



**FRICCIONES
UNIVERSALES**

SAE J661 (STABILIZED NOV 2012) Brake Lining Quality Control Test Procedure

Client	Fricciones Universales S.A. Calle Cuenca 678 / 68 0 Villa Lynch - Ptdo. San Martin Buenos Aires - Argentina	Work Order No.	166437
		Test No.	M22-522-23
		Date	23 Jun 16
Formulation	FU- CTR	Technician	M. Richey
Sample	2.16	Prepared By	A. Vernatter

	Sample Mass	Sample Thickness			Indicator	Sample Size		
	grams	inches		average	inches	inches		
Initial	4.5881	0.243	0.245	0.244	0.244	0.000		
Final	4.2841	0.231	0.233	0.225	0.230	-0.026	min	max
Loss	0.3040	0.012	0.012	0.019	0.014		Length	0.993 0.995
Loss %	6.63%				5.87%		Width	0.989 0.996

Total Work = 6.662 MJ

Wear Rate = 0.046 g/MJ

FIRST BASELINE			SAE J866 FRICTION CLASSIFICATION			SECOND FADE		
Cycle	Temp °F	μ	Sum	Mean	Class	Minutes	Temp °F	μ
1	197	0.48	Normal	2.19	0.548	0.0	200	0.54
5	199	0.52				0.5	250	0.54
10	197	0.53	Hot	3.81	0.381	1.0	300	0.55
15	197	0.54				1.5	350	0.55
20	190	0.55				2.0	400	0.56
			Pre-Wear Indicator (inches)			2.5	450	0.59
			-0.005			3.1	500	0.58
FIRST FADE			WEAR TEST			3.7	550	0.46
Minutes	Temp °F	μ	Cycle	Temp °F	μ	6.5	600	0.10
0.0	200	0.55	1	390	0.51	10.0	624	0.04
0.5	250	0.55	10	395	0.50	SECOND RECOVERY		
1.0	300	0.53	20	395	0.52			
1.6	350	0.48	30	395	0.54			
2.2	400	0.46	40	395	0.55			
3.0	450	0.42	50	396	0.56			
3.8	500	0.39	60	396	0.57			
4.8	550	0.24	70	396	0.58			
			80	396	0.59			
			90	396	0.59			
			100	396	0.59			
FIRST RECOVERY			Post-Wear Indicator (inches)					
Temp °F	μ		-0.020					
500	0.17		Wear Sequence Loss (inches)					
400	0.27	H	0.015					
300	0.41	H						
200	0.52							
						SECOND BASELINE		
						Cycle	Temp °F	μ
						1	199	0.54
						5	200	0.56
						10	201	0.56
						15	200	0.57
						20	191	0.57

Comments: No unusual noise or performance characteristics observed.

