

**ISM
Lubricant Performance Test**

Report Packet Version No.
ISM VERSION 20050125 BETA

Method
METHOD

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 oil / 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 an average test result using multiple test criteria.

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

Stand:	STAND	Engine:	ENGINE	Engine Run No:	ENRUN
End Of Test Date:	DTCOMP	End Of Test Time:	EOTTIME		
Oil Code:	OILCODE				
Formulation / Stand Code:	FORM				
Alternate Codes:	ALTCODE1	ALTCODE2	ALTCODE3		

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

Submitted By:

SUBLAB

Testing Laboratory

SUBSIGIM

Signature

SUBNAME

Typed Name

SUBTITLE

Title

**ISM Lubricant Performance Test
Form 2
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**ISM Lubricant Performance Test
Form 3
Summary Of Test Method**

The ISM Lubricant Performance Test is an engine-dynamometer test which evaluates the ability of a lubricant to minimize crosshead wear, filter plugging and sludge build-up. This test is a two-stage, steady state test (constant speed and load). Stage A is 50 hours and is run with retarded fuel injection timing to produce elevated soot levels in the oil. Stage B is 50 hours and is run under heavy load conditions to induce wear. The stages are run in sequence (Stage A followed by Stage B) twice for a total test length of 200 hours.

The test engine is a Cummins ISM diesel engine with EGR. It is an in-line six cylinder, four-stroke, turbocharged engine with electronically controlled fuel injection. A two-h break-in is conducted prior to each test since a new engine build is used for each test.

ISM Test Conditions

Parameter	Stage A	Stage B
Time, h	50	50
Injection Timing, °BTDC	Variable	Variable
Speed, r/min	1800	1600
Fuel Flow, kg/h	58.0	64.4
Intake CO 2%	0.97 - 1.09	0.97 - 1.09
Inlet Manifold Temp., °C	80	65.5
Coolant Out Temp., °C	65.5	65.5
Fuel In Temp., °C	40	40
Oil Gallery Temp., °C	115	115
Intake Air Temp., °C	Record	Record
Intake Air Pressure, kPa absolute	Record	Record
Intake Manifold Pressure, kPa absolute	300 Minimum	320 Minimum
Exhaust Back Pressure, kPa absolute	107	107
Crankcase Pressure, kPa	Record	Record
Coolant System Pressure, kPa	99 - 107	99 - 107
Power, kW	Record	Record
Torque, Nm	Record	Record
Pre-turbine Exhaust Temp., °C	Record	Record
Tailpipe Exhaust Temp., °C	Record	Record
Oil Sump Temp., °C	Record	Record
Inlet Air Dew Point, °C	Record	Record
Inlet Air Humidity, kg/kg	Record	Record
Oil Gallery Pressure, kPa	Record	Record
Oil Filter Delta P, kPa	Record	Record

**ISM Lubricant Performance Test
Test Results Summary
Form 4**

Laboratory: LAB	EOT Date: DTCOMP	EOT Time: EOTTIME
Stand: STAND	Engine: ENGINE	Engine Run No.: ENRUN
Formulation/Stand Code:		FORM
Oil Code: OILCODE	Engine Kit S/N: ENKIT	

Date Test Started	DTSTRT
Start Time	STRTTIME
Test Length	TESTLEN
TMC Oil Code ^A	IND
Laboratory Oil Code	LABOCODE
SAE Viscosity	SAEVISC
TGA Soot % At 50 h	TGA050
TGA Soot % At 150 h	TGA150
Average TGA Soot % 0 - 200 h	TGAAVG
Total Oil Consumption, kg	TOTOCON

	Average Crosshead Mass Loss (mg)	Filter Plugging Delta P (kPa)	Average Sludge Rating (merits)
Original Result	ACWL	OILDPA	ASRT
Transformed Result ^B	TRNACWL	TRNODP	TRNASRT
Correction Factor ^B	ACWLCF	OILDPCF	ASRTCF
Corrected Transformed Result ^B	ACWLCOR	OILDPCOR	ASRTCOR
Severity Adjustment ^B	ACWL_SA	OILDPA_SA	ASRT_SA
Final Transformed Result ^B	TACWLFNL	TODPFNL	TASRTFNL
Final Result	ACWLFNL	OILDPFNL	ASRTFNL

