

**IR SCOTE Test Procedure  
Form 1**

Method **METHOD**  
Version **IR VERSION 20030409**  
Conducted For  
**TSTSPON1**  
**TSTSPON2**

<b>LABVALID</b>	<b>V = Valid</b>
	<b>I = Invalid</b>
<b>N = Results Can Not Be Interpreted As Representative of Oil Performance (Non-Reference Oil) and Shall Not Be Used For Multiple Test Acceptance Criteria.</b>	

<b>TSTOIL</b>	<b>RO = Reference Oil Test</b>
	<b>NR = All Other Tests</b>

<b>CALDFLAG</b>	<b>Was This Test Run Under a Valid Calibration? (Y/N)</b>
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<b>LABQIA</b>	<b>Lab Is Currently Operating Under An LTMS Precision Alarm *</b>
<b>STANDQIA</b>	<b>Stand Is Currently Operating Under An LTMS Precision Alarm *</b>

\* Check box only if YES

<b>Test Number</b>			
Test Stand:	<b>STAND</b>	Engine Run	<b>ENRUN</b>
EOT Time:	<b>EOTTIME</b>	EOT Date:	<b>DTCOMP</b>
Oil Code: <b>OILCODE</b>			
Formulation/Stand <b>FORM</b>			
Alternate Codes: <b>ALTCODE1</b>		<b>ALTCODE2</b>	<b>ALTCODE3</b>
SAE Viscosity Grade: <b>SAEVIISC</b>			

In my opinion this test **OPVALID** been conducted in accordance with the Test Procedure (Research Report) and the appropriate amendments through the information letter system. The remarks included in the report describe the anomalies associated with this test.

SUBMITTED BY: \_\_\_\_\_ **SUBLAB**  
 \_\_\_\_\_ Testing Laboratory  
 \_\_\_\_\_ **SUBSIGIM**  
 \_\_\_\_\_ Signature  
 \_\_\_\_\_ **SUBNAME**  
 \_\_\_\_\_ Typed Name  
 \_\_\_\_\_ **SUBTITLE**  
 \_\_\_\_\_ Title

**IR SCOTE Test Procedure**  
**Form 2**  
**Test Report Summary**

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

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

	CORRECTION EFFECTIVE DATE	WD	TGC	TLC	BOTOC g/h	EOTOC g/h	Oil Con. Delta EOTOC-BOTOC g/h
Unadjusted Lab Rating		WD	TGC	TLC	BOTOC	EOTOC	DOC
Industry Correction (If Any)	DATECF	WD CF	TG CCF	TLC CF	BOTOCCI	EOTOCCE	DOCCF
Subtotal		WDCOR	TGCCOR	TLCOR	OTOCCO	OTOCCO	DOCCOR
Lab Severity <sup>B</sup> Adjustment (If Any)	DATESA	WDSA	TGCSA	TLCSA	BOTOCSA	EOTOCSA	DOCSA
Total		WDFNL	TGCFNL	TLCFNL	OTOCEN	OTOCFN	DOCFNL

	EFFECTIVE DATE	WD	TGC	TLC	BOTOC g/h	EOTOC g/h	Oil Con. Delta EOTOC-BOTOC g/h
Test Target Mean <sup>A</sup>	EFFDATE	WDM	TGCM	TLCM	BOTOCM	EOTOCM	DOCM
Test Target Std <sup>A</sup>	EFFDATE	WDS	TGCS	TLCS	BOTOCs	EOTOCs	DOCS
API CATEGORY <sup>B</sup> Pass Limit	DTCEFF	WDPL	TGCPL	TLCPL	BOTOCPL	EOTOCPL	DOCPPL

Referee Ratings	Referee Lab	WD	TGC	TLC
	RRLAB	RRWD	RRTGC	RRTLC

	Rings			Piston		Cylinder Liner
	Top	Inter. 1	Oil	Crown	Skirt	
Ring Loss of Side Clearance (mm)	L_SCTOP	L_SCINT1	L_SCOIL			
Ring End Gap Increase (mm)	RINGGTI	RINGGII	RINGGOI			
Is the Ring Stuck?	STUCKTOP	STUCKINI	STUCKOIL			
Scuffed Area %	SCUFFTOP	SCUFFINI	SCUFFOIL	SCUFFCRON	SCUFFSKRT	SCUFFLIN
Average Wear Step (µm)						AWEARST
% Bore Polish						BOREPOL

