

TWO-STROKE-CYCLE GASOLINE ENGINE LUBRICANT EVALUATION
D4863 ASTM TC SEQUENCE II

SUMMARY OF ENGINE TEST RESULTS
YAMAHA CE50S TIGHTENING TEST

Test Number: _____ Fuel: _____ Start Date: _____
Stand Number: _____ Fuel/Oil Ratio: _____ E.O.T. Date: _____
Test Length: _____ SI234 Fuel Batch ID: _____

Delta Torque, lbs. in.

Lubricant Code:	Ind	Bench	Lab Code	Tightening No.:
Temperature, °C	S12	S12	S12	Mean
300	S1.12	S1.12	S1.12	S1.12
325	S1.12	S1.12	S1.12	S1.12
350	S1.12	S1.12	S1.12	S1.12

Lubricant Code:	Ind	Bench	Lab Code	Tightening No.:
Temperature, °C	S12	S12	S12	Mean
300	S1.12	S1.12	S1.12	S1.12
325	S1.12	S1.12	S1.12	S1.12
350	S1.12	S1.12	S1.12	S1.12

Lubricant Code:	Ind	Bench	Lab Code	Tightening No.:
Temperature, °C	S12	S12	S12	Mean
300	S1.12	S1.12	S1.12	S1.12
325	S1.12	S1.12	S1.12	S1.12
350	S1.12	S1.12	S1.12	S1.12

Lubricant Code:	Ind	Bench	Lab Code	Tightening No.:
Temperature, °C	S12	S12	S12	Mean
300	S1.12	S1.12	S1.12	S1.12
325	S1.12	S1.12	S1.12	S1.12
350	S1.12	S1.12	S1.12	S1.12

Temperature, °C	Mean	Mean
300	S1.12	S1.12
325	S1.12	S1.12
350	S1.12	S1.12

Previous Reference Data

Code	Date	Test Number	Mean
CCCCCCCCCCCC	YYYYMMDD	CCCCCCCCCCCC	S1.12
CCCCCCCCCCCC			S1.12
CCCCCCCCCCCC	YYYYMMDD	CCCCCCCCCCCC	S1.12
CCCCCCCCCCCC			S1.12

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SUMMARY OF ENGINE TEST RESULTS
YAMAHA CE50S TIGHTENING TEST

Lubricant Code: CCCCCCCCCCCCCCCCCC Test Number: CCCCCCCCCCCCCCCCCC E.O.T. Date: CCCCCCCC

Student T Test For Significance of Difference Between

	<u>Benchmark</u>	<u>Non-Reference</u>	
Code:	CCCCCCCCCCCCCCCCCC	CCCCCCCCCCCCCCCCCC	CCCCCCCCCCCCCCCCCC
Lab Code:	CCCCCCCCCCCCCCCCCC	CCCCCCCCCCCCCCCCCC	
Number of Data Points:	S12	S12	
Mean:	S1.12	S1.12	CCCC
Std. Dev. (n-1):	S1.1234	S1.1234	
Outlier Tightening Numbers:	CCCCCCCCCCCCCCCCCC	CCCCCCCCCCCCCCCCCC	
Variance:	S1.1234	S1.1234	
Combined Estimate of Std. Dev:	S1.1234		
Degrees of Freedom:	S12		
Critical Value t*:	S1.1234		
t Critical 0.05 (95% confidence):			
Confidence Level:	S1.123		

On the basis of the Student "T" test there is ^{CCC} a significant difference between the reference and non reference lubricants at the 95% confidence level.

t* is compared to the critical value of t, t critical, from table A4.1.

TABLE A4.1 Critical Values of the t -

Degrees of Freedom	Degrees of Confidence				
	90%	95%	97.5%	99%	99.5%
10	1.372	1.812	2.228	2.764	3.169
11	1.363	1.796	2.201	2.718	3.106
12	1.356	1.782	2.179	2.681	3.055
13	1.350	1.771	2.160	2.650	3.012
14	1.345	1.761	2.145	2.624	2.977
15	1.341	1.753	2.131	2.602	2.947
16	1.337	1.746	2.120	2.583	2.921
17	1.333	1.740	2.110	2.567	2.898
18	1.330	1.734	2.101	2.552	2.878
19	1.328	1.729	2.093	2.539	2.861
20	1.325	1.725	2.086	2.528	2.845
21	1.323	1.721	2.080	2.518	2.831
22	1.321	1.717	2.074	2.508	2.819
23	1.319	1.714	2.069	2.500	2.807
24	1.318	1.711	2.064	2.492	2.797
25	1.316	1.705	2.060	2.485	2.787
26	1.315	1.706	2.056	2.479	2.779
27	1.314	1.703	2.052	2.473	2.771
28	1.313	1.701	2.048	2.467	2.763
29	1.311	1.699	2.045	2.462	2.756
30	1.310	1.697	2.042	2.457	2.750