Last Stand Reference Results			
Stand: STAND	Engine: RENGINE	Engine Run No.: RENRUN	
Oil Code :		ROILCODE	
Test Length		RTESTLEN	
TMC Oil Code		RIND	
EOT Date		RDTCOMP	
EOT Time		REOTTIME	
Stand Calibration Expiration Date		DTCALEXP	
TGA Soot % At 50 h		RTGA050	
TGA Soot % At 150 h		RTGA150	
Average TGA Soot % 0 - 200 h		RTGAAVG	
Total Oil Consumption, kg		RTOTOCON	
	Average Crosshead Mass Loss (mg)	Filter Plugging Delta P (kPa)	Average Sludge Rating (merits)
Final Result	RACWLFNL	RFPDPFNL	RASRTFNL

^A Reference Tests Only

^B Filter Plugging Delta P Value in Transformed Units

**ISM Lubricant Performance Test
Form 5
Operational Summary**

Laboratory:	LAB	DTCOMP	EOT Time:	EOTIME
Stand:	STAND	ENGINE	Engine Run No.:	ENRUN
Formulation/Stand Code:				
FORM				
Oil Code:				
OILCODE				

Parameter	Units	QI Threshold	EOT QI ^A	Target		Average		Samples ^B	BQD ^C	Over/Under Range ^D
				1800	1600	ARPMA	ARPMB			
Speed	r/min	0.000	QRPM	58.0	64.4	AFFLOA	AFFLOB	NFFLO	BFFLO	OFFLO
Fuel Flow	kg/h	0.000	QFLO	65.5		ACOLOUT		NCOLOUT	BFCOLOUT	OCOLOUT
Coolant Out	°C	0.000	QCLOUT	40		AFUELT		NFUELT	BFUELT	OFUELT
Fuel In	°C	0.000	QFUELT	115		AOILTEM		NOILTEM	BOILTEM	OILTEM
Oil Gallery	°C	0.000	QOILTEM	80.0	65.5	AINMANTA	AINMANTB	NINMANT	BINMANT	OINMANT
Intake Manifold	°C	0.000	QINMANT	107		AEXHSTP		NEXHSTP	BEXHSTP	OEXHSTP
Exhaust	kPa	0.000	QEXHSTP							
Parameter	Units	Typical Values^E								
Torque	N-m	TBD	TBD	ALOADA		ALOADB				
Power	kW	TBD	TBD	APWRA		APWRB				
Intake CO	%	0.97 – 1.09	0.97 – 1.09	AICO2A		AICO2B				
Blowby	L/min		TBD	ABLOBY						
Coolant In	°C		TBD	ACOLIN						
Intake Air	°C		TBD	AINAIRT						
Pre-Turbine	°C		TBD	APTURT						
Tailpipe	°C		TBD	ATAILPT						
Fuel	kPa		TBD	AFPMP						
Oil Gallery	kPa		TBD	AOILPRS						
Coolant	kPa		99 - 107	ACOLOUP						
Intake Manifold	kPa		TBD	AINMANP						
Crankcase	kPa		TBD	ACCASEP						
Intake Air	kPa		TBD	AINAIRR						

^A QI values above the threshold are acceptable by the Cummins Surveillance Panel. QI values below the threshold may not be considered acceptable based on an engineering review. See the comments section of this report.

