

**Two-Stroke-Cycle Gasoline Engine Lubricant Evaluation
D4857 (Y350M2) ASTM TC Sequence I Test Procedure
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Form 2**

Lab: CC	EOT Date: YYYYMMDD	End Time: HH:MM
Engine No.: CCCCCCCCCC	Run Number: CCC	
Reference Oil	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCC	Cylinder: CCCCCCS1
Non Reference Oil	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCC	Cylinder: CCCCCCS1
Formulation / Stand Code: CC-CCCCCCCCC-C-C-CCCCCC-CC-CC-CCCC		

Form No.

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**Two-Stroke-Cycle Gasoline Engine Lubricant Evaluation
D4857 (Y350M2) ASTM TC Sequence I Test Procedure**

Test Result Summary

Form 4

Lab: CC	EOT Date: YYYYMMDD	End Time: HH:MM
Engine No.: CCCCCCCCCC	Run Number: CCC	
Reference Oil: CC	Industry Oil Code: CCCCCC	Cylinder: S1
Non Reference Oil: CC		Cylinder: S1
Formulation / Stand Code: CC-CCCCCCCCC-C-C-CCCCC-CC-CC-CCCC		
Date Test YYYYMMDD	Start Time: HH:MM	
Stand No.: CCCCC	Test Length: CCCCC	

Test Information	Cylinder 1	Cylinder 2
Laboratory Oil	CCCCCCCCCCCC	CCCCCCCCCCCC
Fuel Type	CCCCCCCC	CCCCCCCC
Fuel / Oil Ratio	CCCC	CCCC

Engine Inspection		Cylinder 1	Cylinder 2
Piston Varnish	Thrust	S1.1	S1.1
	Anti-Thrust	S1.1	S1.1
	Average	S1.1	S1.1
	Ring Land	S1.1	S1.1
	Undercrown	S1.1	S1.1
Wristpin	Varnish	S1.1	S1.1
	Condition	CCCC	CCCC
	Bearing Varnish	S1.1	S1.1
	Bearing Condition	CCCC	CCCC
Cylinder Liner Varnish		S1.1	S1.1
Ring Sticking	Top Ring	S12.1	S12.1
	Second Ring	S1.12	S1.12
	^A Correction Factor	S1.12	S1.12
Deposits	Piston Crown	S1.1	S1.1
	Cylinder Head	S1.1	S1.1
	Exhaust Port Blocking	S1.1	S1.1
	Exhaust Port Blocking	S1.1	S1.1
Piston Scuffing	Thrust	S1.1	S1.1
	Anti-Thrust	S1.1	S1.1
Cylinder Liner Wear		S1.1	S1.1
CRC Demerit Number		S12.123	S12.123

^ACorrection factor updated via information letter.
Contact ASTM-TMC for current correction factor.

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Ring Land Ratings

Form 5

Lab: CC	EOT Date: YYYYMMDD	End Time: HH:MM
Engine No.: CCCCCCCCCC	Ring Number: CCC	
Reference Oil: CC	Industry Oil Code: CCCCCC	Cylinder: S1
Non Reference Oil: CC		Cylinder: S1
Formulation / Stand Code: CC-CCCCCCCCC-C-C-CCCCC-CC-CC-CCCC		

Ring Lands - Carbon Ratings					
Deposit Type	Deposit Factor	Cylinder 1		Cylinder 2	
		Area %	Demerit	Area %	Demerit
HC	1.000	S123	S12.123	S123	S12.123
MHC	0.750	S123	S12.123	S123	S12.123
MC	0.500	S123	S12.123	S123	S12.123
LC	0.250	S123	S12.123	S123	S12.123
VLC	0.150	S123	S12.123	S123	S12.123
Carbon Rating (demerits)		S12.123		S12.123	

Ring Lands - Lacquer Ratings					
Deposit Type	Deposit Factor	Cylinder 1		Cylinder 2	
		Area %	Demerit	Area %	Demerit
BL	0.100	S123	S12.123	S123	S12.123
DBRN	0.075	S123	S12.123	S123	S12.123
AL	0.050	S123	S12.123	S123	S12.123
LAL	0.025	S123	S12.123	S123	S12.123
VLAL	0.010	S123	S12.123	S123	S12.123
RL	0.001	S123	S12.123	S123	S12.123
Lacquer Rating		S12.123		S12.123	
Clean	0	S123	S12.123	S123	S12.123

Zonal Rating (demerits)	S12.123	S12.123
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**Two-Stroke-Cycle Gasoline Engine Lubricant Evaluation
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Ring Ratings

Form 6

Lab: CC	EOT Date: YYYYMMDD	End Time: HH:MM
Engine No.: CCCCCCCCCC	Run Number: CCC	
Reference Oil : CC	Industry Oil Code: CCCCCC	Cylinder: S1
Non Reference Oil: CC		Cylinder: S1
Formulation / Stand Code: CC-CCCCCCCCC-C-C-CCCCC-CC-CC-CCCC		

Cylinder Number	Ring Number	NMMA Rating	-1.85 Correction Factor ^A	Visual Rating	Adjusted Rating ^B
S1	S1	S12.12	S1.12	S12.12	S12.12
S1	S1	S12.12	S1.12	S12.12	S12.12
S1	S1	S12.12	S1.12	S12.12	S12.12
S1	S1	S12.12	S1.12	S12.12	S12.12
S1	S1	S12.12	S1.12	S12.12	S12.12
S1	S1	S12.12	S1.12	S12.12	S12.12

^A A correction factor of -1.85 merits is applied to the benchmark reference oil (TMC 606) second ring sticking results, when run with the non-reference oil.