Test Speed = 417 r/min

Test Load = 150 lbf

μ = Friction Coefficient

* = Temperature not achieved

Temperatures reported at onset of application

Signature *Ann Vernatter*

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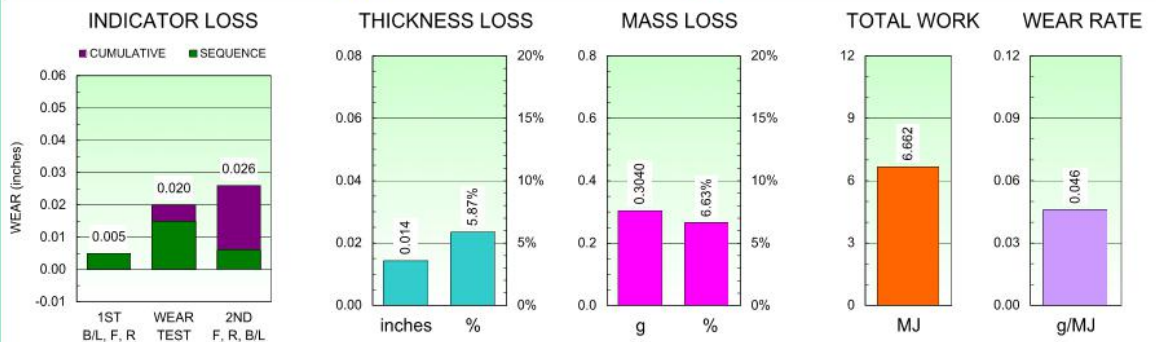
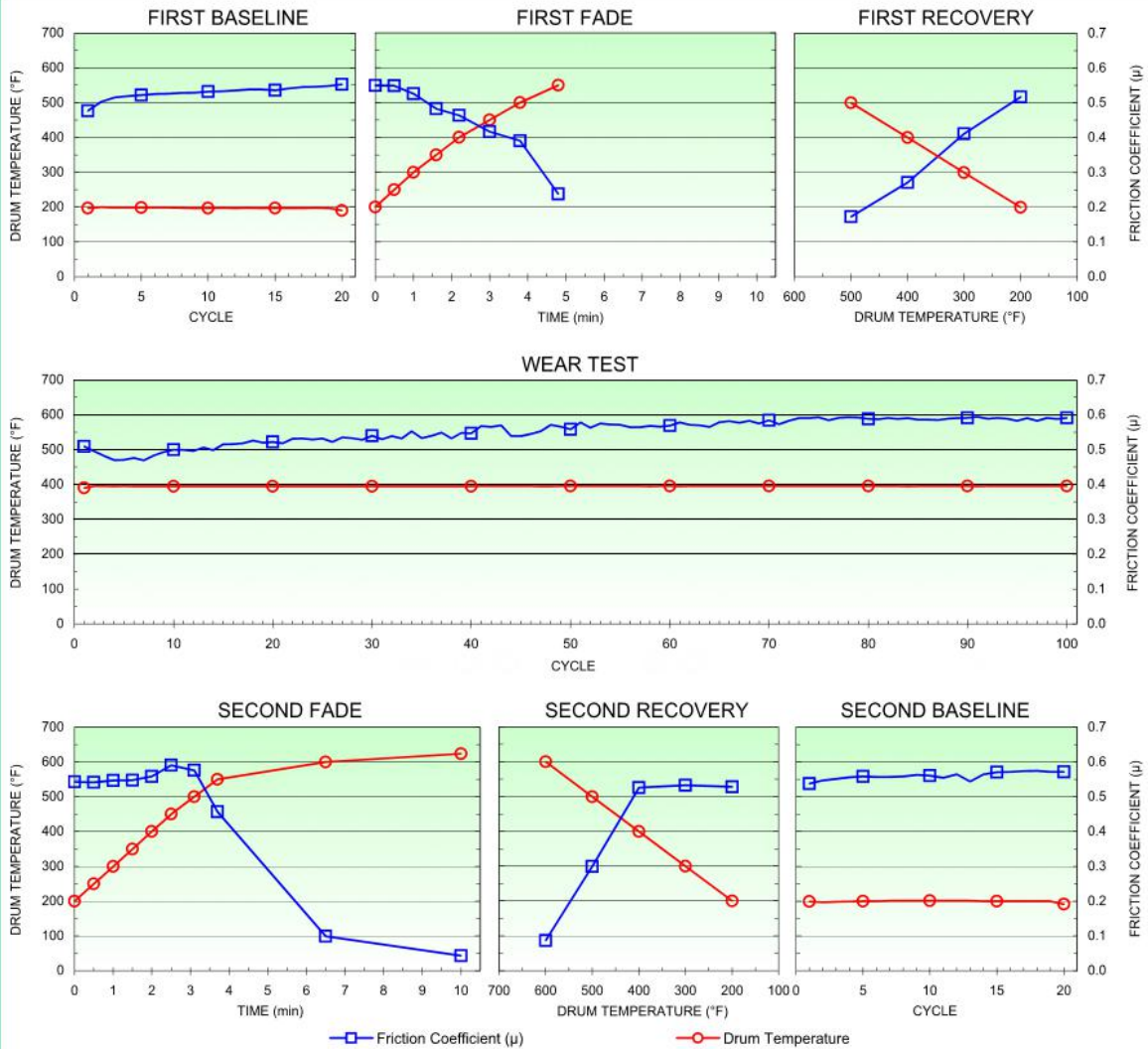
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SAE J661 (STABILIZED NOV 2012) Brake Lining Quality Control Test Procedure