Notes: <sup>A</sup>Reference oil tests or as requested by test sponsor  
<sup>B</sup>Non-reference oil tests only

**IR SCOTE Test Procedure  
Form 3  
Operational Summary**

Lab: LAB	EOT Date: DTCOMP	End Time: EOTTIME	Method: METHOD					
Stand: STAND	Run Number: ENRUN							
Formulation/Stand Code: FORM								
Oilcode: OILCODE								
CONTROLLED PARAMETERS								
Operating Parameter	Quality Index Threshold	EOT Quality Index	Process		Total Data Points			
			Units	Target	Average	Samples <sup>A</sup>	BQD <sup>B</sup>	Over/Under Range <sup>C</sup>
Engine Speed	0.00	ORPM	r/min	1800	ARPM	NRPM	BRPM	ORPM
Fuel Flow	0.00	QFLO	g/min	240	AFFLO	NFFLO	BFFLO	OFFLO
Humidity	0.00	QHUMID	g/kg	17.8	AHUMID	NHUMID	BHUMID	OHUMID
Coolant Flow	0.00	QCOLFLO	L/min	75	ACOLFLO	NCOLFLO	BCOLFLO	OCOLFLO
Temperature								
Coolant Out	0.00	QCOLOUT	°C	105	ACOLOUT	NCOLOUT	BCOLOUT	OCOLOUT
Oil to Manifold	0.00	QOMANTMI	°C	120	QOMANTMI	NOMANTMI	BOMANTMI	OOMANTMI
Inlet Air Manifold	0.00	QINAIPT	°C	60	AINAIPT	NINAIPT	BINAIPT	OINAIPT
Fuel into Head	0.00	QFUELTMP	°C	42	AFUELTMP	NFUELTMP	BFUELTMP	OFUELTMP
Pressures								
Oil to Manifold	0.00	QOMANPR	kPa	415	AOMANPR	NOMANPR	BOMANPR	OOMANPR
Inlet Air (Abs.)	0.00	QINAI RP	kPa	292	AINAI RP	NINAI RP	BINAI RP	OINAI RP
Fuel From Head	0.00	QFUELPR	kPa	275	AFUELPR	NFUELPR	BFUELPR	OFUELPR
Exhaust (Abs.)	0.00	QEBP	kPa	252	AEBP	NEBP	BEBP	OEBP
NON-CONTROLLED PARAMETERS								
Operating Parameter	Process		Total Data Points					
	Units	Typical Range <sup>D</sup>	Average	Samples <sup>A</sup>	BQD <sup>B</sup>	Over/Under Range <sup>C</sup>		
Intake Air Flow	kg/h	360-410	AAIRFLO					
Power	kW	65-70	APWR	NPWR	BPWR	OPWR		
Torque	Nm	330-350	ATORQUE	NTORQUE	BTORQUE	OTORQUE		
Blowby	L/min	20-56	ABLBY	NBLBY	BBLBY	OBLBY		
Temperature								
Coolant In	°C	97-101	ACOLIN	NCOLIN	BCOLIN	OCOLIN		
Coolant Delta T	°C	4-8	ACOLDT	NCOLDT	BCOLDT	OCOLDT		
Oil Cooler In	°C	120-124	AOCOOLIN	NOCOOLIN	BOCOOLIN	OOCOOLIN		
Heating Oil	°C	165 max.	AHEATOIL	NHEATOIL	BHEATOIL	OHEATOIL		
Exhaust	°C	590-620	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		

<sup>A</sup> Total number of data points taken as determined from test length and procedural specified sampling rate.

<sup>B</sup> Number of Bad Quality Data points not used in the calculation of the statistical measures.

<sup>C</sup> Number of points clipped by over/under range limits of the statistical measures.

<sup>D</sup> Gathered from IQ Matrix Test data.

