

# **ABIC TESTING LABORATORIES, INC.**

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Report to: Oscar Lubricants LLC

July 15, 2024

Sample of: DOT 4 Motor Vehicle Brake Fluid

Submitted by: Dr. Talal El Sayed

Project No: 5687-01

Sample No: 3870

Marking: DOT 4

Sampled by: Client

## **RESULTS OF TESTS FOR CONFORMANCE WITH INTERNATIONAL STANDARD ORGANIZATION SPECIFICATION 4925, CLASS 4 ROAD VEHICLES NON-PETROLEUM BASE BRAKE FLUID**

<b><u>Test</u></b>	<b><u>Requirements</u></b>	<b><u>Method (Section)</u></b>	<b><u>Results</u></b>	<b><u>Comment</u></b>
<b><u>Viscosity</u></b>		6.1		
@ -40°C	Max. 1500 mm <sup>2</sup> /s.		1082 mm <sup>2</sup> /s	Passes
@ 100°C	Min. 1.5 mm <sup>2</sup> /s.		2.0 mm <sup>2</sup> /s	Passes
<b><u>Original Equilibrium Reflux Boiling Point</u></b>	Min. 230°C	6.2	258°C	Passes
<b><u>Wet Equilibrium Reflux Boiling Point</u></b>	Min. 155°C	6.2.6	172°C	Passes
<b><u>pH</u></b>	7-11.5	6.3	8.02	Passes
<b><u>Brake Fluid Stability</u></b>		6.4		
<b><u>High Temperature Stability Boiling Point Change</u></b>	Max. ±5°C	6.4.1	No change	Passes
<b><u>Chemical Stability Boiling Point Change</u></b>	Max. ±5°C	6.4.2	No change	Passes
Source: ABIC Testing Laboratories, Inc.				

<u>Test</u>	<u>Requirements</u>	<u>Method (Section)</u>	<u>Results</u>	<u>Comment</u>
<b><u>Corrosion (5% Water Added) 120 ± 2 hours @ 100°C ± 2°C</u></b>		6.5		
Weight Change in mg./sq. cm.				
Tinned Iron	-0.2 to 0.2		-0.01	Passes
Steel	-0.2 to 0.2		-0.01	Passes
Aluminum	-0.1 to 0.1		+0.01	Passes
Cast Iron	-0.2 to 0.2		+0.02	Passes
Brass	-0.4 to 0.4		-0.05	Passes
Copper	-0.4 to 0.4		-0.02	Passes
Pitting or etching of strips outside contact area	None		None	Passes
Gelling of fluid /water mixture at 23 ± 5°C	None		None	Passes
Crystallization deposit on glass jar walls or on metal strips	None		None	Passes
pH of water/fluid mixture	7-11.5		8.20	Passes
Sedimentation	Max. 0.10%		None	Passes
Disintegration of <b>SBR</b> rubber cup as evidenced by blisters,	None		None	Passes
Disintegration of <b>SBR</b> rubber cup as evidenced by carbon separation	None		None	Passes
Decrease in hardness of <b>SBR</b> rubber cups	Max. -15 IRHD		-2 IRHD	Passes
Increase in base diameter of <b>SBR</b> rubber cup	Max. 1.4 mm.		0.18 mm	Passes
<b>SBR</b> rubber cup volume increase	Max. 16%		-1.63%	Passes
Source: ABIC Testing Laboratories, Inc				

<u>Test</u>	<u>Requirements</u>	<u>Method (Section)</u>	<u>Results</u>	<u>Comment</u>
<b><u>Fluidity and Appearance at Low Temperatures, continued</u></b>		6.6		
144 hours ± 4 hours @ -40°C ± 2°C				
Time for air bubble to top	Max. 10 seconds		1 second	Passes
Stratification or sedimentation, sludging or crystallization	None		None	Passes
Appearance of sample after warming to room temperature	Same as before testing		Same as before testing	Passes
6 hours ± 0.2 hours @ -50°C ± 2°C				
Time for air bubble to top	Max. 35 seconds		3 seconds	Passes
Stratification or sedimentation, sludging or crystallization	None		None	Passes
Appearance of sample after warming to room temperature	Same as before testing		Same as before testing	Passes
<b><u>Water Tolerance</u></b>		6.7		
22 hours ± 2 hours @ -40°C ± 2°C				
Discernability of black contrast lines	Clearly discernible		Clearly discernible	Passes
Stratification or Sedimentation	None		None	Passes
Time for air bubble to travel to top	Max. 10 seconds		2 seconds	Passes
22 hours ± 2 hours @ 60°C ± 2°C				
Stratification	None		None	Passes
Sedimentation	Max. 0.05%		None	Passes
Source: ABIC Testing Laboratories, Inc				

<u>Test</u>	<u>Requirements</u>	<u>Method (Section)</u>	<u>Results</u>	<u>Comment</u>
<b><u>Compatibility</u></b>		6.8		
22 ± 2 hours @ -40°C ± 2°C				
Stratification	None		None	Passes
Sedimentation				
22 ± 2 hours @ 60°C ± 2°C				
Stratification	None		None	Passes
Sedimentation	Max. 0.05%		None	Passes
<b><u>Oxidation: 70 ± 2 hours @ 23 ± 5°C then 168 ± 2 hours @ 70°C ± 2°C</u></b>		6.9		
Pitting or roughing of metal strips outside of area in contact with tinfoil	None		None	Passes
Gum deposited on metal strips	Trace		None	Passes
Weight Change in mg./sq. cm				
Aluminum	Max. 0.05		0.00	Passes
Cast Iron	Max. 0.3		0.01	Passes
<b><u>Effect on Rubber: SBR Cups</u></b>		6.10		
70 hours ± 2 hours @ 120°C ± 2°C				
Hardness increase	None		None	Passes
Hardness decrease	Max. -15 IRHD		3 IRHD	Passes
Base diameter increase	0.15 mm. to 1.40 mm.		0.38 mm	Passes
<b>SBR rubber cup volume increase</b>	1-16%		1.72%	Passes
Source: ABIC Testing Laboratories, Inc.				

<u>Test</u>	<u>Requirements</u>	<u>Method (Section)</u>	<u>Results</u>	<u>Comment</u>
<b>Effect on Rubber: EPDM</b>		6.10		
70 hours ± 2 hours @ 120°C ± 2°C				
Hardness increase	None		None	Passes
Hardness decrease	Max. -15 IRHD		None	Passes
<b>EPDM volume increase</b>	1-16%		2.79%	Passes
Reserve Alkalinity	To be reported	ASTM D1121		
Source: ABIC Testing Laboratories, Inc.				

**Discussion**

The sample of DOT 4 Brake Fluid tested meets all the requirements of the International Standards Organization Specification 4925, Class 4 Road Vehicles Non-Petroleum Base Brake Fluid as published July 2020.

Respectfully Submitted



Leonard Mackowiak  
 Vice President  
 ABIC Testing Laboratories, Inc.



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