Version

Title / Validity Declaration Page

Form 1

Conducted for

V	= Valid					
	= Invalid					
N = Results cannot be Interpreted as Representative of Oil Performance (Non-Reference Oil) and shall not be used for Multiple Test Acceptance Criteria						
RO	= Reference Oil Test					
NR	= All Other Tests					
		est Number	T			
Test Stand	Number of Tests Since Last	Stand Calibration Test	Total Runs on Test Stand			
Lab Engine N	umber:	Total Runs on Engine:				
Test Fuel:		Fuel Batch:				
EOT Date:		EOT Time:				
Oil Code: ^A						
	Stand Code: ^B					
Alternate Cod						
Anternate ood	co.					
Method DXXXX	his test been conducted and the appropriate amendments ciated with this test.					
	port relate only to the items tested.					
This report shall not ^A CMIR or Non-Refer	be reproduced, except in full, without the v	written approval of Southwest Rese	earch Institute®.			
CMIR or Non-Retei B ACC Registered Te						
C When Provided or						
	Submitted by:	Te	esting Laboratory			
			Signature			
SwR	0		Typed Name			
			• •			
			Title			



Table of ContentsForm 2

Laboratory:	Laboratory Oil Code:
Stand:	Test No.:
Oil Code:	
Formulation / Stand Code:	

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Summary of Test Method Form 3



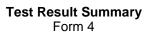
Laboratory:	Laboratory Oil Code:			
Stand:	Test No.:			
Dil Code:				
Formulation / Stand Code:				

The LSPI engine oil aging test is a fired engine dynamometer lubricant test which ages the engine oil in preparation for the evaluation of the oil in the Seq IX LSPI test. The running duration of 72 hours.

The used oil aging for LSPI uses a 2.0 liter Ford EccoBoost engine as the test apparatus. The engine is turbocharged and gasoline direct-injected, and incorporates dual overhead cams and four valves per cycle. The engine is modified to provide higher than normal blowby. An eight hour break-in schedule is conducted prior to going on test conditions.

The test sequence is as outlined in the table below:

Parameter	Units	Quantity
Duration	Н	72
Engine Speed	r/min	2500
Engine Torque	Nm	128
Oil Gallery Temperature	°C	100
Coolant Out Temperature	°C	85
Coolant Flow	L/min	70
Intake Air Temperature	°C	32
Intake Air Pressure	kPa	0.05
Intake Air Humidity	g/kg	11.4
Coolant Pressure	°C	70
Air Charge Temperature	kPa	30
Air-Fuel Ratio	λ	1.0
Exhaust Backpressure	kPa	107
Blowby Outlet Temperature	L/min	65-75





Laboratory:	Laboratory Oil Code:			
Stand:	Test No.:			
Oil Code:	Dil Code:			
Formulation / Stand Code:				
Date Started:	Engine No.:			
Time Started:	Fuel Batch:			
Date Completed:	SAE Viscosity:			
Time Completed:	Test Length:			

Critical Oil Analysis Results

Reference Oil:

Parameter	New Oil	End of Test
Total Acid Number		
Total Base Number		
Kinematic Viscosity @ 40 °C		
Kinematic Viscosity @ 100 °C		
Soot Concentration		
Oxidation, FTIR by D7414		
Nitration, FTIR by D7624		
Fuel Dilution, D3525		
Weight of Oil Drain @ End of Test		

Blowby				
Test Hours	Blowby, L/min			
23.5 to 23.75				
47.5 to 47.75				
71.5 to 71.75				
Maximum				
Minimum				
Average				



Operational Summary

Form 5

Laboratory:	Laboratory Oil Code:		
Stand:	Test No.:		
Dil Code:			
Formulation / Stand Code:			

			QI	EOT			Numb	er of
	Parameter	Units	Threshold	QI	Target	Average	Samples	BQD
	Speed	r/min	0.000		2500			
	Torque	Nm	0.000		128			
ers	Oil Gallery Temperature	°C	0.000		100			
Parameters	Coolant Out Temperature	°C	0.000		85			
ran	Coolant System Pressure	kPa	0.000		70			
Pal	Engine Coolant Flow	L/min	0.000		70			
pa	Intake Air Humidity	g/kg	0.000		11.4			
ontrolled	Intake Air Pressure	kPa	0.000		0.05			
ıtı	Exhaust Back Pressure	kPaA	0.000		107			
ပိ	Intake Air Temperature	°C	0.000		32			
	Air Charge Temperature	°C	0.000		30			
	Lambda	λ	0.000		1			
	Blowby Flowrate	L/min			65-75			

	Parameter	Units	Average	Number of Samples	Number of BQD
	Ambient Cell	°C			
	Fuel Flow	kg/h			
S.	Ignition Voltage	V			
Parameters	Fuel Temperature	°C			
E E	Coolant In Temperature	°C			
are	Oil Filter In Temperature	°C			
	Exhaust Temperature	°C			
le le	Manifold Absolute Pressure	kPaA			
Non-Controlled	Boost Pressure	kPaA			
jo	Barometric Pressure	kPaA			
n-C	Oil Gallery Pressure	kPa			
2	Oil Head Pressure	kPa			
	Crankcase Pressure	kPa			
	Fuel Pressure	kPa			
	Pre-Intercooler Pressure	kPaA		·	

Downtime Summary Form 7



Laboratory:	Laboratory Oil Code:		
Stand:	Test No.:		
Oil Code:			
Formulation / Stand Code:			

lumber of Downtime Occurrences:					
Test Hours	Date	Downtime	Reasons		
Total Do					

Test Comments Form 8



Laboratory:	Laboratory Oil Code:		
Stand:	Test No.:		
Oil Code:			
Formulation / Stand Code:			

Number of Comment Lines:			
1			