**IR SCOTE Test Procedure  
Form 4  
Assembly Measurements And Part Record**

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

Assembly Measurements and Parts Record			
Injector Setting ( GO / NO-GO )			INJSET
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	LINERSN	LINERDC	A
Top Ring	TOPPN	TOPSN		E
Intermediate Ring	INTPN	INTSN		E
Oil Ring	OILPN	OILSN		E
Piston Crown	CROWPNP	CROWNSN	CROWDC	F
Piston Skirt	SKIRTPN	SKIRTSN		I
Fuel Injector	NOZZLEPN	NOZZLESN		K
ECM EPROM	ECMPN		ECMDC	
Piston Cooling Jet	PTUBEPN	PTUBESN		

<sup>A</sup> On liner O.D.  
<sup>B</sup> On liner O.D. (NNNN)  
<sup>C</sup> On box label  
<sup>D</sup> On top of piston

<sup>E</sup> On paper envelope containing the ring  
<sup>F</sup> Number below "E" located on piston top  
<sup>G</sup> Number below "E" located on piston top

<sup>H</sup> On bottom surface skirt  
<sup>I</sup> On bottom surface under pin bore  
<sup>J</sup> On top surface of plunger  
<sup>K</sup> On top surface of plunger – 6 digits  
<sup>L</sup> On ECAT software

**1R SCOTE Test Procedure  
Form 5  
Piston Rating Summary**

Lab: LAB	EOT Date: DTCOMP	End Time: EOTTIME	Stand: STAND	Run: ENRUN	Method: METHOD
Formulation/Stand Code: FORM			Oilcode: OILCODE		
Test Fuel: TESTFUEL	Fuel Batch: FUELBTID	Date Rated: DTRATE	Rater Initials: RINIT	Verified By: VRINIT	
<b>Last Stand Reference Information</b>	Date Completed: LRDTCOMP	Stand: STAND	Run: LRENRUN	TMC Oil Code: LIND	
	WD	TGC	TLC	BOTOC g/h	EOTOC g/h
Last Reference on this Stand	LRWD	LRTGC	LRTLCL	LRBOTOC	LREOTOC
Industry Average	LRAWD	LRATGC	LRATLCL	LRABTOC	LRAETOC
Industry Standard Deviation	LRSWD	LRSTGC	LRSTLCL	LRSBTOC	LRSETOC

**Total Piston Ratings Summary**

Deposit Factor	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,%	Demerit	A,%	Demerit	
	A,%	Demerit	A,%	Demerit	A,%	Demerit	A,%	Demerit		A,%	Demerit	A,%	Demerit	A,%	Demerit	A,%	Demerit	A,%	Demerit	
<b>C a r b o n</b>	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
	<b>Total</b>	G1ACTC	G1DCTC	G2ACTC	G2DCTC	L1ACTC	L1DCTC	L2ACTC	L2DCTC		G3ACTC	G3DCTC	L3ACTC	L3DCTC	L4ACTC	L4DCTC	OGACTC	OGDCTC	UCACTC	UCDCTC
<b>V a r i a n t</b>	8 - 9	G1V9A	G1V9D	G2V9A	G2V9D	L1V9A	L1V9D	L2V9A	L2V9D	7.5										
	7 - 7.9	G1V8A	G1V8D	G2V8A	G2V8D	L1V8A	L1V8D	L2V8A	L2V8D											
	6 - 6.9	G1V7A	G1V7D	G2V7A	G2V7D	L1V7A	L1V7D	L2V7A	L2V7D		G3V75A	G3V75D	L3V75A	L3V75D	L4V75A	L4V75D	OGV75A	OGV75D	UCV75A	UCV75D
	5 - 5.9	G1V6A	G1V6D	G2V6A	G2V6D	L1V6A	L1V6D	L2V6A	L2V6D											
	4 - 4.9	G1V5A	G1V5D	G2V5A	G2V5D	L1V5A	L1V5D	L2V5A	L2V5D											
	3 - 3.9	G1V4A	G1V4D	G2V4A	G2V4D	L1V4A	L1V4D	L2V4A	L2V4D		G3V45A	G3V45D	L3V45A	L3V45D	L4V45A	L4V45D	OGV45A	OGV45D	UCV45A	UCV45D
	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		G3V15A	G3V15D	L3V15A	L3V15D	L4V15A	L4V15D	OGV15A	OGV15D	UCV15A	UCV15D
	Clean	G1VCLN	0	G2VCLN	0	L1VCLN	0	L2VCLN	0		Clean	G3VCLN	0	L3VCLN	0	L4VCLN	0	OGVCLN	0	UCVCLN
<b>Total</b>	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			
Industry Rating	G1WD		G2WD		L1WD		L2WD		G3WD		L3WD		L4WD		OGWD		UCWD			
<b>WD:</b>	WD		<b>TLHC %:</b> TLHC		<b>TGF %:</b> TGF		<b>IGF %:</b> IGF		<b>TLFC %:</b> TLFC											
<b>Unweighted:</b>	UWD		<b>TLC:</b> TLC		<b>TGC:</b> TGC		<b>IGC:</b> IGC		<b>Under Crown Carbon:</b> UCC											

**IR SCOTE Test Procedure  
Form 5A**

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

RATEWSIM

Refer to Appendix A14 for an example of Piston Ring Worksheet.