Client Fricciones Universales S.A.
Formulation FU- CTR

Work Order No. 166437
Test No. M22-522-23



THIRD FADE, RECOVERY AND BASELINE
Following SAE J661 Test

Client	Fricciones Universales S.A. Calle Cuenca 678 / 68 0 Villa Lynch - Ptdo. San Martin Buenos Aires - Argentina	Work Order No.	166437
Formulation	FU- CTR	Test No.	M22-522-23
Sample	2.16	Date	23 Jun 16
		Technician	M. Richey
		Prepared By	A. Vernatter

	Sample Mass	Sample Thickness				Indicator	Sample Size	
	grams	inches			average	inches	inches	
Initial	4.2841	0.231	0.233	0.235	0.233	0.000	min	max
Final	4.1705	0.219	0.219	0.214	0.217	-0.008	Length	0.993 0.995
Loss	0.1136	0.012	0.014	0.021	0.016	0.008	Width	0.989 0.996
Loss %	2.65%				6.72%			

Total Work = 1.327 MJ

Wear Rate = 0.086 g/MJ

THIRD FADE			THIRD RECOVERY	
Minutes	Temp °F	μ	Temp °F	μ
0.0	200	0.49	900	*
0.5	250	0.50	800	*
0.9	300	0.51	700	*
1.4	350	0.50	600	0.22
1.9	400	0.50	500	0.43
2.5	450	0.52	400	0.51
3.0	500	0.53	300	0.49
3.6	550	0.53	200	0.47
4.3	600	0.41		
8.8	650	0.06		
20.0	698	0.02		

THIRD BASELINE		
Cycle	Temp °F	μ
1	199	0.49
5	199	0.53
10	201	0.56
15	202	0.57
20	190	0.57

Comments: No unusual noise or performance characteristics observed.

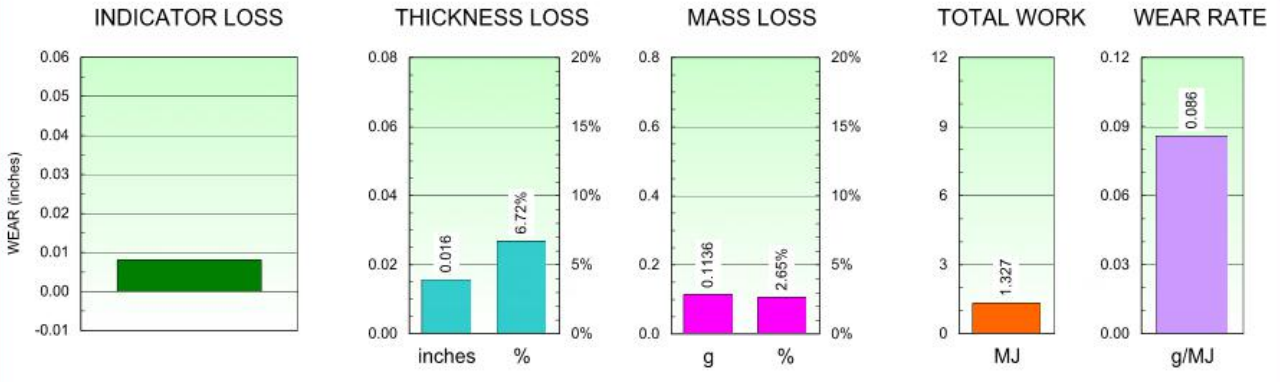
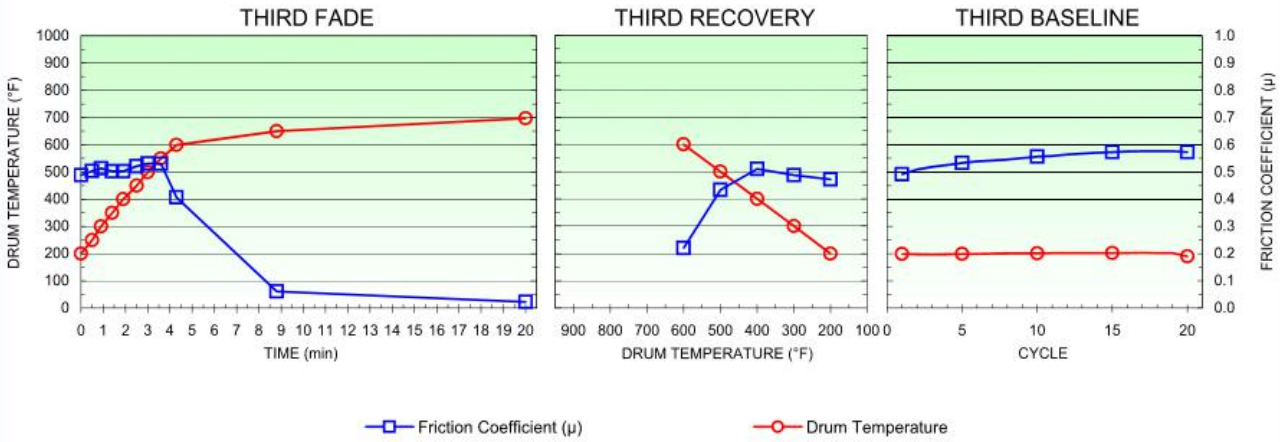
Test Speed = 417 r/min
 Test Load = 150 lbf
 μ = Friction Coefficient
 * = Temperature Not Achieved

