used in Determining an Average Test Result Using Multiple Test Criteria.	

Test Number		
Test Stand:	STAND	Engine Run #: ENRUN
EOT Time:	EOTTIME	EOT Date: DTCOMP
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 ASTM Test Method D 6681 and the appropriate amendments through the information letter system. The remarks included in this report describe the anomalies associated with this test.

^A CMIR or Non-Reference Oil Code

Submitted By: _____	SUBLAB
Testing Laboratory _____	SUBSIGM
Signature _____	SUBNAME
Typed Name _____	SUBTITLE
Title _____	

1P
Form 1
Test Report Summary

Lab: LAB	EOT Date: DTCOMP	End Time: EOTTIME	Method: METHOD
Stand: STAND	Run Number: ENRUN		
Formulation/Stand Code: FORM			
Oilcode/CMIR: OILCODE			
CMIR			

Start Date: DSTRT	Total Test Length: TESTLEN	TMC Oil Type: IND
Lab Internal Oil Code: LABOCODE		Engine Serial Number: ENGSN

Unadjusted Lab Rating	Correction Effective Date	WDP	TGC	TLC	Oil Consumption g/h	Transformed Oil Consumption	EOTOC g/h	Transformed EOTOC
Industry Correction (If Any)	DATECF	WD	TGC	TLC	OC	OCT	EOTOC	ETOC
Subtotal		WDCOR	TGCCOR	TLCOR		OCTCOR		TOCTCO
Lab Severity Adjustment (If Any) ^B	DATESA	WDSA	TGCSA	TLCSA		OCTSA		ETOCTSA
Total		WDFNL	TGCFNL	TLCFNL	OCFNL	OCTFNL	OTOCFN	TOCTFN

Test Target Mean ^A	Correction Effective Date	WDP	TGC	TLC	Oil Consumption g/h	Transformed Oil Consumption	EOTOC g/h	Transformed EOTOC
Test Target Mean ^A	EFFDATE	WDM	TGCM	TLCM		OCTM		3OTOCTM
Test Target STD ^A	EFFDATE	WDS	TGCS	TLCS		OCTS		EOTOCTS
API CATEGORY ^B	DTCEFF	WDPL	TGCP	TLCPL	OCPL		3OTOCP	

Referee Ratings	Referee Lab	WDP	TGC	TLC				
	RRLAB	RRWD	RRTGC	RRTLIC				
	Top		Int. 1	Oil	Piston Crown	Piston Skirt	Liner	
Ring Loss of Side Clearance (mm)	LSCTOP	LSCINT1	LSCOIL					
Ring End Gap Increase (mm)	RINGGTI	RINGGHI	RINGGOI					
Is the Ring Stuck?	STUCKTOP	STUCKINI	STUCKOIL					
Scuffed Area %	SCUFFTOP	SCUFFINI	SCUFFOIL	SCUFFRON	SCUFFSKRT	SCUFFLIN		
Average Wear Step (µm)							AWEARST	
% Bore Polish							BOREPOL	

Notes: ^A Reference oil tests or as requested by test sponsor

^B Non-reference oil tests only

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Form 2
Operational Summary

Lab: LAB	EOT Date: DTCOMP	End Time: EOTTIME	Method: METHOD
Stand: STAND	Run Number: ENRUN		
Formulation/Stand Code: FORM			
Oilcode/CMIR: OILCODE			CMIR

Operating Parameter	Quality Index Threshold	EOT Quality Index	Process		Total Data Points			
			Units	Target	Average	Samples ^A	BQD ^B	Over/Under Range ^C
Engine Speed	0.00	QRPM	r/min	1800	ARPM	NRPM	BRPM	ORPM
Fuel Flow	0.00	QFPLO	g/min	185	AFPLO	NFPLO	BFPLO	OPFLO
Humidity	0.00	QHUMID	g/kg	17.8	AHUMID	NHUMID	BHUMID	OHUMID
Coolant Flow	0.00	OCOLFLO	L/min	75	ACOLFLO	NCOLFLO	BCOLFLO	OCOLFLO
Temperature								
Coolant Out	0.00	OCOLOUT	°C	90	ACOLOUT	NCOLOUT	BCOLOUT	OCOLOUT
Oil To Manifold	0.00	OMANTMI	°C	130	AOMANTMI	NOMANTMI	OMANTM	DOMANTMI
Inlet Air	0.00	QINAIRT	°C	60	AINAIRT	NINAIRT	BINAIRT	OINAIRT
Fuel Into Head	0.00	QFUELTMP	°C	42	AFUELTMP	NFUELTMP	BFUELTMI	OFUELTMP
Pressures								
Oil To Manifold	0.00	QOMANPR	kPa	415	AOMANPR	NOMANPR	BOMANPR	OOMANPR
Inlet Air (Absolute)	0.00	QINAIRP	kPa	272	AINAIRP	NINAIRP	BINAIRP	OINAIRP
Exhaust (Absolute)	0.00	QEBBP	kPa	265	AEBBP	NEBP	BEBP	OEBBP
Fuel From Head	0.00	QFUELPR	kPa	275	AFUELPR	NFUELPR	BEUELPR	OFUELPR

Operating Parameter	Units	Typical Range ^D	Average	Total Data Points		
				Samples ^A	BQD ^B	Over/Under Range ^C
Intake Air Flow	kg/h	312-378	AAIRFLO			
Power	kW	53-57	APWR	NPWR	BPWR	OPWR
Torque	Nm	248-301	ATORQUE	NTORQUE	BTORQUE	OTORQUE
Blowby	L/min	20-56	ABLBY	NBLBY	BBLBY	OBLBY
Temperature						
Coolant In	°C	85-88	ACOLIN	NCOLIN	BCOLIN	OCOLIN
Coolant Delta T	°C	2-6	ACOLDT	NCOLDT	BCOLDT	OCOLDT
Oil Cooler In	°C	128-131	AOCOOLIN	NOCOOLIN	BCCOOLIN	OCCOOLIN
Heating Oil	°C	165	AHEATOIL	NHEATOIL	BHEATOIL	OHEATOIL
Exhaust	°C	maximum	AEXHTMP	NEXHTMP	BEXHTMP	OEXHTMP
Pressures						
Crankcase	kPa	0.09-0.3	ACCV	NCCV	BCCV	OCCV
Coolant to Jug	kPa	64-92	ACOLPR	NCOLPR	BCOLPR	OCOLPR

^A Total number of data points taken as determined from test length and procedural specified sampling rate.
^B Number of Bad Quality Data points not used in the calculation of the statistical measures.
^C Number of points clipped by over/under range limits of the statistical measures.
^D Gathered from IP Matrix Test data.