**1R SCOTE Test Procedure**  
**Form 6**  
**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			

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	31THCA	31TMCA	31TLCA	G1T9A	G1T8A	G1T7A	G1T6A	G1T5A	G1T4A	G1T3A	G1T2A	G1T1A	31TCLNA
		B	31BHCA	31BMCA	31BLCA	G1B9A	G1B8A	G1B7A	G1B6A	G1B5A	G1B4A	G1B3A	G1B2A	G1B1A	31BCLNA
	2	T	32THCA	32TMCA	32TLCA	G2T9A	G2T8A	G2T7A	G2T6A	G2T5A	G2T4A	G2T3A	G2T2A	G2T1A	32TCLNA
		B	32BHCA	32BMCA	32BLCA	G2B9A	G2B8A	G2B7A	G2B6A	G2B5A	G2B4A	G2B3A	G2B2A	G2B1A	32BCLNA
	3	T	33THCA	33TMCA	33TLCA	G3T9A	G3T8A	G3T7A	G3T6A	G3T5A	G3T4A	G3T3A	G3T2A	G3T1A	33TCLNA
		B	33BHCA	33BMCA	33BLCA	G3B9A	G3B8A	G3B7A	G3B6A	G3B5A	G3B4A	G3B3A	G3B2A	G3B1A	33BCLNA
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	1BKHC	1BKMC	1BKLC	R1BK9A	R1BK8A	R1BK7A	R1BK6A	R1BK5A	R1BK4A	R1BK3A	R1BK2A	R1BK1A	1BKCLN.
	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	2BKHC	2BKMC	2BKLC	R2BK9A	R2BK8A	R2BK7A	R2BK6A	R2BK5A	R2BK4A	R2BK3A	R2BK2A	R2BK1A	2BKCLN.
	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	3BKHC	3BKMC	3BKLC	R3BK9A	R3BK8A	R3BK7A	R3BK6A	R3BK5A	R3BK4A	R3BK3A	R3BK2A	R3BK1A	3BKCLN.

