

**Report On**  
**Chain Wear Evaluation**  
 Version

Conducted For

	V = Valid
	I = Invalid
	N = Results cannot be interpreted as representative of oil performance (Non-reference oil) and shall not be used for multiple test acceptance

	NR = Non-reference oil test
	RO = Reference oil test

<b>Test Number</b>			
Test Stand	Number of Tests Since Last Stand Calibration Test	Total Runs on Test Stand	
Lab Engine Number		Total Runs on Engine	
Lab Head Number		Chain Number	
Test Fuel		Fuel Batch	
EOT Date		EOT Time	
Oil Code			
Formulation/Stand Code			
Alternate Codes			

In my opinion this test _____ been conducted in a valid manner in accordance with the Test Method, D XXXX, and appropriate amendments. The remarks included in the report describe the anomalies associated with this test.
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Submitted By: \_\_\_\_\_

Testing Laboratory

Signature

Typed Name

Title

**Chain Wear Test  
Form 2  
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**Chain Wear Test  
Form 3  
Summary of Test Method**

The Chain Wear test is a fired engine dynamometer lubricant test which evaluates the ability of a test lubricant to reduce timing chain wear. The test method is a cyclic test, with a total running duration of 144 hours.

The Chain Wear Test uses a Ford water cooled, 4 cycle, in-line cylinder, 2.0 liter EccoTech engine as the test apparatus. The engine incorporates a dual overhead cam, four valves per cylinder (2 intake; 2 exhaust), and direct acting mechanical bucket lifter valve train design. The timing chain is replaced each test. An Eight hour break-in schedule is conducted prior to going on test conditions. The Chain is measured prior to installation, after break-in and at the end of test.

The test sequence is repeated for 54 test cycles. Each cycle consists of two stages as outlined in the table below:

Parameter	Units	Stage 1	Stage 2
Duration	min	120	60
Engine Speed	r/min	1550	2500
Engine Torque	N·m	50	128
Oil Gallery Temperature	°C	50	100
Coolant Out Temperature	°C	45	85
Coolant Flow	L/min	40	70
Intake Air Temperature	°C	32	32
Intake Air Pressure	kPa	0.05	0.05
Intake Air Humidity	g/kg	11.4	11.4
Coolant Pressure	kPa	70	70
Air Charge Temperature	°C	30	30
Air-Fuel Ratio	$\lambda$	0.78	1
Exhaust Backpressure	kPa	104	107
Blowby Heat Exchanger Inlet	°C	20	85

# Chain Wear

## Form 4

### Test Result Summary

Lab		Oil Code	
Stand		Test No.	
Laboratory Oil Code			
Formulation Stand Code			

Date Started		Engine No.	
Time Started		Fuel Batch	
Date Completed		SAE Viscosity	
Time Completed		Reference Oil	
Test Length			

### Pass/Fail Results

PARAMETER	% Change
End of Test Chain Stretch	
End of Test Chain Stretch, Industry Correction Factor	
End of Test Chain Stretch, Laboratory SA	
End of Test Chain Stretch, Final Result	

### Additional Parameters

PARAMETER	Result
Average Blowby	
Total Oil Consumption	
TGA Soot	

**Chain Wear Test  
Form 5  
Operational Summary**

Lab		Oil Code	
Stand		Test No.	
Laboratory Oil Code			
Formulation Stand Code			

Controlled Parameters	Parameter	Units	QI Threshold	EOT QI	Target		Average		Number of	
					Stage 1	Stage 2	Stage 1	Stage 2	Samples	BQD
	Speed	r/min	0.000		1550	2500				
	Torque	N·m	0.000		50	128				
	Oil Gallery	°C	0.000		50	100				
	Coolant Out	°C	0.000		45	85				
	Coolant System	kPa	0.000		70	70				
	Blowby Heat Exchanger In	°C	0.000		20	85				
	Engine Coolant Flow	L/min	0.000		40	70				
	Intake Air Humidity	g/kg	0.000		11.4	11.4				
Intake Air Pressure	kPa	0.000		0.05	0.05					
Exhaust Back Pressure	kPa	0.000		104	107					
Intake Air Temperature	°C	0.000		32	32					
Air Charge Temperature	°C	0.000		30	30					

Non-controlled Parameters	Parameter	Units	Target		Average		Number of	
			Stage 1	Stage 2	Stage 1	Stage 2	Samples	BQD
	Ambient Cell	°C	27	27				
	Fuel Flow	kg/h	Record	Record				
	Lambda	λ	0.78	1				
	Ignition Voltage	V	13	13				



**Chain Wear  
Form 7  
Oil Level and Blowby Results**

Lab		Oil Code	
Stand		Test No.	
Laboratory Oil Code			
Formulation Stand Code			

<b>Cycle</b>	<b>Test Hour</b>	<b>Oil Consumed, g</b>
<b>Total Oil Consumption</b>		

Stage II	
Test Hours	Blowby, L/min
<b>Maximum</b>	
<b>Minimum</b>	
<b>Average Blowby, Hours 23 - 119</b>	
<b>Average</b>	

Chain Wear  
**Form 8**  
**Chain Wear Measurements**

Lab		Oil Code	
Stand		Test No.	
Laboratory Oil Code			
Formulation Stand Code			

		0 Hour *	End of Test
<b>Reference</b>	<b>1</b>		
	<b>2</b>		
	<b>3</b>		
	<b>Average</b>		
<b>Test Chain</b>	<b>1</b>		
	<b>2</b>		
	<b>3</b>		
	<b>Average</b>		
	<b>% Change</b>		

**\*Post Break-in**



**Chain Wear  
Form 9  
Downtime Summary**

Lab		Oil Code	
Stand		Test No.	
Laboratory Oil Code			
Formulation Stand Code			

Number of Downtime Occurrences			
Test Hours	Date	Downtime	Reasons
			<b>Total Downtime (hours)</b>



**Chain Wear**  
**Form 11**  
**American Chemistry Council Code of Practice**  
**Test Laboratory Conformance Statement**

Test Laboratory					
Test Sponsor					
Formulation / Stand Code					
Test Number					
Start Date		Start Time		Time Zone	

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 \_\_\_\_\_ No \_\_\_\_\_ \*

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 \_\_\_\_\_ No \_\_\_\_\_ \*

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 \_\_\_\_\_ \* No \_\_\_\_\_

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 \_\_\_\_\_ \* No \_\_\_\_\_ (This currently applies only to specific deviations identified in the ASTM Information Letter System)

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

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Typed Name

\_\_\_\_\_  
Title