^B The adjusted ring rating is calculated by averaging the NMMA ring rating and the visual ring rating. The visual ring rating is calculated by assessing the total number of degrees the ring visually appears to be stuck in the groove. The normal NMMA ring ratings are then applied as though the ring is firmly stuck over the area, even though in most cases rings in this condition can be forced to move through the application of varying amounts of pressure.

**Two-Stroke-Cycle Gasoline Engine Lubricant Evaluation
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Operational Summary
Form 7**

Lab: CC	EOT Date: YYYYMMDD	End Time: HH:MM
Engine No.: CCCCCCCCCC	Run Number: CCC	
Reference Oil: CCC	Industry Oil Code: CCCCCC	Cylinder: S1
Non Reference Oil: CCC	Cylinder: S1	
Formulation / Stand Code: CC-CCCCCCCCC-C-C-CCCCCC-CC-CC-CCCC		

Parameters	Phase I			Phase II		
	Maximum	Minimum	Average	Maximum	Minimum	Average
Engine Speed, r/min	S1234	S1234	S1234	S1234	S1234	S1234
Dynamometer Speed, r/min	S1234	S1234	S1234	S1234	S1234	S1234
Observed Load, hp	S12.12	S12.12	S12.12	S12.12	S12.12	S12.12
Corrected Load, hp	S12.12	S12.12	S12.12	S12.12	S12.12	S12.12
Air / Fuel Ratio #1	S12.12	S12.12	S12.12	S12.12	S12.12	S12.12
Air / Fuel Ratio #2	S12.12	S12.12	S12.12	S12.12	S12.12	S12.12
Air Flow #1 lb / h	S12.12	S12.12	S12.12	S12.12	S12.12	S12.12
Air Flow #2 lb / h	S12.12	S12.12	S12.12	S12.12	S12.12	S12.12
Fuel Flow #1 lb / h	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12
Fuel Flow #2 lb / h	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12
Pressures						
Fuel Pressure #1, psi	S1.12	S.12	S1.12	S1.12	S1.12	S1.12
Fuel Pressure #2, psi	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12
Intake Air Pressure, in. H ₂ O	S1.123	S1.123	S1.123	S1.123	S1.123	S1.123
Barometric Pressure, in. Hg	S12.12	S12.12	S12.12	S12.12	S12.12	S12.12
Temperatures, ° F						
Spark Plug #1	S123	S123	S123	S123	S123	S123
Spark Plug #2	S123	S123	S123	S123	S123	S123
Cylinder Liner #1	S123	S123	S123	S123	S123	S123
Cylinder Liner #2	S123	S123	S123	S123	S123	S123
Exhaust #1	S1234	S1234	S1234	S1234	S1234	S1234
Exhaust #2	S1234	S1234	S1234	S1234	S1234	S1234
Fuel #1	S12	S12	S12	S12	S12	S12
Fuel #2	S12	S12	S12	S12	S12	S12
Intake Air, Carburetor	S12	S12	S12	S12	S12	S12
Intake Air Dew Point	S12	S12	S12	S12	S12	S12
Ambient	S12	S12	S12	S12	S12	S12

**Two-Stroke-Cycle Gasoline Engine Lubricant Evaluation
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Test Fuel Analysis (Last Batch)

Form 11

Lab: CC	EOT Date: YYYYMMDD	End Time: HH:MM
Engine No.: CCCCCCCCC	Rig No.: CCC	
Reference Oil: CCC	Industry Oil Code: CCCCCC	Cylinder: S1
Non Reference Oil: CCC		Cylinder: S1
Formulation / Stand Code: CC-CCCCCCCCC-C-C-CCCCC-CC-CC-CCCC		
Supplier CCCCCCCCCCCCCCCCCCCCC	Batch Identifier: CCCCCCCCCCCCCCCCC	

Measurement	Specs.	Analysis	Test Method
Gravity, °API		S12.1	
Color		CCCCCCCC	
Doctor Test		CCCCCCCC	
Copper Corrosion, 3h @ 212 °F	1 Maximum	S123	D 130
Reid Vapor Pressure, psig		S1.1	
Research Octane Number		S12.1	
Motor Octane Number		S12.1	
(Research + Motor) / 2		S12.1	
Total Sulfur, % Weight	0.04 - 0.05	S1.1234	D 2622
Gum, mg/100 mL		S1.1	
Oxidation Stability, min		S1234	
Lead, g/gal		S1.123	
Distillation, °C			
IBP	Report	S1234	D 86
10%	Report	S1234	D 86
50%	Report	S1234	D 86
90%	282 - 338	S1234	D 86
EP	Report	S1234	D 86
Recovery, %		S12.1	
Pona, % vol			
Paraffins + Napthenes		S12.1	
Olefin	Report	S12.1	D 1319
Aromatics % Vol.	28 - 33	S12.1	D 1319