**Additional Deposit & Condition Ratings**

Piston Crown	CROWNAD
Piston Skirt	SKIRTAD
Rings	RINGSAD
Liner	LINERAD

**1R SCOTE Test Procedure  
Form 6A  
Referee Rating**

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

<b>Total Piston Ratings Summary</b>																											
	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.													
<b>CARBON</b>	HC - 1.0	RRG1F	RRG1F	RRG2F	RRG2F	RRL1F	RRL1F	RRL2F	RRL2F		RRG3F	RRG3H	RRL3F	RRL3HC	RRL4H	RRL4HC											
	MC - 0.5	RRG1M	RRG1M								RRG3M	RRG3M															
	LC - .25	RRG1L	RRG1L	RRG2L	RRG2L	RRL1L	RRL1L	RRL2L	RRL2L		RRG3L	RRG3L	RRL3L	RRL3LC	RRL4L	RRL4LC	RROGL	RROGL	RRUCI	RRUCI							
	TOTAL	RG1A	RG1DC	RG2A	RG2DC	RL1A	RL1DC	RL2A	RL2DC		RG3AC	RG3DC	RL3AC	RL3DC	RL4AC	RL4DC	ROGAC	ROGDC	RUCAC	RUCDC							
<b>VARNI SH</b>	8 - 9	RRG1V	RRG1V	RRG2V	RRG2V	RRL1V	RRL1V	RRL2V	RRL2V	7.5																	
	7 - 7.9	RRG1V	RRG1V	RRG2V	RRG2V	RRL1V	RRL1V	RRL2V	RRL2V		RRG3V	RRG3V	RRL3V	RRL3V7	RRL4V	RRL4V75	RROGV	RRUCV	RROGV	RRUCV							
	6 - 6.9	RRG1V	RRG1V	RRG2V	RRG2V	RRL1V	RRL1V	RRL2V	RRL2V																		
	5 - 5.9	RRG1V	RRG1V	RRG2V	RRG2V	RRL1V	RRL1V	RRL2V	RRL2V	4.5																	
	4 - 4.9	RRG1V	RRG1V	RRG2V	RRG2V	RRL1V	RRL1V	RRL2V	RRL2V		RRG3V	RRG3V	RRL3V	RRL3V4	RRL4V	RRL4V45	RROGV	RRUCV	RROGV	RRUCV							
	3 - 3.9	RRG1V	RRG1V	RRG2V	RRG2V	RRL1V	RRL1V	RRL2V	RRL2V																		
	2 - 2.9	RRG1V	RRG1V	RRG2V	RRG2V	RRL1V	RRL1V	RRL2V	RRL2V	1.5																	
	1 - 1.9	RRG1V	RRG1V	RRG2V	RRG2V	RRL1V	RRL1V	RRL2V	RRL2V		RRG3V	RRG3V	RRL3V	RRL3V1	RRL4V	RRL4V15	RROGV	RRUCV	RROGV	RRUCV							
	>0 - 0.9	RRG1V	RRG1V	RRG2V	RRG2V	RRL1V	RRL1V	RRL2V	RRL2V																		
Clean	RRG1V	0	RRG2V	0	RRL1V	0	RRL2V	0	Clean	RRG3V	0	RRL3V	0	RRL4V	0	RROGV	0	RRUCV	0								
Total	RG1A	RG1DV	RG2A	RG2DV	RL1A	RL1DV	RL2A	RL2DV		RG3AV	RG3DV	RL3A	RL3DV	RL4A	RL4DV	ROGA	ROGD	RUCA	RUCDV								
Rating	RRG1UWD		RRG2UWD		RRL1UWD		RRL2UWD			RRG3UWD		RRL3UWD		RRL4UWD		RROGUW		RRUCUWD									
Location Factor	2		3		1		3			20		20		60		0.5		1									
Industry Rating	RRG1WD		RRG2WD		RRL1WD		RRL2WD			RRG3WD		RRL3WD		RRL4WD		RROGWD		RRUCWD									
<b>WD:</b> RRWD	<b>TLHC %:</b> RRTLHC			<b>TGF %:</b> RRTGF			<b>IGF %:</b> RRIGF			<b>TLFC %:</b> RRTLFC																	
<b>Unweighted:</b> RRUWD	<b>TLC:</b> RRTLC			<b>TGC:</b> RRTGC			<b>IGC:</b> RRIGC			<b>Undercrown Carbon:</b> RRUC																	



# 1R SCOTE Test Procedure

## Form 7

### Oil Analysis Data

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

Oil Analysis	New	TST_H036	TST_H072	TST_H108	ST_H144	ST_H188	ST_H216	TST_H252	ST_H288	ST_H324	ST_H360	ST_H396	ST_H432	ST_H468	TST_H504
VISC @ 100 °C	V100NEW	V100H036			V100H144			V100H252			V100H360		V100H432		V100H504
VISC @ 40 °C	V40_NEW	V40_H036			V40_H144			V40_H252			V40_H360		V40_H432		V40_H504
TBN D4739	TBN_NEW	TBN_H036			TAN_H144			TAN_H252			TAN_H360		TAN_H432		TAN_H504
TAN D664	TAN_NEW	TAN_H036			TBN_H144			TBN_H252			TBN_H360		TBN_H432		TBN_H504
TGA Soot %											TGA_H360		TGA_H432		TGA_H504

#### Wear Metals (ppm)

Fe	FEWMNEW	FEWMH036			FEWMH144			FEWMH252			FEWMH360		FEWMH432		FEWMH504
Al	ALWMNEW	ALWMH036			ALWMH144			ALWMH252			ALWMH360		ALWMH432		ALWMH504
Si	SIWMNEW	SIWMH036			SIWMH144			SIWMH252			SIWMH360		SIWMH432		SIWMH504
Cu	CUWMNEW	CUWMH036			CUWMH144			CUWMH252			CUWMH360		CUWMH432		CUWMH504
Cr	CRWMNEW	CRWMH036			CRWMH144			CRWMH252			CRWMH360		CRWMH432		CRWMH504
Pb	PBWMNEW	PBWMH036			PBWMH144			PBWMH252			PBWMH360		PBWMH432		PBWMH504