^B Total number of data points taken

^C Number of Bad Quality Data points not used in the calculation of the statistical measures

^D Number of points clipped by over/under range limits

^E Typical values determined from reference oil test database

**ISM Lubricant Performance Test
Form 6
Crosshead Mass Loss Summary**

Laboratory: LAB	EOT Date: DTCOMP	EOT Time: EOTTIME
Test Number		
Stand: STAND	Engine: ENGINE	Engine Run No.: ENRUN
Formulation / Stand Code:		FORM
Oil Code:		OILCODE

Location	Serial No.	Pretest Mass (g)	EOT Mass (g)	Mass Loss (mg)
1E	CHDSN1E	CHDPTW1E	CHDEW1E	CHDEWL1E
1I	CHDSN1I	CHDPTW1I	CHDEW1I	CHDEWL1I
2I	CHDSN2I	CHDPTW2I	CHDEW2I	CHDEWL2I
2E	CHDSN2E	CHDPTW2E	CHDEW2E	CHDEWL2E
3E	CHDSN3E	CHDPTW3E	CHDEW3E	CHDEWL3E
3I	CHDSN3I	CHDPTW3I	CHDEW3I	CHDEWL3I
4I	CHDSN4I	CHDPTW4I	CHDEW4I	CHDEWL4I
4E	CHDSN4E	CHDPTW4E	CHDEW4E	CHDEWL4E
5E	CHDSN5E	CHDPTW5E	CHDEW5E	CHDEWL5E
5I	CHDSN5I	CHDPTW5I	CHDEW5I	CHDEWL5I
6I	CHDSN6I	CHDPTW6I	CHDEW6I	CHDEWL6I
6E	CHDSN6E	CHDPTW6E	CHDEW6E	CHDEWL6E

Intake / Exhaust Summary	Intake		Exhaust	
	As Measured	Outlier Screened	As Measured	Outlier Screened
Average Crosshead Mass Loss (mg)	ACHDWLI	OACHDWLI	ACHDWLE	OACHDWLE
Minimum Crosshead Mass Loss (mg)	ICHDWLI	OICHDWLI	ICHDWLE	OICHDWLE
Maximum Crosshead Mass Loss (mg)	XCHDWLI	OXCHDWLI	XCHDWLE	OXCHDWLE
Standard Deviation (mg)	SCHDWLI	OSCHDWLI	SCHDWLE	OSCHDWLE
Outlier Crossheads Locations ⁴	CHDOUTI		CHDOUTE	