THIRD FADE, RECOVERY AND BASELINE

Following SAE J661 Test

Client Fricciones Universales S.A.
 Formulation FU-CTR

Work Order No. 166437
 Test No. M22-522-23





Sample Lab Test Report

Link Test Report #: 170019-4
Test Description: SAE J661 Rev Feb 1997 Brake Lining Quality Test
Purpose of Test To Evaluate the Characteristics of Brake Materials
Program #: BRW16008A0
Lining Material: P.VO.165
Test Date(s): 16/02/2017

Requested By:

Fricciones Universales S.A
Alfredo Tomas Bertucci
Cuenca 678/80 - V.Lynch
San Martin - Prov. Bs.As
Código Postal B1672AHN
Argentina

Tested By:

Testing Coordination and Facility

Link South America
Avenida Jaraguá, 89
Sorocaba, SP
www.linkeng.com
Phone: (55) 15-3416-0600

SAE J661 Rev Feb 1997 Brake Lining Quality Test

Test Information

Customer Name	Fricciones Universales S.A
Requestor	Alfredo Tomas Bertucci
Test Procedure	SAE J661
Program Number	BRW16008A0
Test Coordinator	Pedro Oliveira
Test Equipment	Chase Machine #3443
Test Dates	16/02/2017
Datalogger	v1.0.10
Template Version	3.00

Setup Details

Sample Material	P.VO.165
Sample Size	25.4 mm x 25.4 mm
Sample Manufacturer	Fricciones Universales
Test Pressure	150 psi

Sample Test Summary

Normal Friction Coefficient	0.383
Normal Friction Class	F
Hot Friction Coefficient	0.369
Hot Friction Class	F
Minimum Bold Coefficient	0.278
Max Variation Below Average for Bold Readings	0.000
Max % Variation for Bold Readings	0.00%

Comments:

Processed by:	Henrique Rodrigues +55 (15) 3416 0607	Title:	T. Q. Engineer Trainee	Date:	16/02/2017
Reviewed by:	Pedro Oliveira +55 (15) 3416 0604	Title:	T.E. Coordinator	Date:	16/02/2017

Signed by:

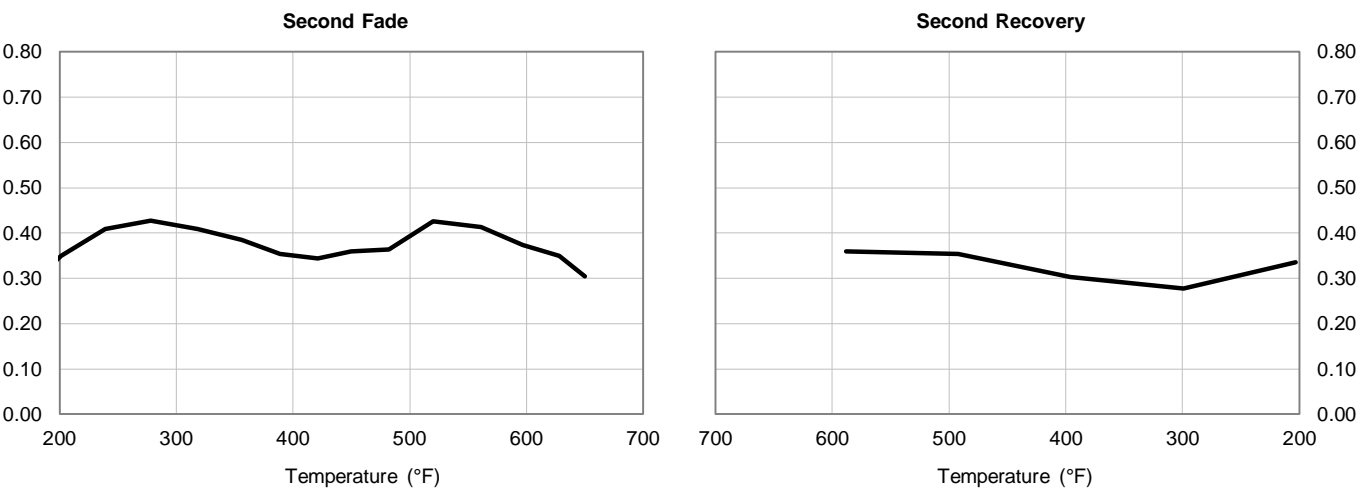
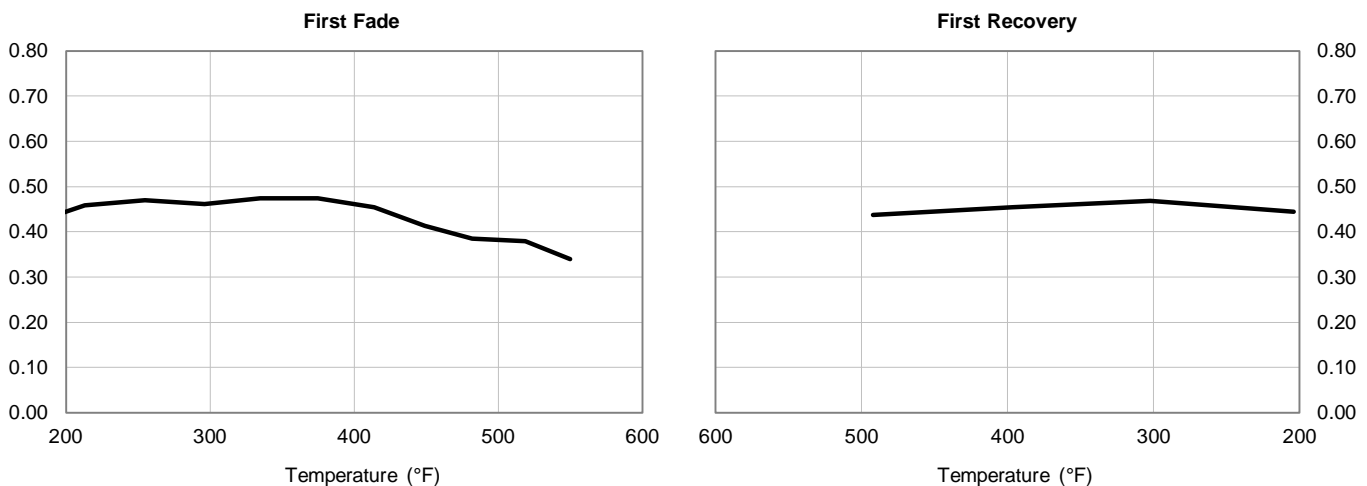
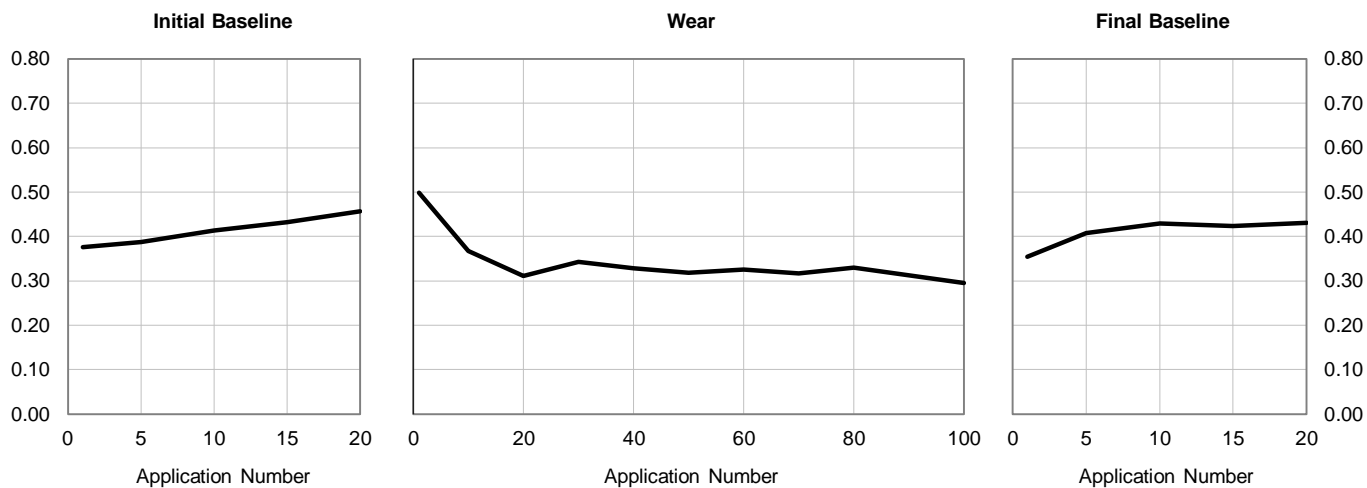
Data applicable to the materials tested. Report can be copied in full. Uncertainty of measurement available upon request.