#### Other Results

Fuel Dilution	FDILH036										FDILH360				FDILH504
IR O <sub>2</sub>	IRO2H036				RO2H144			IRO2H252			IRO2H360		IRO2H432		IRO2H504
Blowby(L/min)	BLBYH036	BLBYH072	BLBYH108	BLBYH144	BLBYH180	BLBYH216	BLBYH252	BLBYH288	BLBYH324	BLBYH360	BLBYH396	BLBYH432	BLBYH468	BLBYH504	
Oil Consumption g/h for hrs ending	CONH036	CONH072	CONH108	CONH144	CONH180	CONH216	CONH252	CONH288	CONH324	CONH360	CONH396	CONH432	CONH468	CONH504	
Oil Consumption r <sup>2</sup>	CRRH036	CRRH072	CRRH108	CRRH144	CRRH180	CRRH216	CRRH252	CRRH288	CRRH324	CRRH360	CRRH396	CRRH432	CRRH468	CRRH504	
Fuel Position (mm)	FPOSH036						FPOSH252				FPOSH360				FPOSH504

**Note:**

- (1) Total oil in system 5800 ± 50 g
- (2) Refill oil scale cart to full level every 36 h. Take oil samples at hours shown before adding oil.

**IR SCOTE Test Procedure**  
**Form 8**  
**Downtime Summary**

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

Number of Downtime Occurrences		DWNOCR	Reasons
Test Hours	Date	Downtime	
DOWNR001	DDATR001	DTMR001	DREAR001
DOWNR002	DDATR002	DTMR002	DREAR002
DOWNR003	DDATR003	DTMR003	DREAR003
DOWNR004	DDATR004	DTMR004	DREAR004
DOWNR005	DDATR005	DTMR005	DREAR005
DOWNR006	DDATR006	DTMR006	DREAR006
DOWNR007	DDATR007	DTMR007	DREAR007
DOWNR008	DDATR008	DTMR008	DREAR008
DOWNR009	DDATR009	DTMR009	DREAR009
DOWNR010	DDATR010	DTMR010	DREAR010
DOWNR011	DDATR011	DTMR011	DREAR011
DOWNR012	DDATR012	DTMR012	DREAR012
DOWNR013	DDATR013	DTMR013	DREAR013
DOWNR014	DDATR014	DTMR014	DREAR014
DOWNR015	DDATR015	DTMR015	DREAR015
<b>TOTLDOWN</b>			<b>Total Downtime (125 HR. MAX)</b>

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

**IR SCOTE Test Procedure  
Form 8A  
Downtime Summary**

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

Test Hours	Date	Downtime	Number of Downtime Occurrences		Reasons
			DW/NOCR		
DOWNR016	DDATR016	DTMR016	DREAR016		
DOWNR017	DDATR017	DTMR017	DREAR017		
DOWNR018	DDATR018	DTMR018	DREAR018		
DOWNR019	DDATR019	DTMR019	DREAR019		
DOWNR020	DDATR020	DTMR020	DREAR020		
DOWNR021	DDATR021	DTMR021	DREAR021		
DOWNR022	DDATR022	DTMR022	DREAR022		
DOWNR023	DDATR023	DTMR023	DREAR023		
DOWNR024	DDATR024	DTMR024	DREAR024		
DOWNR025	DDATR025	DTMR025	DREAR025		
DOWNR026	DDATR026	DTMR026	DREAR026		
DOWNR027	DDATR027	DTMR027	DREAR027		
DOWNR028	DDATR028	DTMR028	DREAR028		
DOWNR029	DDATR029	DTMR029	DREAR029		
DOWNR030	DDATR030	DTMR030	DREAR030		
<b>TOTLDOWT</b>			<b>Total Downtime (125 HR. MAX)</b>		

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

**IR SCOTE Test Procedure  
Form 8B  
Downtime Summary**

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

Test Hours	Date	Downtime	Number of Downtime Occurrences		Reasons
			DWNOCR		
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		
<b>TOTLDOWN</b>			<b>Total Downtime (125 HR. MAX)</b>		

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

## IR SCOTE Test Procedure Form 9 Ring Measurements

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

All Ring Measurements Are Made Using Metric Feeler Gages

Ring Gaps Specifications (mm)	1Y4014 Top	1Y4013 Intermediate	1Y4012 Oil
	0.350 – 0.550	0.754 – 0.906	0.400 – 0.750
Pre-Test	RINGGTE	RINGGIE	RINGGOE
Post-Test	RINGGTO	RINGGIO	RINGGOO
Increase	RINGGTI	RINGGII	RINGGOI