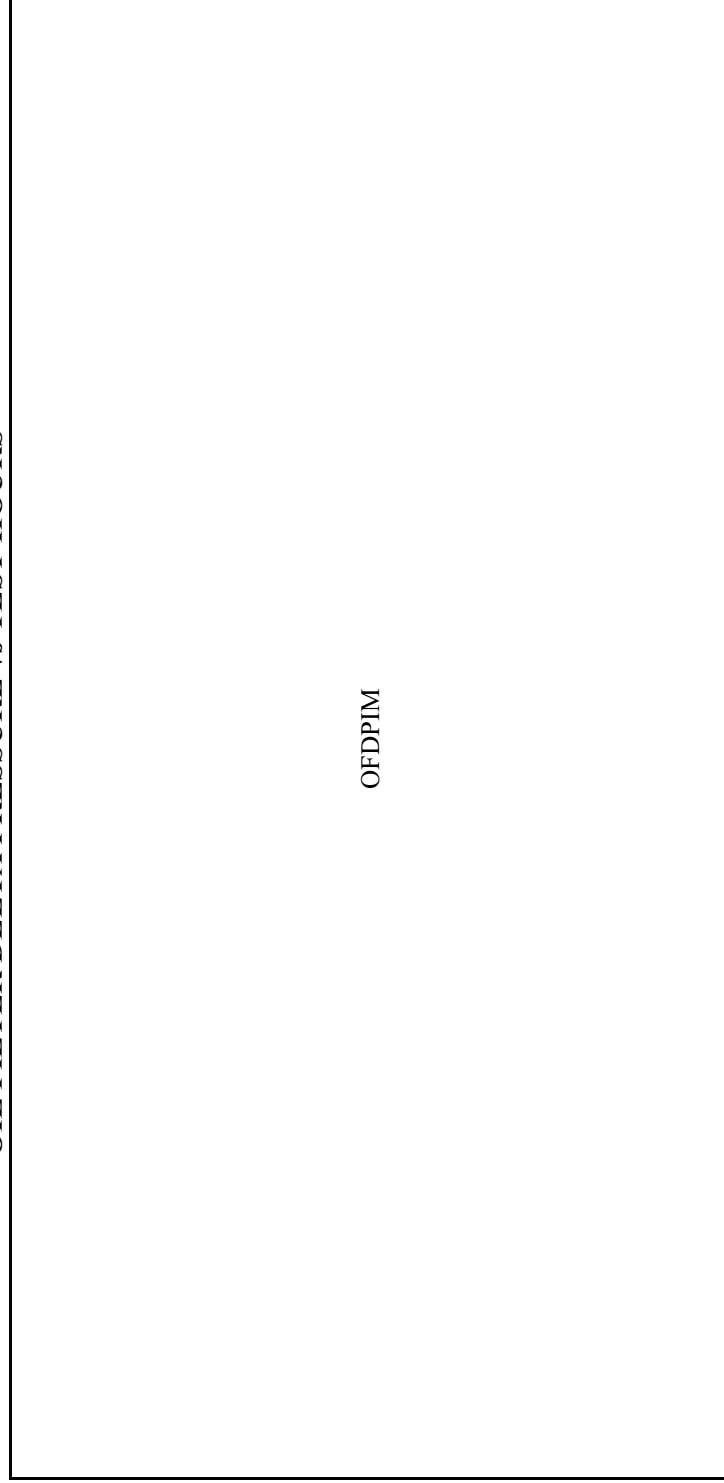
⁴ Location Designation. Example: 3E

Overall Summary	As Measured	Outlier Screened	Result
Average Crosshead Mass Loss (mg)	AMACAWL	CAWL	ACWL
Minimum Crosshead Mass Loss (mg)	AMICAWL	ICHDEWL	
Maximum Crosshead Mass Loss (mg)	AMXCAWL	XCHDEWL	
Standard Deviation (mg)	AMSCAWL	SCHDEWL	

**ISM Lubricant Performance Test
Form 7
Oil Filter Delta Pressure Plot**

Laboratory:	LAB	EOT Date:	DTCOMP	EOT Time:	EOTTIME
Test Number					
Stand:	STAND	Engine:	ENGINE	Engine Run No.:	ENRUN
Formulation / Stand Code: FORM					
Oil code: OILCODE					

OIL FILTER DELTA PRESSURE vs TEST HOURS



OIL FILTER DELTA P (kPa)

OFDPIM

TEST HOURS

**ISM Lubricant Performance Test
Form 8
Sludge Rating Summary**

Laboratory:	LAB	EOT Date:	DTCOMP	EOT Time:	EOTTIME
Test Number					
Stand:	STAND	Engine:	ENGINE	Engine Run No.:	ENRUN
Formulation / Stand Code: FORM					
Oil Code: OILCODE					

Sludge Rating Summary

Sludge Depth	Valve Cover % of Area	Valve Cover Volume Factor	Oil Pan % of Area	Oil Pan Volume Factor
1/4A	RCSEA01	RCSEV01	OILPSA01	OILPSV01
1/2A	RCSEA02	RCSEV02	OILPSA02	OILPSV02
3/4A	RCSEA03	RCSEV03	OILPSA03	OILPSV03
A	RCSEA04	RCSEV04	OILPSA04	OILPSV04
AB	RCSEA05	RCSEV05	OILPSA05	OILPSV05
B	RCSEA06	RCSEV06	OILPSA06	OILPSV06
BC	RCSEA07	RCSEV07	OILPSA07	OILPSV07
C	RCSEA08	RCSEV08	OILPSA08	OILPSV08
D	RCSEA09	RCSEV09	OILPSA09	OILPSV09
E	RCSEA10	RCSEV10	OILPSA10	OILPSV10
F	RCSEA11	RCSEV11	OILPSA11	OILPSV11
G	RCSEA12	RCSEV12	OILPSA12	OILPSV12
H	RCSEA13	RCSEV13	OILPSA13	OILPSV13
I	RCSEA14	RCSEV14	OILPSA14	OILPSV14
J	RCSEA15	RCSEV15	OILPSA15	OILPSV15
Total Volume Factor:		RCSEVT	Total Volume Factor:	OILPSVT
Merit Rating:		RCSEMRT	Merit Rating:	OILPSMRT
		Average Sludge Rating:		
		ASRT		