1P
Form 3

Assembly Measurements and Parts Record

Lab: LAB	EOT Date: DTCOMP	End Time: EOTTIME	Method: METHOD
Stand: STAND	Run Number: ENRUN		
Formulation/Stand Code: FORM			
Oilcode/CMIR: OILCODE CMIR			

Assembly Measurements and Parts Record			
Injector Setting (GO /NO-GO)		INSET	
Was Timing Initialized? (YES/NO)		TINIT	
Piston/Head Clearance mm		PISTONCL	
Cam Gear Backlash mm		CAMLASH	
Desired Fuel Timing °BTC		FUELTIM	
Intake Valve Open °ATC		INVALOPN	
Injector Plunger Lift mm @ 72°		PLUNLIFT	
Intake Valve Lift mm @ 456°		INLIFT	
Exhaust Valve Lift mm @ 247°		EXLIFT	

	Part Number	Serial Number	Date Code	Inspection Code
Liner	LINERPN	A LINERSN	B LINERDC	B
Top Ring	TOPPN	C TOPSN	E	
Intermediate Ring	INTPN	C INTSN	E	
Oil Ring	OILPN	C OILSN	E	
Piston Crown	CROWNPN	D CROWNSN	D CROWNDC	F CROWNIC
Piston Skirt	SKIRTPN	H SKIRTSN	I	
Fuel Injector	NOZZLEPN	J NOZZLESN	K	
ECM EPROM	ECMPN		ECMDC	
Piston Cooling Jet	PTUBEPN	PTUBESN		

^A On liner O.D.
^B On liner O.D. (NNAN)
^C On box label
^D On top of piston

^E On paper envelope containing the ring
^F Number below "E" located on piston top
^G Number below "E" located on piston top

^H On bottom surface skirt
^I On bottom surface under pin bore
^J On top surface of plunger
^K On top surface of plunger

1P
Form 4
Piston Rating Summary

Test Identification	Lab: LAB	EOT Date: DTCOMP	End Time: EOTTIME	Stand: STAND	Run #: ENRUN	Method: METHOD		
Formulation/Stand Code: FORM				Oilcode: OILCODE			CMIR	
Test Fuel: TESTFUEL	Fuel Batch: FUELBTID	Date Rated: DTRATE	Rater Initials: RINIT	Verified By: VRINIT				
Last Stand Reference Information	Date Completed: LRDTCOMP		Stand: STAND		Run: LRENRUN		TMC Oil Code: LIND	
	WDP	TGC	TLC	Oil Consumption g/h	Transformed Oil Consumption	EOTOC g/h	Transformed EOTC	
	Last Reference this Stand	LRWD	LRTGC	LRTLC	LROC	LROCT	LREOTOC	LRETOCT
	Industry Average	LRAWD	LRATGC	LRATLC		LRAOCT		LRAETOCT
	Industry STD	LRSWD	LRSTGC	LRSTLC		LRSOCT		LRSETOCT