Ring Side Clearance*	A	B	C	D	Average	Minimum	Specification	
<b>Top</b>	Pre-Test	SIDETPE1	SIDETPE2	SIDETPE3	SIDETPE4	ASIDETPE	ISIDETPE	0.090 mm – 0.127 mm
	Post-Test	SIDETPO1	SIDETPO2	SIDETPO3	SIDETPO4	ASIDETPO	ISIDETPO	
	LSC	LSCT1	LSCT2	LSCT3	LSCT4	LSCTOP	ILSCT	
<b>Int.</b>	Pre-Test	SIDE1PE1	SIDE1PE2	SIDE1PE3	SIDE1PE4	ASIDE1PE	ISIDE1PE	0.060 mm – 0.110 mm
	Post-Test	SIDE1PO1	SIDE1PO2	SIDE1PO3	SIDE1PO4	ASIDE1PO	ISIDE1PO	
	LSC	LSCI1	LSCI2	LSCI3	LSCI4	LSCINT1	ILSCINT	
<b>Oil</b>	Pre-Test	SIDEOP1	SIDEOP2	SIDEOP3	SIDEOP4	ASIDEOP	ISIDEOP	0.030 mm – 0.080 mm
	Post-Test	SIDEOP1	SIDEOP2	SIDEOP3	SIDEOP4	ASIDEOP	ISIDEOP	
	LSC	LSCO1	LSCO2	LSCO3	LSCO4	LSCOIL	ILSCO	

\* Notes:

1. Write “STUCK” in place of dimension when applicable.
2. Write “<0.03 mm” for clearance when applicable.
3. Write “>” before calculated decrease or average decrease values that incorporate a “<0.03 mm” in calculation.
4. LSC = Loss of side clearance
5. MIN: Oil Ring minimum side clearance is measured 360° around piston.

**IR SCOTE Test Procedure**  
**Form 10**  
**Liner Measurements**

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

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

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

Liner Bore Measurement (137.154 mm minimum)			
Before Test - Diameter (Dial Bore Gage)			
Bore Height	Longitudinal	Transverse	Out of Round (0.038 mm max)
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 mm max.)	TAPRLONG	TAPRTRAN	
After Test – (Surface Profile)			
Longitudinal µm		Transverse µm	
	Front	Rear	T
	AWEARLF	AWEARLR	AWEARTT
	AWEARLRF	AWEARLR	AWEARRTT
	AWEARLRF	AWEARLR	AWEARRTT

**1R SCOTE Test Procedure  
Form 11  
Characteristics of the Data Acquisition System**

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

Parameter (1)	Sensing Device (2)	Calibration Frequency (3)	Record Device (4)	Observation Frequency (5)	Record Frequency (6)	Log Frequency (7)	System Response (8)
<b>Operation Conditions</b>							
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
<b>Temperatures (°C)</b>							
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
<b>Pressures (kPa)</b>							
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 from Head	FFILSENS	FFILCALF	FFILRECD	FFILOBSF	FFILRECF	FFILLOGF	FFILSYSR
Crankcase	CCVSENS	CCVCALF	CCVRECD	CCVOBSF	CCVRECF	CCVLOGF	CCVSYSR
<b>Flows (L/min)</b>							
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) THE FREQUENCY AT WHICH THE MEASUREMENT IS CALIBRATED
- (4) THE TYPE OF DEVICE WHERE DATA IS RECORDED
  - LG – HANDLOG SHEET
  - DL – AUTOMATIC DATA LOGGER
  - SC – STRIP CART RECORDER
  - C/N – COMPUTER, USING MANUAL ENTRY
  - C/D – COMPUTER, USING DIRECT I/O ENTRY

- (5) DATA 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:
  - 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