<u>Sample 1</u> 170019-4		Test Number	Manufacturer Fricciones Universales	
Application <u>Sample 1</u>		Initial Baseline	Material P.VO.165	
1	0.376		Normal	0.383 F
20	0.457			
Temp (°F) <u>Sample 1</u>		First Fade	Hot	0.369 F
200.0	0.453			
550.0	0.339			
(or Temp @ 10min)				
Temp (°F) <u>Sample 1</u>		First Recovery	<u>Average</u>	<u>Norm/Hot</u>
500.0	0.438		0.438	
400.0	0.454		0.454	Hot
300.0	0.468		0.468	Hot
200.0	0.445		0.445	
Application <u>Sample 1</u>		Wear		
1	0.498			
100	0.295			
Temp (°F) <u>Sample 1</u>		Second Fade	<u>Average</u>	Max Var. <u>< Average</u> <u>Norm/Hot</u> <u>% Var</u>
200.0	0.346		0.346	0.000 Normal 0%
250.0	0.413		0.413	0.000 Normal 0%
300.0	0.423		0.423	0.000 Normal 0%
350.0	0.389		0.389	0.000 - 0%
400.0	0.348		0.348	0.000 Normal 0%
450.0	0.360		0.360	0.000 Hot 0%
500.0	0.372		0.372	0.000 Hot 0%
550.0	0.425		0.425	0.000 Hot 0%
600.0	0.372		0.372	0.000 Hot 0%
650.0	0.305		0.305	0.000 Hot 0%
(or Temp @ 10min)				
Temp (°F) <u>Sample 1</u>		Second Recovery	<u>Average</u>	Max Var. <u>< Average</u> <u>Norm/Hot</u> <u>% Var</u>
600.0	0.359		0.359	0.000 - 0%
500.0	0.354		0.354	0.000 Hot 0%
400.0	0.302		0.302	0.000 Hot 0%
300.0	0.278		0.278	0.000 Hot 0%
200.0	0.336		0.336	0.000 - 0%
Application <u>Sample 1</u>		Final Baseline		
1	0.355			
20	0.430			