Total Piston Ratings Summary

	Grooves				Lands				Deposit Factor	Groove		Lands				Oil Cooling		Under Crown			
	No. 1		No. 2		No. 1		No. 2			No. 3		No. 3		No. 4							
	A,%	DEM.	A,%	DEM.	A,%	DEM.	A,%	DEM.		A,%	DEM.	A,%	DEM.	A,%	DEM.	A,%	DEM.	A,%	DEM.		
CARBON	HC - 1.0	G1HCA	G1HCD	G2HCA	G2HCD	L1HCA	L1HCD	L2HCA	L2HCD		G3HCA	G3HCD	L3HCA	L3HCD	L4HCA	L4HCD					
	MC - 0.5	G1MCA	G1MCD								G3MCA	G3MCD									
	LC - .25	G1LCA	G1LCD	G2LCA	G2LCD	L1LCA	L1LCD	L2LCA	L2LCD		G3LCA	G3LCD	L3LCA	L3LCD	L4LCA	L4LCD	OGLCA	OGLCD	UCLCA	UCLCD	
	Total	G1ACTO	G1DCTO	G2ACTO	G2DCTO	L1ACTO	L1DCTO	L2ACTO	L2DCTO		G3ACTO	G3DCTO	L3ACTO	L3DCTO	L4ACTO	L4DCTO	OGACTO	OGDCTO	UCACTO	UCDCTO	
VARNISH	8 - 9	G1V9A	G1V9D	G2V9A	G2V9D	L1V9A	L1V9D	L2V9A	L2V9D	7.5	G3V75A	G3V75D	L3V75A	L3V75D	L4V75A	L4V75D	OGV75A	OGV75D	UCV75A	UCV75D	
	7 - 7.9	G1V8A	G1V8D	G2V8A	G2V8D	L1V8A	L1V8D	L2V8A	L2V8D		G3V45A	G3V45D	L3V45A	L3V45D	L4V45A	L4V45D	OGV45A	OGV45D	UCV45A	UCV45D	
	6 - 6.9	G1V7A	G1V7D	G2V7A	G2V7D	L1V7A	L1V7D	L2V7A	L2V7D		4.5	G3V15A	G3V15D	L3V15A	L3V15D	L4V15A	L4V15D	OGV15A	OGV15D	UCV15A	UCV15D
	5 - 5.9	G1V6A	G1V6D	G2V6A	G2V6D	L1V6A	L1V6D	L2V6A	L2V6D	G3VCLN		0	L3VCLN	0	L4VCLN	0	OGVCLN	0	UCVCLN	0	
	4 - 4.9	G1V5A	G1V5D	G2V5A	G2V5D	L1V5A	L1V5D	L2V5A	L2V5D	1.5											
	3 - 3.9	G1V4A	G1V4D	G2V4A	G2V4D	L1V4A	L1V4D	L2V4A	L2V4D		Clean										
	2 - 2.9	G1V3A	G1V3D	G2V3A	G2V3D	L1V3A	L1V3D	L2V3A	L2V3D												
	1 - 1.9	G1V2A	G1V2D	G2V2A	G2V2D	L1V2A	L1V2D	L2V2A	L2V2D												
	>0 - 0.9	G1V1A	G1V1D	G2V1A	G2V1D	L1V1A	L1V1D	L2V1A	L2V1D												
Clean	G1VCLN	0	G2VCLN	0	L1VCLN	0	L2VCLN	0	Clean	G3VCLN	0	L3VCLN	0	L4VCLN	0	OGVCLN	0	UCVCLN	0		
Total	G1AVTC	G1DVTC	G2AVTC	G2DVTC	L1AVTC	L1DVTC	L2AVTC	L2DVTC		G3AVTC	G3DVTC	L3AVTC	L3DVTC	L4AVTC	L4DVTC	OGAVTC	OGDVTC	UCAVTC	UCDVTC		
Rating	G1UWD		G2UWD		L1UWD		L2UWD			G3UWD		L3UWD		L4UWD		OGUWD		UCUWD			
Location Factor	2		3		1		3			20		20		60		0.5		1			
Ind. Rating	G1WD		G2WD		L1WD		L2WD			G3WD		L3WD		L4WD		OGWD		UCWD			
WDP		TGC				Top Land Carbon		Unweighted Deposits				Top Land Flaked Carbon %									
WD		TGC				TLC		UWD				TLFC									

1P
Form 4A
Piston Rating Worksheet

Lab: LAB	EOT Date: DTCOMP	End Time: EOTTIME	Method: METHOD
Stand: STAND	Run Number: ENRUN		
Formulation/Stand Code: FORM			
Oilcode/CMIR: OILCODE			CMIR

RATEWSIM

1P
Form 5
Supplemental Piston Deposits (Groove Sides and Rings)

Lab: LAB	EOT Date: DTCOMP	End Time: EOTTIME	Method: METHOD
Stand: STAND	Run Number: ENRUN		
Formulation/Stand Code: FORM			
Oilcode: OILCODE CMIR			

Deposit Type		Carbon			Varnish										
		HC	MC	LC	8 - 9	7 - 7.9	6 - 6.9	5 - 5.9	4 - 4.9	3 - 3.9	2 - 2.9	1 - 1.9	>0 -	Clean	
Groove Top and Bottom	1	T	G1THCA	G1TMCA	G1TLCA	G1T9A	G1T8A	G1T7A	G1T6A	G1T5A	G1T4A	G1T3A	G1T2A	G1T1A	G1TCLNA
		B	G1BHCA	G1BMCA	G1BLCA	G1B9A	G1B8A	G1B7A	G1B6A	G1B5A	G1B4A	G1B3A	G1B2A	G1B1A	G1BCLNA
	2	T	G2THCA	G2TMCA	G2TLCA	G2T9A	G2T8A	G2T7A	G2T6A	G2T5A	G2T4A	G2T3A	G2T2A	G2T1A	G2TCLNA
		B	G2BHCA	G2BMCA	G2BLCA	G2B9A	G2B8A	G2B7A	G2B6A	G2B5A	G2B4A	G2B3A	G2B2A	G2B1A	G2BCLNA
	3	T	G3THCA	G3TMCA	G3TLCA	G3T9A	G3T8A	G3T7A	G3T6A	G3T5A	G3T4A	G3T3A	G3T2A	G3T1A	G3TCLNA
		B	G3BHCA	G3BMCA	G3BLCA	G3B9A	G3B8A	G3B7A	G3B6A	G3B5A	G3B4A	G3B3A	G3B2A	G3B1A	G3BCLNA
Top Bottom and Back of Rings	1	T	R1THCA	R1TMCA	R1TLCA	R1T9A	R1T8A	R1T7A	R1T6A	R1T5A	R1T4A	R1T3A	R1T2A	R1T1A	R1TCLNA
		B	R1BHCA	R1BMCA	R1BLCA	R1B9A	R1B8A	R1B7A	R1B6A	R1B5A	R1B4A	R1B3A	R1B2A	R1B1A	R1BCLNA
		BK	R1BKHC	R1BKMC	R1BKLC	R1BK9A	R1BK8A	R1BK7A	R1BK6A	R1BK5A	R1BK4A	R1BK3A	R1BK2A	R1BK1A	R1BKCLNA
	2	T	R2THCA	R2TMCA	R2TLCA	R2T9A	R2T8A	R2T7A	R2T6A	R2T4A	R2T5A	R2T3A	R2T2A	R2T1A	R2TCLNA
		B	R2BHCA	R2BMCA	R2BLCA	R2B9A	R2B8A	R2B7A	R2B6A	R2B5A	R2B4A	R2B3A	R2B2A	R2B1A	R2BCLNA
		BK	R2BKHC	R2BKMC	R2BKLC	R2BK9A	R2BK8A	R2BK7A	R2BK6A	R2BK5A	R2BK4A	R2BK3A	R2BK2A	R2BK1A	R2BKCLNA
	3	T	R3THCA	R3TMCA	R3TLCA	R3T9A	R3T8A	R3T7A	R3T6A	R3T5A	R3T4A	R3T3A	R3T2A	R3T1A	R3TCLNA
		B	R3BHCA	R3BMCA	R3BLCA	R3B9A	R3B8A	R3B7A	R3B6A	R3B5A	R3B4A	R3B3A	R3B2A	R3B1A	R3BCLNA
		BK	R3BKHC	R3BKMC	R3BKLC	R3BK9A	R3BK8A	R3BK7A	R3BK6A	R3BK5A	R3BK4A	R3BK3A	R3BK2A	R3BK1A	R3BKCLNA