**IR SCOTTE Test Procedure**  
**Form 12**  
**Engine Operational Data Plots**

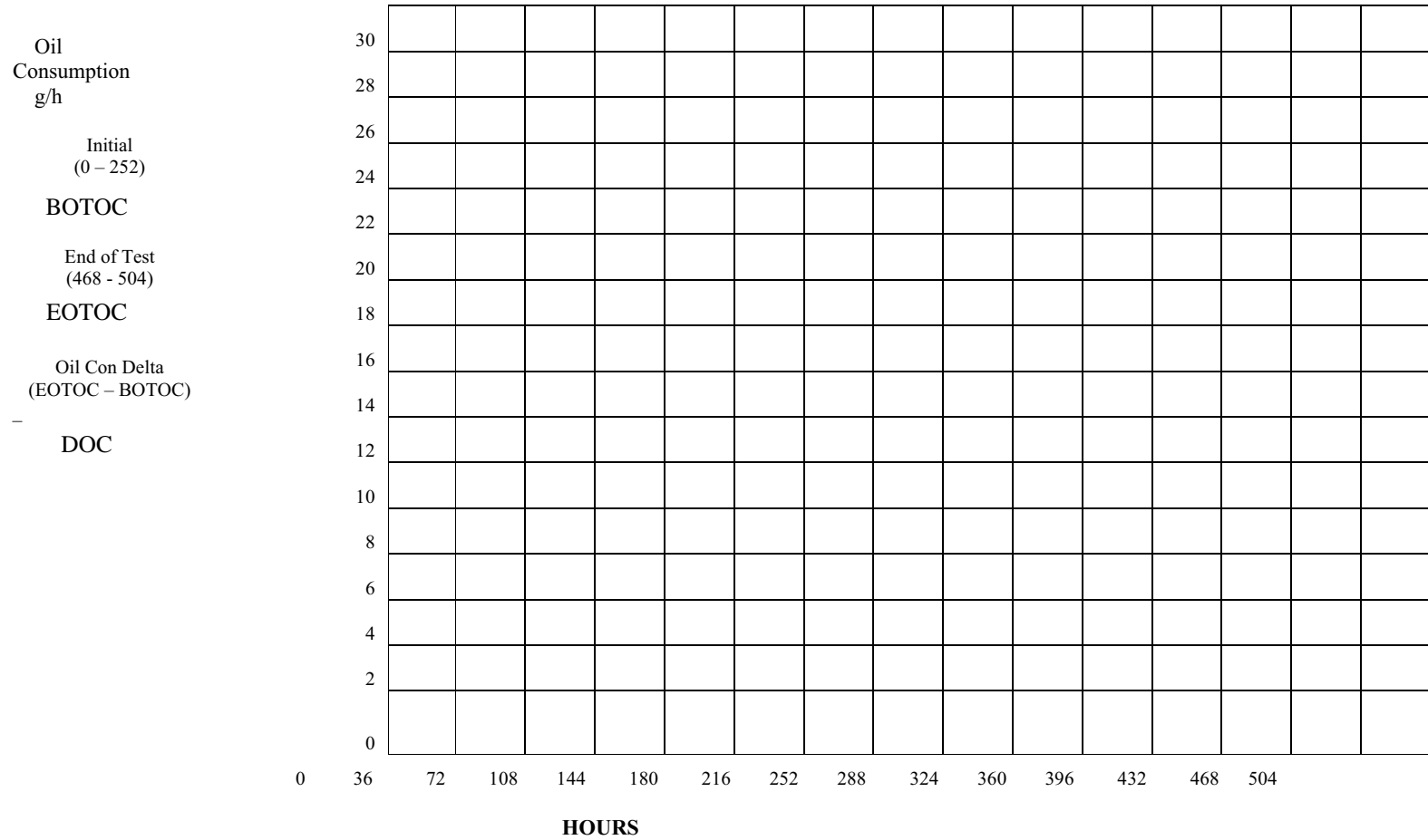
Lab: LAB	EOT Date: DTCOMP	End Time: EOTTIME	Method: METHOD
Stand: STAND			Run: ENRUN
Formulation/Stand Code: FORM			
Oilcode: OILCODE			





**1R SCOTE Test Procedure  
Form 14  
Oil Consumption**

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



**IR SCOTTE Test Procedure**  
**Form 15**  
**Piston, Ring and Liner Photographs**

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

PRLIM

Refer to Appendix A14 for an example of Photo



**IR SCOTE Test Procedure**  
**Form 17**  
**Fuel Batch Analysis**

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

FUELM

Refer to Appendix A14 for examples of appropriate Fuel Batch Analysis

**IR SCOTE Test Procedure**  
**Form 18**  
**TMC Control Chart Analysis**  
**(Reference Oil Tests Only)**

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

CCHIM

Refer to Appendix A14 for examples of Control Chart Analysis page.