

PETRO-LUBRICANT TESTING LABORATORIES, INC.

Member A.S.T.M.

116 Sunset Inn Road
PO Box 300 Lafayette, N.J. 07848
fax 973-579-9447
phone 973-579-3448

December 16, 2013

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Test Report 13111118

Nano Material and Processes, Inc.
659 Heritage Drive
Milford, MI 48381

ATTN: Mr. Andrey Factor

RE: Your samples of November 11, 2013

Final Report

Dear Sir,

Analysis of your samples has been completed. The results are as follows:

SAMPLE: Rotella T 15W40
(No additive in factory sealed white quart bottle) 10-31-13 Baseline
Lab # 13111118

<u>TEST METHOD</u>	<u>DESCRIPTION</u>	<u>RESULTS</u>	
ASTM D3233B Modified	Falex Pin & V Block Test, 4500 lb. Gauge, Pre-Heat to 120°F Using new untreated pins and blocks		
	<u>Load, Lbs</u>	<u>Starting Torque</u>	<u>Final Torque</u>
	300 lbs @ 5 min	11 lb-in	13 lb-in
	500 lbs @ 1 min	19 lb-in	18 lb-in
	750 lbs	29 lb-in	At 13 seconds steel pin sheared.

SAMPLE: Rotella T 15W40
(With additive in silver quart bottle) DSND Sample
Lab # 13111119

<u>TEST METHOD</u>	<u>DESCRIPTION</u>	<u>RESULTS</u>	
ASTM D3233B Modified	Falex Pin & V Block Test, 4500 lb. Gauge, Pre-Heat to 120°F Using new untreated pins and blocks		
	<u>Load, Lbs</u>	<u>Starting Torque</u>	<u>Final Torque</u>
	300 lbs @ 5 min	11 lb-in	12 lb-in
	500 lbs @ 1 min	17 lb-in	17 lb-in
	750 lbs	27 lb-in	At 13 seconds steel pin sheared.

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Nano Material and Processes, Inc.
RE: Your samples of November 11, 2013 Final Report

SAMPLE: Rotella T 15W40
(With additive in silver quart bottle) DSND Sample
Lab # 13111119

<u>TEST METHOD</u>	<u>DESCRIPTION</u>	<u>RESULTS</u>
ASTM D3233B Modified	Falex Pin & V Block Test, 4500 lb. Gauge, Pre-Heat to 120°F Using broken in pins and blocks supplied by customer OE recommended break in at 48 hours, 10/10/2013	
	<u>Load, Lbs</u>	<u>Starting Torque</u> <u>Final Torque</u>
	300 lbs @ 5 min	11 lb-in 11 lb-in
	500 lbs @ 1 min	16 lb-in 16 lb-in
	750 lbs	25 lb-in At 20 seconds steel pin sheared.

SAMPLE: Rotella T 15W40
(No additive in factory sealed white quart bottle) 10-31-13 Baseline
Lab # 13111118

<u>TEST METHOD</u>	<u>DESCRIPTION</u>	<u>RESULTS</u>
ASTM D3233B Modified	Falex Pin & V Block Test, 4500 lb. Gauge, Pre-Heat to 120°F Using new untreated pins and blocks, stopped before failure.	
	<u>Load, Lbs</u>	<u>Starting Torque</u> <u>Final Torque</u>
	300 lbs @ 5 min	12 lb-in 15 lb-in
	500 lbs @ 1 min	19 lb-in 20 lb-in
	PSI Load	Wear Scar Coefficient of Friction
	81,605 psi	0.225 mm 0.116

SAMPLE: Rotella T 15W40
(With additive in silver quart bottle) DSND Sample
Lab # 13111119

<u>TEST METHOD</u>	<u>DESCRIPTION</u>	<u>RESULTS</u>
ASTM D3233B Modified	Falex Pin & V Block Test, 4500 lb. Gauge, Pre-Heat to 120°F Using new untreated pins and blocks, stopped before failure.	
	<u>Load, Lbs</u>	<u>Starting Torque</u> <u>Final Torque</u>
	300 lbs @ 5 min	12 lb-in 13 lb-in
	500 lbs @ 1 min	19 lb-in 19 lb-in
	PSI Load	Wear Scar Coefficient of Friction
	72,537 psi	0.250 mm 0.113

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RE: Your samples of November 11, 2013

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SAMPLE: Rotella T 15W40
(With additive in silver quart bottle) DSND Sample
Lab # 13111119

<u>TEST METHOD</u>	<u>DESCRIPTION</u>	<u>RESULTS</u>
ASTM D3233B Modified	Falex Pin & V Block Test, 4500 lb. Gauge, Pre-Heat to 120°F Using broken in pins and blocks supplied by customer, stopped before failure. OE recommended break in at 6 hours, 10/7/2013	
	<u>Load, Lbs</u>	<u>Starting Torque</u>
	300 lbs @ 5 min	10 lb-in
	500 lbs @ 1 min	17 lb-in
	<u>PSI Load</u>	<u>Wear Scar</u>
	72,537 psi	0.250 mm
		<u>Coefficient of Friction</u>
		0.101

SAMPLE: Rotella T 15W40
(With additive in silver quart bottle) DSND Sample
Lab # 13111119

<u>TEST METHOD</u>	<u>DESCRIPTION</u>	<u>RESULTS</u>
ASTM D3233B Modified	Falex Pin & V Block Test, 4500 lb. Gauge, Pre-Heat to 120°F Using broken in pins and blocks supplied by customer, stopped before failure. OE recommended break in at 30 hours, 10/7/2013	
	<u>Load, Lbs</u>	<u>Starting Torque</u>
	300 lbs @ 5 min	12 lb-in
	500 lbs @ 1 min	18 lb-in
	<u>PSI Load</u>	<u>Wear Scar</u>
	72,537 psi	0.250 mm
		<u>Coefficient of Friction</u>
		0.110

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RE: Your samples of November 11, 2013

Final Report

SAMPLE: Rotella T 15W40
(With additive in silver quart bottle) DSND Sample
Lab # 13111119

TEST METHOD

DESCRIPTION

RESULTS

ASTM D3233B
Modified

Falex Pin & V Block Test, 4500 lb. Gauge, Pre-Heat to 120°F
Using broken in pins and blocks supplied by customer, stopped before failure.

OE recommended break in at 48 hours, 10/12/2013

Load, Lbs

Starting Torque

Final Torque

300 lbs @ 5 min

12 lb-in

13 lb-in

500 lbs @ 1 min

17 lb-in

17 lb-in

PSI Load

Wear Scar

Coefficient of Friction

95,709 psi

0.190 mm

0.101

Please call if you have any questions regarding this report.

Respectfully submitted,



Josiah Wintermute
Chief Chemist

JW:tvh