TWO-STROKE-CYCLE GASOLINE ENGINE LUBRICANT EVALUATION

SUMMARY OF ENGINE TEST RESULTS
YAMAHA CE50S TIGHTENING TEST

CCCCCCCCCCCCCCCCCC Lab Code: CCCCCCCCCCC Tightening No.: CCCCCC

Operating Parameters

Miscellaneous

	S12	S12	S12	S12	S12	S12	S12	<u>Average</u>
Tightening No. Seconds	S12.1	S12.1	S12.1	S12.1	S12.1	S12.1	S12.1	S12.1
Fuel Flow, lb/h	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12
Horsepower, ft-lbf.	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12
Barometer Press., in. Hg	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12

Temperature, °F

Ambient	S12	S12	S12	S12	S12	S12	S12	S12
Wet	S12	S12	S12	S12	S12	S12	S12	S12
Dry	S12	S12	S12	S12	S12	S12	S12	S12
Dynamometer Intake Air	S12	S12	S12	S12	S12	S12	S12	S12
Fuel Exhaust								

Torque, lbf-in.

- @ 170°C
- @ 200°C
- @ 300°C
- @ 325°C
- @ 350°C

Delta Torque, lbf-in.

@ 300°C								
@ 325°C	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12
@ 350°C	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12

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SUMMARY OF ENGINE TEST RESULTS
YAMAHA CE50S TIGHTENING TEST

CCCCCCCCCCCCCCCCCC Lab Code: CCCCCCCCCCCCCCCCCCC Lab Code: Tightening No.: CCCCCC

Operating Parameters

Miscellaneous

	S12	S12	S12	S12	S12	S12	S12	<u>Average</u>
Tightening No.	S12	S12	S12	S12	S12	S12	S12	
Seconds	S12.1	S12.1	S12.1	S12.1	S12.1	S12.1	S12.1	
Fuel Flow, lb/h	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	
Horsepower, ft-lbf.	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	
Barometer Press., in. Hg	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	

Temperature, °F

Ambient	S12	S12	S12	S12	S12	S12	S12
Wet	S12	S12	S12	S12	S12	S12	S12
Dry	S12	S12	S12	S12	S12	S12	S12
Dynamometer	S12	S12	S12	S12	S12	S12	S12
Intake Air							
Fuel							
Exhaust							

Torque, lbf-in.

@ 170°C

@ 200°C

@ 300°C

@ 325°C

@ 350°C

Delta Torque, lbf-in.

@ 300°C	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12
@ 325°C	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12
@ 350°C	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12

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SUMMARY OF ENGINE TEST RESULTS
YAMAHA CE50S TIGHTENING TEST

CCCCCCCCGCCCCCECCCCCCCCCCCCCCCCCCCCG CCCCCCCCCCC Tightening No.: CCCCCC
Lubricant Code: Lab Code:

Operating Parameters

Miscellaneous

	S12	S12	S12	S12	S12	S12	S12	<u>Average</u>
Tightening No. Seconds	S12.1	S12.1	S12.1	S12.1	S12.1	S12.1	S12.1	S12.1
Fuel Flow, lb/h	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12
Horsepower, ft-lbf.	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12
Barometer Press., in. Hg	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12

Temperature, °F

Ambient	S12	S12	S12	S12	S12	S12	S12
Wet	S12	S12	S12	S12	S12	S12	S12
Dry	S12	S12	S12	S12	S12	S12	S12
Dynamometer Intake Air	S12	S12	S12	S12	S12	S12	S12
Fuel Exhaust							

Torque, lbf-in.

@ 170°C

@ 200°C

@ 300°C

@ 325°C

@ 350°C

Delta Torque, lbf-in.

@ 300°C	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12
@ 325°C	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12
@ 350°C	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12	S1.12