Additional Deposit & Condition Ratings	
Piston Crown	CROWNAD
Piston Skirt	SKIRTAD
Rings	LINERAD
Liner	RINGSAD

1P
Form 5A
Referee Rating

Test Identification			
Lab: LAB	EOT Date: DTCOMP	End Time: EOTIME	Method: METHOD
Stand: STAND	Run: ENRUN		
Formulation/Stand Code: FORM			
Oilcode: OILCODE	CMIR		
Referee Rating Information			
Company: RRLAB	Rating Number: RRNO	Date Rated: RRDATE	Rater: RRINIT

Total Piston Ratings Summary																					
	Deposit Factor	Grooves				Lands				Deposit Factor	Groove		Lands				Oil Cooling Gallery		Under Crown		
		No. 1		No. 2		No. 1		No. 2			No. 3		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 R B O N	HC - 1.0	RRG1HC	RRG1HC	RRG2HC	RRG2HC	RRL1HC	RRL1HC	RRL2HC	RRL2HC	7.5	RRG3HC	RRG3HC	RRL3HC	RRL3HC	RRL4HC	RRL4HC					
	MC - 0.5	RRG1MC	RRG1MC								RRG3MC	RRG3MC									
	LC - .25	RRG1LC	RRG1LC	RRG2LC	RRG2LC	RRL1LC	RRL1LC	RRL2LC	RRL2LC		RRG3LC	RRG3LC	RRL3LC	RRL3LC	RRL4LC	RRL4LC	RROGLC	RROGLC	RRUCLCA	RRUCLCD	
	Total	RG1ACT	RG1DC	RG2AC	RG2DC	RL1ACT	RL1DCT	RL2ACT	RL2DCT		RG3ACT	RG3DCT	RL3ACT	RL3DCT	RL4ACT	RL4DC	ROGAC	ROGDC	RUCACT	RUCDCT	
V A R I A T I O N	8 - 9	RRG1V9	RRG1V9	RRG2V9	RRG2V9	RRL1V9	RRL1V9	RRL2V9	RRL2V9	7.5	RRG3V75	RRG3V75	RRL3V75	RRL3V75	RRL4V75	RRL4V75	RROGV75	RROGV75	RRUCV75A	RRUCV75D	
	7 - 7.9	RRG1V8	RRG1V8	RRG2V8	RRG2V8	RRL1V8	RRL1V8	RRL2V8	RRL2V8		RRG3V75	RRG3V75	RRL3V75	RRL3V75	RRL4V75	RRL4V75	RROGV75	RROGV75	RRUCV75A	RRUCV75D	
	6 - 6.9	RRG1V7	RRG1V7	RRG2V7	RRG2V7	RRL1V7	RRL1V7	RRL2V7	RRL2V7		RRG3V75	RRG3V75	RRL3V75	RRL3V75	RRL4V75	RRL4V75	RROGV75	RROGV75	RRUCV75A	RRUCV75D	
	5 - 5.9	RRG1V6	RRG1V6	RRG2V6	RRG2V6	RRL1V6	RRL1V6	RRL2V6	RRL2V6		RRG3V75	RRG3V75	RRL3V75	RRL3V75	RRL4V75	RRL4V75	RROGV75	RROGV75	RRUCV75A	RRUCV75D	
	4 - 4.9	RRG1V5	RRG1V5	RRG2V5	RRG2V5	RRL1V5	RRL1V5	RRL2V5	RRL2V5		RRG3V45	RRG3V45	RRL3V45	RRL3V45	RRL4V45	RRL4V45	RROGV45	RROGV45	RRUCV45A	RRUCV45D	
	3 - 3.9	RRG1V4	RRG1V4	RRG2V4	RRG2V4	RRL1V4	RRL1V4	RRL2V4	RRL2V4		RRG3V45	RRG3V45	RRL3V45	RRL3V45	RRL4V45	RRL4V45	RROGV45	RROGV45	RRUCV45A	RRUCV45D	
	2 - 2.9	RRG1V3	RRG1V3	RRG2V3	RRG2V3	RRL1V3	RRL1V3	RRL2V3	RRL2V3		RRG3V45	RRG3V45	RRL3V45	RRL3V45	RRL4V45	RRL4V45	RROGV45	RROGV45	RRUCV45A	RRUCV45D	
	1 - 1.9	RRG1V2	RRG1V2	RRG2V2	RRG2V2	RRL1V2	RRL1V2	RRL2V2	RRL2V2		RRG3V15	RRG3V15	RRL3V15	RRL3V15	RRL4V15	RRL4V15	RROGV15	RROGV15	RRUCV15A	RRUCV15D	
	>0 - 0.9	RRG1V1	RRG1V1	RRG2V1	RRG2V1	RRL1V1	RRL1V1	RRL2V1	RRL2V1		RRG3V15	RRG3V15	RRL3V15	RRL3V15	RRL4V15	RRL4V15	RROGV15	RROGV15	RRUCV15A	RRUCV15D	
	Clean	RRG1V0	0	RRG2V0	0	RRL1V0	0	RRL2V0	0		RRG3V0	0	RRL3V0	0	RRL4V0	0	RROGV0	0	RRUCV0	0	
Total	RG1AV7	RG1DVT	RG2AV7	RG2DVT	RL1AV7	RL1DVT	RL2AV7	RL2DVT	RG3AV7	RG3DVT	RL3AV7	RL3DVT	RL4AV7	RL4DVT	ROGAV7	ROGDVT	RUCAV7	RUCDVT			
Rating	RRG1UWE		RRG2UWE		RRL1UWD		RRL2UWD		RRG3UWD		RRL3UWE		RRL4UWI		RROGUWI		RRUCUWI				
Location Factor	2		3		1		3		20		20		60		0.5		1				
Ind. Rating	RRG1WD		RRG2WD		RRL1WD		RRL2WD		RRG3WD		RRL3WD		RRL4WD		RROGWD		RRUCWD				
WDP				TGC				TLC				Unweighted Deposits				Top Land Flaked Carbon %					
RRWD				RRTGC				RRTLTC				RRUWD				RRTLFC					