**ISM Lubricant Performance Test
Form 9
Ring Mass Loss Summary**

Laboratory:	LAB	EOT Date:	DTCOMP	EOT Time:	EOTTIME
Test Number					
Stand:	STAND	Engine:	ENGINE	Engine Run No.:	ENRUN
Formulation / Stand Code:	FORM				
Oil Code:	OILCODE				

Cylinder	Top Ring			Second Ring			Oil Ring		
	Mass (g)		Mass Loss (mg)	Mass (g)		Mass Loss (mg)	Mass (g)		Mass Loss (mg)
	Pretest	EOT		Pretest	EOT		Pretest	EOT	
1	RWCYL1PT	RWCYL1ET	RWLCYL1T	RWCYL1PS	RWCYL1ES	RWLCYL1S	RWCYL1PO	RWCYL1EO	RWLCYL1O
2	RWCYL2PT	RWCYL2ET	RWLCYL2T	RWCYL2PS	RWCYL2ES	RWLCYL2S	RWCYL2PO	RWCYL2EO	RWLCYL2O
3	RWCYL3PT	RWCYL3ET	RWLCYL3T	RWCYL3PS	RWCYL3ES	RWLCYL3S	RWCYL3PO	RWCYL3EO	RWLCYL3O
4	RWCYL4PT	RWCYL4ET	RWLCYL4T	RWCYL4PS	RWCYL4ES	RWLCYL4S	RWCYL4PO	RWCYL4EO	RWLCYL4O
5	RWCYL5PT	RWCYL5ET	RWLCYL5T	RWCYL5PS	RWCYL5ES	RWLCYL5S	RWCYL5PO	RWCYL5EO	RWLCYL5O
6	RWCYL6PT	RWCYL6ET	RWLCYL6T	RWCYL6PS	RWCYL6ES	RWLCYL6S	RWCYL6PO	RWCYL6EO	RWLCYL6O

As Measured Results

Average Mass Loss (mg)	AMARWLT		ARWLS		ARWLO
Std. Dev. Mass Loss (mg)	SRWLT		SRWLS		SRWLO
Maximum Mass Loss (mg)	XRWLT		XRWLS		XRWLO
Minimum Mass Loss (mg)	IRWLT		IRWLS		IRWLO
Outlier Top Ring (cylinder number)	RINGOUT				
Outlier Screened Results					
Average Mass Loss (mg)	ARWLT				

**ISM Lubricant Performance Test
Form 10
Oil Analysis Summary**

Laboratory:	LAB	EOT Date:	DTCOMP	EOT Time:	EOTTIME
Test Number					
Stand:	STAND	Engine:	ENGINE	Engine Run No.:	ENRUN
Formulation / Stand Code:	FORM				
Oil Code:	OILCODE				

