



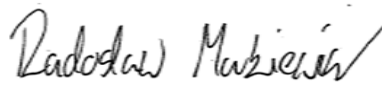
Physical Properties Test Report

Link Test Report: 105146-1-1
Test Description: SAE J661 Rev Feb 1997 Brake Lining Quality Test
Purpose of Test: To Evaluate the Characteristics of Brake Materials
Material Identification: D1748
Test Date: 12/18/2020 to 12/18/2020

Requested By:

ROYAL BRAKES CANADA
HARRY DIBADJ
1500-701 WEST GEORGIA STREET
VANCOUVER, B.C. V7Y 1C6
CANADA

Report Approved By:



Supervising Engineer, M.Sc.

Date: 12/22/20



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Test Number
105146-1-1

Customer Reference
D1748

SAE J661 Rev Feb 1997 Brake Lining Quality Test

Test Information

Customer Name	Royal Brakes Canada
Requestor	Harry Dibadj
Test Procedure	SAE J661
Program Number	J661noinsp.chp
Test Coordinator	E. DEJULES
Test Equipment	Chase Machine 12
Test Dates	12/18/2020 to 12/18/2020
Datalogger	v1.0.10
Template Version	2.06

Setup Details

Sample Material	D1748
Sample Size	1" X 1"
Sample Manufacturer	Royal Brakes Canada
Test Pressure	150 psi

Sample Test Summary

Normal Friction Coefficient	0.411	Pass
Normal Friction Class	F	
Hot Friction Coefficient	0.351	Pass
Hot Friction Class	F	
Minimum Bold Coefficient	0.362	Pass
Max Variation Below Avg for Bold readings	0.000	Pass
Max % Variation for Bold Readings	0%	Pass

Pass / Fail

Pass

Comments:

Created by:	Chris Arquette (313) 625-4000	Title	Test Engineer	Date	12/22/2020
Reviewed by:	Radoslaw Markiewicz (313) 625-4000	Title	Supervising Engineer	Date	12/22/2020

Data applicable to the materials tested. **Valid if signed by the test engineer.** Report can be copied in full. Bilateral uncertainty of measurements 0.63% of FS. Coverage factor of 2. Confidence of 95%. Details available upon request.



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		Test Number								
		<u>Sample 1</u>	<u>Sample 2</u>	<u>Sample 3</u>	<u>Sample 4</u>	<u>Sample 5</u>	Manufacturer			
		105146-1-4					Royal Brakes Canada			
		Initial Baseline					Material			
		<u>Sample 1</u>	<u>Sample 2</u>	<u>Sample 3</u>	<u>Sample 4</u>	<u>Sample 5</u>	D1748			
Application										
1		0.416								
20		0.423								
		First Fade								
Temp (°F)		<u>Sample 1</u>	<u>Sample 2</u>	<u>Sample 3</u>	<u>Sample 4</u>	<u>Sample 5</u>				
200.0		0.414								
500.0		0.363								
(or Temp @ 10min)										
		First Recovery								
Temp (°F)		<u>Sample 1</u>	<u>Sample 2</u>	<u>Sample 3</u>	<u>Sample 4</u>	<u>Sample 5</u>	<u>Average</u>	<u>Norm/Hot</u>		
500.0		0.316					0.316			
400.0		0.331					0.331	Hot		
300.0		0.337					0.337	Hot		
200.0		0.349					0.349			
		Wear								
Application		<u>Sample 1</u>	<u>Sample 2</u>	<u>Sample 3</u>	<u>Sample 4</u>	<u>Sample 5</u>				
1		0.354								
100		0.400								
		Second Fade								
Temp (°F)		<u>Sample 1</u>	<u>Sample 2</u>	<u>Sample 3</u>	<u>Sample 4</u>	<u>Sample 5</u>	<u>Average</u>	<u>Max Var.</u>		
200.0		0.458					0.458	0.000	Normal	0%
250.0		0.401					0.401	0.000	Normal	0%
300.0		0.393					0.393	0.000	Normal	0%
350.0		0.395					0.395	0.000	-	0%
400.0		0.392					0.392	0.000	Normal	0%
450.0		0.397					0.397	0.000	Hot	0%
500.0		0.387					0.387	0.000	Hot	0%
550.0		0.370					0.370	0.000	Hot	0%
600.0		0.336					0.336	0.000	Hot	0%
650.0		0.310					0.310	0.000	Hot	0%
(or Temp @ 10min)										
		Second Recovery								
Temp (°F)		<u>Sample 1</u>	<u>Sample 2</u>	<u>Sample 3</u>	<u>Sample 4</u>	<u>Sample 5</u>	<u>Average</u>	<u>Max Var.</u>		
600.0		0.318					0.318	0.000	-	
500.0		0.337					0.337	0.000	Hot	
400.0		0.344					0.344	0.000	Hot	
300.0		0.362					0.362	0.000	Hot	
200.0		0.363					0.363	0.000	-	
		Final Baseline								
Application		<u>Sample 1</u>	<u>Sample 2</u>	<u>Sample 3</u>	<u>Sample 4</u>	<u>Sample 5</u>				
1		0.367								
20		0.402								



Test Number
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Customer Reference
D1748

Manufacturer: Royal Brakes Canada
Material: D1748
Test Pressure: 150 psi

Normal **0.411** **F**
Hot **0.351** **F**

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Sample 1 of 1

Wear

	Initial	Final	Loss	Loss / %	Specific Wear	
Weight (gr)	8.483	8.246	0.237	2.79%	1.08E-01	gr/hp-hr
Thickness (inch)	0.247	0.237	0.010	4.05%	4.55E-03	in ³ /hp-hr

Baseline

Event	Initial		Final	
	Force (lb)	μ	Force (lb)	μ
1	64	0.416	55	0.367
5	71	0.470	58	0.386
10	69	0.454	59	0.397
15	66	0.438	61	0.405
20	63	0.423	61	0.402

Wear

Event	Force (lb)	μ
1	53	0.354
10	53	0.357
20	56	0.376
30	56	0.373
40	57	0.380
50	57	0.378
60	58	0.383
70	57	0.381
80	57	0.386
90	57	0.385
100	60	0.400

First Fade

Time (sec)	Force (lb)	μ	Temp (°F)
0	63	0.414	228
30	61	0.404	266
60	59	0.388	303
90	57	0.379	338
120	55	0.368	371
150	56	0.368	406
180	57	0.375	441
210	56	0.374	474
240	53	0.348	509
270	51	0.338	536
300			
330			
360			
390			
420			
450			
480			
510			
540			
570			
600			

Second Fade

Time (sec)	Force (lb)	μ	Temp (°F)
0	59	0.390	238
30	60	0.400	284
60	59	0.390	323
90	59	0.395	360
120	60	0.399	401
150	57	0.379	438
180	56	0.370	474
210	55	0.371	507
240	53	0.355	538
270	52	0.346	564
300	50	0.333	588
330	47	0.312	609
360	47	0.317	629
390	47	0.313	646
420			
450			
480			
510			
540			
570			
600			

First Recovery

Event	Force (lb)	μ	Temp (°F)
1	48	0.316	511
2	50	0.331	413
3	50	0.337	317
4	53	0.349	215

Second Recovery

Event	Force (lb)	μ	Temp (°F)
1	48	0.318	602
2	51	0.337	511
3	52	0.344	414
4	54	0.362	314
5	55	0.363	223



Test Number
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Customer Reference
D1748

Manufacturer: Royal Brakes Canada
Material: D1748
Test Pressure: 150 psi

12/18/2020
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Sample 1 of 1

Coefficient of Friction