1P
Form 6
Oil Analysis

Test Identification															
Lab:	LAB	EOT Date:	DTCOMP	End Time:	EOTTIME	Method:	METHOD								
Stand:	STAND	Run:	ENRUN												
Formulation/Stand Code:	FORM														
Oilcode:	OILCODE	CMIR													
Test Fuel:	TESTFUEL	Fuel Batch:	FUELBTID												

Oil Analysis	New	24	48	72	96	120	144	168	192	216	240	264	288	312	336	360
Viscosity @ 100°C	V100NEW	V100H02			V100H096						V100H240		V100H288			V100H360
Viscosity @ 40°C	V40_NEW	V40_H02			V40_H096						V40_H240		V40_H288			V40_H360
TBN D4739	TBN_NEW	TBN_H02			TBN_H096						TBN_H240		TBN_H288			TBN_H360
TAN D664	TAN_NEW	TAN_H02			TAN_H096						TAN_H240		TAN_H288			TAN_H360
Wear Metals																
Fe (ppm)	FEWMNEW	FEWMH02			FEWMH096						FEWMH240		FEWMH288			FEWMH360
Al (ppm)	ALWMNEW	ALWMH02			ALWMH096						ALWMH240		ALWMH288			ALWMH360
Si (ppm)	SIWMNEW	SIWMH02			SIWMH096						SIWMH240		SIWMH288			SIWMH360
Cu (ppm)	CUWMNEW	CUWMH02			CUWMH096						CUWMH240		CUWMH288			CUWMH360
Cr (ppm)	CRWMNEW	CRWMH02			CRWMH096						CRWMH240		CRWMH288			CRWMH360
Pb (ppm)	PBWMNEW	PBWMH02			PBWMH096						PBWMH240		PBWMH288			PBWMH360
Fuel Dilution %		FDILH02									FDILH240					FDILH360
Blowby (L/min)		BLBYH02	BLBYH04	BLBYH07	BLBYH09	BLBYH12	BLBYH14	BLBYH16	BLBYH19	BLBYH21	BLBYH24	BLBYH26	BLBYH28	BLBYH31	BLBYH33	BLBYH36
Oil Consumption g/h for hrs ending		CONH02	CONH04	CONH07	CONH09	CONH12	CONH14	CONH16	CONH19	CONH21	CONH24	CONH26	CONH28	CONH31	CONH33	CONH36
Oil Consumption r2		CRRH02	CRRH04	CRRH07	CRRH09	CRRH12	CRRH14	CRRH16	CRRH19	CRRH21	CRRH24	CRRH26	CRRH28	CRRH31	CRRH33	CRRH36
Fuel Position (mm)		FPOSH02									FPOSH240					FPOSH360

1P
Form 7
Downtime Summary

Lab: LAB	EOT Date: DTCOMP	End Time: EOTTIME	Method: METHOD
Stand: STAND	Run Number: ENRUN		
Formulation/Stand Code: FORM			
Oilcode/CMIR: OILCODE		CMIR	

Number of Downtime Occurrences		DWNOCR	Reasons
Test Hours	Date	Downtime	
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
		TOTL DWN	Total Downtime (125 Hour Maximum)

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

1P
Form 7A
Downtime Summary

Lab: LAB	EOT Date: DTCOMP	End Time: EOTTIME	Method: METHOD
Stand: STAND	Run Number: ENRUN		
Formulation/Stand Code: FORM			
Oilcode/CMIR: OILCODE			CMIR

Number of Downtime Occurrences			DW/NOCR	Reasons
Test Hours	Date	Downtime		
DOW/NR016	DDATR016	DTIMR016	DREAR016	
DOW/NR017	DDATR017	DTIMR017	DREAR017	
DOW/NR018	DDATR018	DTIMR018	DREAR018	
DOW/NR019	DDATR019	DTIMR019	DREAR019	
DOW/NR020	DDATR020	DTIMR020	DREAR020	
DOW/NR021	DDATR021	DTIMR021	DREAR021	
DOW/NR022	DDATR022	DTIMR022	DREAR022	
DOW/NR023	DDATR023	DTIMR023	DREAR023	
DOW/NR024	DDATR024	DTIMR024	DREAR024	
DOW/NR025	DDATR025	DTIMR025	DREAR025	
DOW/NR026	DDATR026	DTIMR026	DREAR026	
DOW/NR027	DDATR027	DTIMR027	DREAR027	
DOW/NR028	DDATR028	DTIMR028	DREAR028	
DOW/NR029	DDATR029	DTIMR029	DREAR029	
DOW/NR030	DDATR030	DTIMR030	DREAR030	
TOTLDOWN			Total Downtime (125 Hour Maximum)	

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

1P
Form 7B
Downtime Summary

Lab: LAB	EOT Date: DTCOMP	End Time: EOTTIME	Method: METHOD
Stand: STAND	Run Number: ENRUN		
Formulation/Stand Code: FORM			
Oilcode/CMIR: OILCODE		CMIR	