Test Hours	Viscosity @ 100°C, cSt	TGA % Soot	TBN D4739	TAN D664	Copper (ppm)	Iron (ppm)	Lead (ppm)	Aluminum (ppm)	Chromium (ppm)
NEW	V100NEW	TGANEW	TBNNEW	TANNEW	CUWMNEW	FEWMNEW	PBWNEW	ALWNEW	CRWNEW
TST_H025	V100H025	TGA_H025	TBN_H025	TAN_H025	CUWMH025	FEWMH025	PBWMH025	ALWMH025	CRWMH025
TST_H050	V100H050	TGA050	TBN_H050	TAN_H050	CUWMH050	FEWMH050	PBWMH050	ALWMH050	CRWMH050
TST_H075	V100H075	TGA_H075	TBN_H075	TAN_H075	CUWMH075	FEWMH075	PBWMH075	ALWMH075	CRWMH075
TST_H100	V100H100	TGA_H100	TBN_H100	TAN_H100	CUWMH100	FEWMH100	PBWMH100	ALWMH100	CRWMH100
TST_H125	V100H125	TGA_H125	TBN_H125	TAN_H125	CUWMH125	FEWMH125	PBWMH125	ALWMH125	CRWMH125
TST_H150	V100H150	TGA150	TBN_H150	TAN_H150	CUWMH150	FEWMH150	PBWMH150	ALWMH150	CRWMH150
TST_H175	V100H175	TGA_H175	TBN_H175	TAN_H175	CUWMH175	FEWMH175	PBWMH175	ALWMH175	CRWMH175
TST_H200	V100H200	TGA_H200	TBN_H200	TAN_H200	CUWMH200	FEWMH200	PBWMH200	ALWMH200	CRWMH200

**ISM Lubricant Performance Test
Form 11
Test Fuel Analysis (Last Batch)**

Laboratory:	LAB	EOT Date:	DTCOMP	EOT Time:	EOTTIME
Test Number					
Stand:	STAND	Engine:	ENGINE	Engine Run No.:	ENRUN
Formulation / Stand Code:			FORM		
Oil Code:			OILCODE		

Fuel Supplier	Fuel Batch Identifier
FUELSUP	FUELBTID

Measurement	Specifications	Analysis		Test Method
		New	EOT	
Total Sulfur, % Weight	0.04 - 0.05	FUELSNEW	FUELSEOT	D 2662
Gravity, °API	34.5 - 36.5	APIGRNEW	APIGREOT	D 1298
Hydrocarbon Composition				
Aromatics % Volume	28 – 33	FUELAROM		D 1319
Olefin	Report	FUELOLEF		D 1319
Cetane Index	Report	CETANEIN		D 4737
Cetane Number	42 – 48	CETANENO		D 613
Copper Strip Corrosion	1 Maximum	FUELUCU		D 130
Flash Point, °C	54 Maximum	FLASHPT		D 93
Pour Point, °C	-18 Maximum	FUELPOUR		D 97
Carbon Residue on 10% Residuum, %	0.35 Maximum	FUELGRES		D 524 (10% Bottoms)
Water & Sediment, % Volume	0.05 Maximum	FUELH2O		D 2709
Viscosity, cSt @ 40 °C	2.4 - 3.0	KINVIS		D 445
Total Acid Number	0.05 Maximum	FUELTAN		D 664
Strong Acid Number	0.00 Maximum	FUELSAN		D 664
Accelerated Stability	Tbd	FUELACS		D 2274
Saturates, %	Report	FUELSATU		D 1319
Cloud Point, °C	Report	FUELCLOU		D 2500
Distillation, °C				
IBP	Report	FUELIBP		D 86
10%	Report	FUEL10		D 86
50%	Report	FUEL50		D 86
90%	282 – 338	FUEL90		D 86
EP	Report	FUELEP		D 86

**ISM Lubricant Performance Test
Form 12
Injector Adjusting Screw Mass Loss**

Laboratory:	LAB	EOT Date:	DTCOMP	EOT Time:	EOTTIME
Test Number					
Stand:	STAND	Engine:	ENGINE	Engine Run No.:	ENRUN
Formulation / Stand Code:			FORM		
Oil Code:			OILCODE		

Screw #	Pretest Mass, g	Post-Test Mass, g	Mass Loss, mg
1	BOTIAS1	EOTIAS1	IASWL1
2	BOTIAS2	EOTIAS2	IASWL2
3	BOTIAS3	EOTIAS3	IASWL3
4	BOTIAS4	EOTIAS4	IASWL4
5	BOTIAS5	EOTIAS5	IASWL5
6	BOTIAS6	EOTIAS6	IASWL6
Total			IASWLTOT
Average			AVGIAS