Manufacturer: Fricciones Universales
 Material: P.VO.165
 Test Pressure: 150 psi

16/02/2017
 170019-4
 Sample 1 of 1

Coefficient of Friction





Sample Lab Test Report

Link Test Report #: 170019-6
Test Description: SAE J661 Rev Feb 1997 Brake Lining Quality Test
Purpose of Test To Evaluate the Characteristics of Brake Materials
Program #: BRW16008A0
Lining Material: B.VO.189
Test Date(s): 16/02/2017

Requested By:

Fricciones Universales S.A
Alfredo Tomas Bertucci
Cuenca 678/80 - V.Lynch
San Martin - Prov. Bs.As
Código Postal B1672AHN
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Tested By:

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Phone: (55) 15-3416-0600

SAE J661 Rev Feb 1997 Brake Lining Quality Test

Test Information

Customer Name	Fricciones Universales S.A
Requestor	Alfredo Tomas Bertucci
Test Procedure	SAE J661
Program Number	BRW16008A0
Test Coordinator	Pedro Oliveira
Test Equipment	Chase Machine #3443
Test Dates	16/02/2017
Datalogger	v1.0.10
Template Version	3.00

Setup Details

Sample Material	B.VO.189
Sample Size	25.4 mm x 25.4 mm
Sample Manufacturer	Fricciones Universales
Test Pressure	150 psi

Sample Test Summary

Normal Friction Coefficient	0.470
Normal Friction Class	G
Hot Friction Coefficient	0.404
Hot Friction Class	F
Minimum Bold Coefficient	0.299
Max Variation Below Average for Bold Readings	0.000
Max % Variation for Bold Readings	0.00%

Comments:

Processed by:	Henrique Rodrigues +55 (15) 3416 0607	Title:	T. Q. Engineer Trainee	Date:	16/02/2017
Reviewed by:	Pedro Oliveira +55 (15) 3416 0604	Title:	T.E. Coordinator	Date:	16/02/2017

Signed by:

Data applicable to the materials tested. Report can be copied in full. Uncertainty of measurement available upon request.

<u>Sample 1</u> 170019-6		Test Number	Manufacturer Fricciones Universales	
Application <u>Sample 1</u>		Initial Baseline	Material B.VO.189	
1	0.391		Normal	0.470 G
20	0.506		Hot	0.404 F
Temp (°F) <u>Sample 1</u>		First Fade		
200.0	0.500			
550.0	0.396			
(or Temp @ 10min)				
Temp (°F) <u>Sample 1</u>		First Recovery	<u>Average</u>	<u>Norm/Hot</u>
500.0	0.473		0.473	
400.0	0.498		0.498	Hot
300.0	0.493		0.493	Hot
200.0	0.454		0.454	
Application <u>Sample 1</u>		Wear		
1	0.498			
100	0.382			
Temp (°F) <u>Sample 1</u>		Second Fade	<u>Average</u>	Max Var. <u>< Average</u> <u>Norm/Hot</u> <u>% Var</u>
200.0	0.459		0.459	0.000 Normal 0%
250.0	0.480		0.480	0.000 Normal 0%
300.0	0.473		0.473	0.000 Normal 0%
350.0	0.464		0.464	0.000 - 0%
400.0	0.470		0.470	0.000 Normal 0%
450.0	0.516		0.516	0.000 Hot 0%
500.0	0.484		0.484	0.000 Hot 0%
550.0	0.414		0.414	0.000 Hot 0%
600.0	0.369		0.369	0.000 Hot 0%
650.0	0.331		0.331	0.000 Hot 0%
(or Temp @ 10min)				
Temp (°F) <u>Sample 1</u>		Second Recovery	<u>Average</u>	Max Var. <u>< Average</u> <u>Norm/Hot</u> <u>% Var</u>
600.0	0.372		0.372	0.000 - 0%
500.0	0.347		0.347	0.000 Hot 0%
400.0	0.293		0.293	0.000 Hot 0%
300.0	0.299		0.299	0.000 Hot 0%
200.0	0.374		0.374	0.000 - 0%
Application <u>Sample 1</u>		Final Baseline		
1	0.391			
20	0.454			

Manufacturer: Fricciones Universales
Material: B.VO.189
Test Pressure: 150 psi

16/02/2017
170019-6
Sample 1 of 1

Coefficient of Friction