Number of Downtime Occurrences		DWNOCR	Reasons
Test Hours	Date	Downtime	
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 (125 Hour Maximum)

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

1P
Form 8
Ring Measurements

Lab: LAB	EOT Date: DTCOMP	End Time:EOTTIME	Method: METHOD
Stand: STAND	Run Number: ENRUN		
Formulation/Stand Code: FORM			
Oilcode/CMIR: OILCODE			CMIR

All Ring Measurements Are Made Using Metric Feeler Gages

Ring Gaps (mm)	Top	Intermediate	Oil
Specifications	0.724 ± 0.076 mm	0.673 ± 0.076 mm	0.51 ± 0.13 mm
Pre-Test	RINGGTE	RINGGHE	RINGGOE
Post-Test	RINGGTO	RINGGIO	RINGGOO
Increase	RINGGTI	RINGGHI	RINGGOI

Ring Side Clearance*	A	B	C	D	Average	Minimum	Specification	
	Pre-Test	SIDETPE1	SIDETPE2	SIDETPE3	SIDETPE4	ASIDETPE	ISIDETPE	0.13+0.04 mm
Post-Test	SIDETPO1	SIDETPO2	SIDETPO3	SIDETPO4	ASIDETPO	ISIDETPO		
LSC	L SCT1	L SCT2	L SCT3	L SCT4	L SCTOP	ILSCT		
Int.	Pre-Test	SIDE1PE1	SIDE1PE2	SIDE1PE3	SIDE1PE4	ASIDE1PE	ISIDE1PE	0.18+0.04 mm
	Post-Test	SIDE1PO1	SIDE1PO2	SIDE1PO3	SIDE1PO4	ASIDE1PO	ISIDE1PO	
	LSC	L SC11	L SC12	L SC13	L SC14	L SCINT1	ILSCINT	
	Pre-Test	SIDE0PE1	SIDE0PE2	SIDE0PE3	SIDE0PE4	ASIDE0PE	ISIDE0PE	
Oil	Post-Test	SIDE0PO1	SIDE0PO2	SIDE0PO3	SIDE0PO4	ASIDE0PO	ISIDE0PO	0.07 +0.02 mm
	LSC	L SC01	L SC02	L SC03	L SC04	L SCOIL	ILSCO	

* Notes:

1. Write "STUCK" in place of dimension when applicable.
2. Write "<0.038 mm " for clearance when applicable.
3. Write ">" before calculated decrease or average decrease values that incorporate a "<0.038 mm" in calculation.
4. LSC: Loss of Side Clearance
5. MIN: Intermediate and Oil Ring minimum side clearance is measured 360° around piston.

1P
Form 9
Liner Measurements

Lab: LAB	EOT Date: DTCOMP	End Time: EOTTIME	Method: METHOD
Stand: STAND	Run Number: ENRUN		
Formulation/Stand Code: FORM			
Oilcode/CMIR: OILCODE			CMIR

Liner Surface Finish (Micrometer)			
Distance From Top	Transverse	Longitudinal	Average
130 mm	BBLFIN1	BBLFINL1	BBLFINA1
50 mm	BBLFIN2	BBLFINL2	BBLFINA2
25 mm	BBLFIN3	BBLFINL3	BBLFINA3
Total Average (Spec: 0.4-0.8 µm)			BBLFIN

%Liner Bore Polish - Grid (Add T/AT Values From Grid)	
Thrust	BOREPT
Anti thrust	BOREPAT
Total	BOREPOL

Liner Bore Measurement (137.154mm minimum)				
Before Test - Diameter (Dial Bore Gage)				
Bore Height	Longitudinal	Transverse	Out of Round (0.038 mm maximum)	
250 mm	BBLONG1	BBTRAN1	OOR1	
210 mm	BBLONG2	BBTRAN2	OOR2	
170 mm	BBLONG3	BBTRAN3	OOR3	
130 mm	BBLONG4	BBTRAN4	OOR4	
50 mm	BBLONG5	BBTRAN5	OOR5	
25 mm	BBLONG6	BBTRAN6	OOR6	
15 mm	BBLONG7	BBTRAN7	OOR7	
Taper (0.050 max)	TAPRLONG	TAPRTRAN		
After Test - (Surface Profile)				
Longitudinal		Transverse		
	Front	Rear	T	
Wear Step @ 15mm	AWEARLRF	AWEARLR	AWEARTT	AWEARTAT

1P
Form 10
Characteristics of the Data Acquisition System

Lab: LAB	EOT Date: DTCOMP	End Time: EOTTIME	Method:METHOD
Stand: STAND	Run Number: ENRUN		
Formulation/Stand Code: FORM			
Oilcode/CMIR: OILCODE		CMIR	

