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

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

Test	**Requirements**	**Method (Section)**	**Results**	**Comment**
Corrosion (5% Water Added) 120 ± 2 hours @ 100°C ± 2°C		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 **SBR** rubber cup as evidenced by blisters,	None		None	Passes
Disintegration of **SBR** rubber cup as evidenced by carbon separation	None		None	Passes
Decrease in hardness of **SBR** rubber cups	Max. -15 IRHD		-2 IRHD	Passes
Increase in base diameter of **SBR** rubber cup	Max. 1.4 mm.		0.18 mm	Passes
SBR rubber cup volume increase	Max. 16%		-1.63%	Passes
Source: ABIC Testing Laboratories, Inc				

Test	Requirements	Method (Section)	Results	Comment
Fluidity and Appearance at Low Temperatures, continued		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
Water Tolerance		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				

Test	Requirements	Method (Section)	Results	Comment
Compatibility		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
Oxidation: 70 ± 2 hours @ 23 ± 5°C then 168 ± 2 hours @ 70°C ± 2°C		6.9		
Pitting or roughing of metal strips outside of area in contact with tinfoil	None		None	Passes
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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
Effect on Rubber: SBR Cups		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
SBR rubber cup volume increase	1-16%		1.72%	Passes
Source: ABIC Testing Laboratories, Inc.				

Test	Requirements	Method (Section)	Results	Comment
Effect on Rubber: EPDM		6.10		
70 hours ± 2 hours @ 120°C ± 2°C				
Hardness increase	None		None	Passes
Hardness decrease	Max. -15 IRHD		None	Passes
EPDM volume increase	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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