**ISM Lubricant Performance Test
Form 13
Unscheduled Downtime & Maintenance Summary**

Laboratory: LAB	EOT Date: DTCOMP	EOT Time: EOTTIME
Test Number		
Stand: STAND	Engine: ENGINE	Engine Run No.: ENRUN
Formulation / Stand Code:		FORM
Oil Code:		OILCODE

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

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

**ISM Lubricant Performance Test
Form 13a
Unscheduled Downtime & Maintenance Summary**

Laboratory: LAB	EOT Date: DTCOMP	EOT Time: EOTTIME
Test Number		
Stand: STAND	Engine: ENGINE	Engine Run No.: ENRUN
Formulation / Stand Code:		FORM
Oil Code:		OILCODE

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

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

**ISM Lubricant Performance Test
Form 13b
Unscheduled Downtime & Maintenance Summary**

Laboratory: LAB	EOT Date: DTCOMP	EOT Time: EOTIME
Test Number		
Stand: STAND	Engine: ENGINE	Engine Run No.: ENRUN
Formulation / Stand Code:		FORM
Oil Code:		OILCODE

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

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

**ISM Lubricant Performance Test
Form 14
Characteristics Of The Data Acquisition System**

Laboratory:	LAB	EOT Date:	DTCOMP	EOT Time:	EOTTIME
Test Number					
Stand:	STAND	Engine:	ENGINE	Engine Run No.:	ENRUN
Formulation / Stand Code:			FORM		
Oil Code:			OILCODE		

Parameter (1)	Sensing Device (2)	Calibration Frequency (3)	Record Device (4)	Observation Frequency (5)	Record Frequency (6)	Log Frequency (7)	System Response (8)
Temperatures							
Oil @ Filt.	OTEMSENS	OTEMCALF	OTEMRECD	OTEMOBSF	OTEMRECF	OTEMLOGF	OTEMSYSR
Fuel In.	FTEMSSENS	FTEMCALF	FTEMRECD	FTEMOBSF	FTEMRECF	FTEMLOGF	FTEMSYSR
Intake Air	AITSENS	AITCALF	AITRECD	AITOBSF	AITRECF	AITLOGF	AITSYSR
Intake Man.	IMANSENS	IMANCALF	IMANRECD	IMANOBSF	IMANRECF	IMANLOGF	IMANSYSR
Pre-Turb.	PTURSENS	PTURCALF	PTURRECD	PTUROBSF	PTURRECF	PTURLOGF	PTURSYSR
Cool. Out	COTSENS	COTCALF	COTRECD	COTOBSF	COTRECF	COTLOGF	COTSYSR
Pressure							
Inlet Air	INRESENS	INRECALF	INRERECD	INREOBSF	INRERECF	INRELOGF	INRESYSR
Exhaust	EXPRSENS	EXPRCALF	EXPRECD	EXPROBSF	EXPRECF	EXPRLOGF	EXPRSYSR
Oil Gallery	OILGSENS	OILGCALF	OILGRECD	OILGOBSF	OILGRECF	OILGLOGF	OILGSYSR
Other							
Fuel Flow	FFLOSENS	FFLOCALF	FFLORECD	FFLOOBSF	FFLORECF	FFLOLOGF	FFLOSYSR
Speed	RPMSSENS	RPMCALF	RPMRECD	RPMOBSF	RPMRECF	RPMLOGF	RPMSYSR
Load	LOADSENS	LOADCALF	LOADRECD	LOADOBSF	LOADRECF	LOADLOGF	LOADSYSR

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
DL – Automatic data logger
C/D – Computer, using direct I/O entry
- (5) Data are observed but only recorded if off spec.
- (6) Data are recorded but are not retained at EOT
- (7) Data are logged as permanent record, note specify if:
SS – snapshot taken at specified frequency
AG/X – Average of X data points at specified frequency
- (8) Time for the output to reach 63.2% of final value for step change at input