Parameter (1)	Sensing Device (2)	Calibration Frequency (3)	Record Device (4)	Observation Frequency (5)	Record Frequency (6)	Log Frequency (7)	System Response (8)
Operation Conditions							
Engine Speed (r/min)	RPMSSENS	RPMCALF	RPMRECD	RPMOBSF	RPMRECF	RPMLOGF	RPMSYSR
Engine Power (kW)	PWRSENS	PWRCALF	PWRRECD	PWROBSF	PWRRECF	PWRLOGF	PWRSYSR
Fuel Flow (g/min)	FFLOSENS	FFLOCALF	FFLORECD	FFLOBSF	FFLORECF	FFLOLOGF	FFLOSYSR
Humidity (g/kg)	HUMSENS	HUMCALF	HUMRECD	HUMOBSF	HUMRECF	HUMLOGF	HUMSYSR
Temperatures (°C)							
Coolant Out	COTSENS	COTCALF	COTRECD	COTOBSF	COTRECF	COTLOGF	COTSYSR
Coolant In	CONSENS	CONCALF	CONRECD	CONOBSF	CONRECF	CONLOGF	CONSYSR
Oil to Manifold	OBRGSENS	OBRGCALF	OBRGRECD	OBRGOBSF	OBRGRECF	OBRGLOGF	OBRGSYSR
Oil Cooler In	OCOLSENS	OCOLCALF	OCOLRECD	OCOLOBSF	OCOLRECF	OCOLLOGF	OCOLSYSR
Inlet Air	AIRSENS	AIRCALF	AIRRECD	AIRTOBSF	AIRRECF	AIRLOGF	AIRSYSR
Exhaust	EXTSENS	EXTCALF	EXTRECD	EXTOBSF	EXTRECF	EXTLOGF	EXTSYSR
Fuel to Head	FUELSENS	FUELCALF	FUELRECD	FUELOBSF	FUELRECF	FUELLOGF	FUELSYSR
Pressures (kPa)							
Oil To Manifold	OBRPSENS	OBRPCALF	OBRPRECD	OBRPOBSF	OBRPRECF	OBRPLOGF	OBRPSYSR
Inlet Air	AIRPSENS	AIRPCALF	AIRPRECD	AIRPOBSF	AIRPRECF	AIRPLOGF	AIRPSYSR
Exhaust	EXPSENS	EXPCALF	EXPRECD	EXPOBSF	EXPRECF	EXPLOGF	EXPSYSR
Fuel to Head	FFILSENS	FFILCALF	FFILRECD	FFILOBSF	FFILRECF	FFILLOGF	FFILSYSR
Crankcase	CCVSENS	CCVCALF	CCVRECD	CCVOBSF	CCVRECF	CCVLOGF	CCVSYSR
Flows (L/min)							
Blowby	BLBYSENS	BLBYCALF	BLBYRECD	BLBYOBSF	BLBYRECF	BLBYLOGF	BLBYSYSR
Coolant Flow	CFLWSENS	CFLWCALF	CFLWRECD	CFLWOBSF	CFLWRECF	CFLWLOGF	CFLWSYSR

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 – Hand log sheet
 DL – Automatic data logger
 C/M – Computer, using manual data entry

- (5) Data area observed but only recorded if off specification
- (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

1P
Form 11
Engine Operational Data Plots

Lab: LAB	EOT Date: DTCOMP	End Time: EOTIME	Method: METHOD
Stand: STAND	Run Number: ENRUN		
Formulation/Stand Code: FORM			
Oilcode/CMIR: OILCODE			CMIR

1P
Form 12
Torque and Exhaust Temperature History

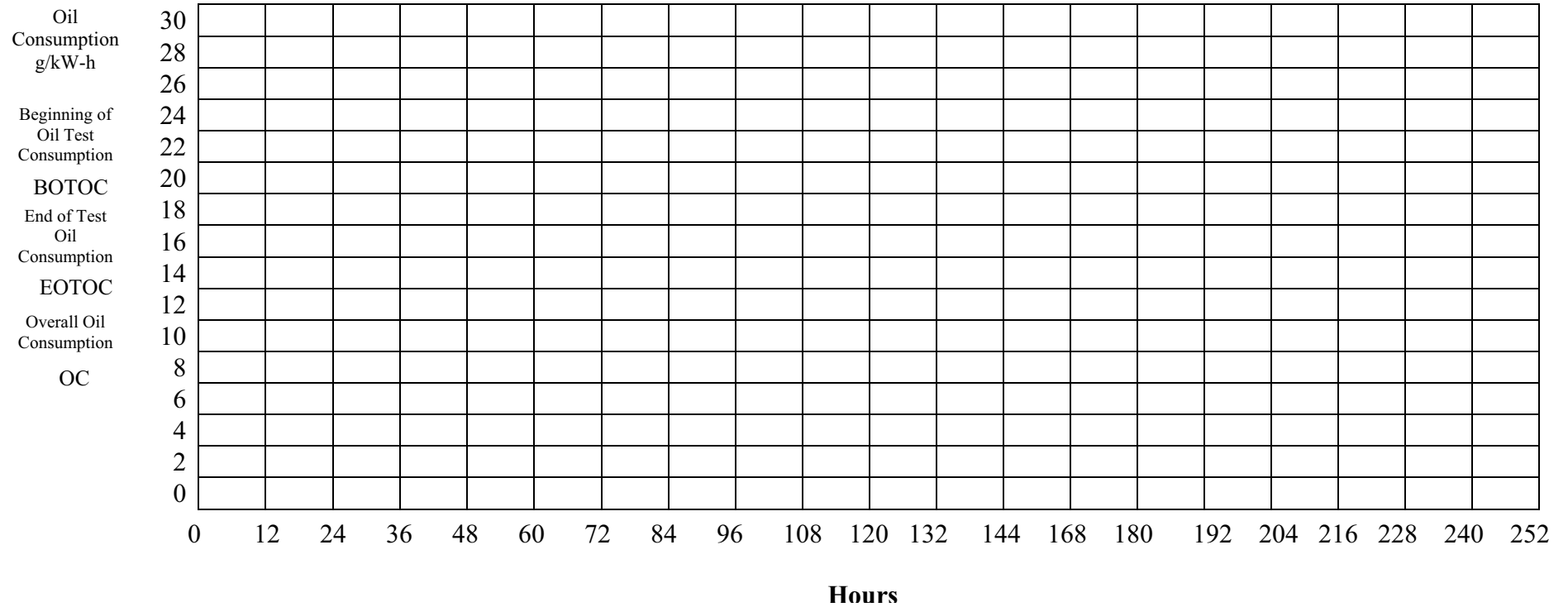
Lab: LAB	EOT Date: DTCOMP	End Time: EOTTIME	Method: METHOD
Stand: STAND	Run Number: ENRUN		
Formulation/Stand Code: FORM			
Oilcode/CMIR: OILCODE			CMIR

Data From Last 10 Tests

Test No.	1	2	3	4	5	6	7	8	9	10
Average Exhaust Temperature °C	AEXHR001	AEXHR002	AEXHR003	AEXHR004	AEXHR005	AEXHR006	AEXHR007	AEXHR008	AEXHR009	AEXHR010
Average Engine Torque Nm	ATORR001	ATORR002	ATORR003	ATORR004	ATORR005	ATORR006	ATORR007	ATORR008	ATORR009	ATORR010

1P
Form 13
Oil Consumption Plot

Lab: LAB	EOT Date: DTCOMP	End Time: EOTTIME	Method: METHOD
Stand: STAND	Run Number: ENRUN		
Formulation/Stand Code: FORM			
Oilcode/CMIR: OILCODE		CMIR	



OCPIM

1P
Form 14
Piston Ring and Liner Photographs

Lab: LAB	EOT Date: DTCOMP	End Time: EOTTIME	Method: METHOD
Stand: STAND	Run Number: ENRUN		
Formulation/Stand Code:	FORM		
Oilcode/CMIR: OILCODE			CMIR

PRLIM

Refer to Appendix A14 for example of Photo Layout

1P
Form 15
Severity Adjustment History

Lab: LAB	EOT Date: DTCOMP	End Time: EOTTIME	Method: METHOD
Stand: STAND	Run Number: ENRUN		
Formulation/Stand Code: FORM			
Oilcode/MIR: OILCODE CMIR			

Usage Dates	WDP	TGC		TLC		Transformed OC		Transformed FOTOC			
		Zi	S.A.	Zi	S.A.	Zi	S.A.	Zi	S.A.		
Start Time	Zi	S.A.	Zi	S.A.	Zi	S.A.	Zi	S.A.	Zi	S.A.	
DTSTR001	DTTMR001	WDZIR001	WDSAR001	TGZIR001	TGSAR001	TLZIR001	TLSAR001	OCZIR001	OCSAR001	ETZIR001	ETSAR001
DTSTR002	DTTMR002	WDZIR002	WDSAR002	TGZIR002	TGSAR002	TLZIR002	TLSAR002	OCZIR002	OCSAR002	ETZIR002	ETSAR002
DTSTR003	DTTMR003	WDZIR003	WDSAR003	TGZIR003	TGSAR003	TLZIR003	TLSAR003	OCZIR003	OCSAR003	ETZIR003	ETSAR003
DTSTR004	DTTMR004	WDZIR004	WDSAR004	TGZIR004	TGSAR004	TLZIR004	TLSAR004	OCZIR004	OCSAR004	ETZIR004	ETSAR004
DTSTR005	DTTMR005	WDZIR005	WDSAR005	TGZIR005	TGSAR005	TLZIR005	TLSAR005	OCZIR005	OCSAR005	ETZIR005	ETSAR005
DTSTR006	DTTMR006	WDZIR006	WDSAR006	TGZIR006	TGSAR006	TLZIR006	TLSAR006	OCZIR006	OCSAR006	ETZIR006	ETSAR006
DTSTR007	DTTMR007	WDZIR007	WDSAR007	TGZIR007	TGSAR007	TLZIR007	TLSAR007	OCZIR007	OCSAR007	ETZIR007	ETSAR007
DTSTR008	DTTMR008	WDZIR008	WDSAR008	TGZIR008	TGSAR008	TLZIR008	TLSAR008	OCZIR008	OCSAR008	ETZIR008	ETSAR008
DTSTR009	DTTMR009	WDZIR009	WDSAR009	TGZIR009	TGSAR009	TLZIR009	TLSAR009	OCZIR009	OCSAR009	ETZIR009	ETSAR009
DTSTR010	DTTMR010	WDZIR010	WDSAR010	TGZIR010	TGSAR010	TLZIR010	TLSAR010	OCZIR010	OCSAR010	ETZIR010	ETSAR010
DTSTR011	DTTMR011	WDZIR011	WDSAR011	TGZIR011	TGSAR011	TLZIR011	TLSAR011	OCZIR011	OCSAR011	ETZIR011	ETSAR011
DTSTR012	DTTMR012	WDZIR012	WDSAR012	TGZIR012	TGSAR012	TLZIR012	TLSAR012	OCZIR012	OCSAR012	ETZIR012	ETSAR012
DTSTR013	DTTMR013	WDZIR013	WDSAR013	TGZIR013	TGSAR013	TLZIR013	TLSAR013	OCZIR013	OCSAR013	ETZIR013	ETSAR013
DTSTR014	DTTMR014	WDZIR014	WDSAR014	TGZIR014	TGSAR014	TLZIR014	TLSAR014	OCZIR014	OCSAR014	ETZIR014	ETSAR014
DTSTR015	DTTMR015	WDZIR015	WDSAR015	TGZIR015	TGSAR015	TLZIR015	TLSAR015	OCZIR015	OCSAR015	ETZIR015	ETSAR015

1P
Form 16
Fuel Batch Analysis

Lab: LAB	EOT Date:	DTCOMP	End Time: EOTTIME	Method: METHOD
Stand: STAND	Run Number:	ENRUN		
Formulation/Stand Code: FORM				
Oilcode/CMIR:OILCODE				CMIR

FUELLIM

1P
Form 17
TMC Control Chart Analysis
(Reference Oil Tests Only)

Lab: LAB	EOT Date: DTCOMP	End Time: EOTTIME	Method: METHOD
Stand: STAND	Run Number: ENRUN		
Formulation/Stand Code: FORM			
Oilcode/CMIR: OILCODE			CMIR

CCHIM

1P
Form 18
American Chemistry Council Code of Practice
Test Laboratory Conformance Statement

Test Laboratory	SUBLAB				
Test Sponsor	TSTSPONI				
Formulation / Stand Code	FORM		TESTNUM		
Test Number	TESTNUM				
Start Date	DSTRT	Start Time	STRTIME	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 ESRQME No ORQME*

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 ESNODEC* No NONODEC

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 Appropriate Conclusion

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