




## Physical Properties Test Report

**Link Test Report:** 101489-5-1  
**Test Description:** SAE J661 Rev Feb 1997 Brake Lining Quality Test  
**Purpose of Test:** To Evaluate the Characteristics of Brake Materials  
**Material Identification:** D924  
**Test Date:** 02/02/2019 - 02/02/2019

### Requested By:

**ROYAL BRAKES CANADA**  
Quality control Department  
1500-701 WEST GEORGIA STREET  
VANCOUVER, B.C. V7Y 1C6  
CANADA

### Report Approved by:

  
\_\_\_\_\_  
Supervising Engineer, M.Sc.

Date: 2/04/19



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## SAE J661 Rev Feb 1997 Brake Lining Quality Test

### Test Information

Customer Name	ROYAL BRAKES CANADA
Requestor	
Test Procedure	SAE J661
Program Number	J661noinsp.chp
Test Coordinator	CA
Test Equipment	Chase Machine #5531
Test Dates	02/02/2019 - 02/02/2019
Datalogger	v1.0.10
Template Version	3.00

### Setup Details

Sample Materia	D924
Sample Size	25.4 mm x 25.4 mm
Sample Manufacturer	ROYAL BRAKES CANADA
Test Pressure	1034 kPa

### Sample Test Summary

Normal Friction Coefficient	0.426	Pass
Normal Friction Class	F	
Hot Friction Coefficient	0.494	Pass
Hot Friction Class	G	
Minimum Bold Coefficient	0.357	Pass
Max Variation Below Average for Bold Readings	0.000	Pass
Max % Variation for Bold Readings	0.00%	Pass

**Pass / Fail**

**Pass**

### Comments:

Processed by:	Chris Arquette (313) 625-4000	Title:	Test Engineer	Date:	02/04/2019
Reviewed by:	Radoslaw Markiewicz (313) 625-4000	Title:	Supervising Engineer	Date:	02/04/2019

Data applicable to the materials tested. 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.



**Test Number**

Sample 1  
101489-5-1

Manufacturer  
**ROYAL BRAKES CANADA**

**Initial Baseline**

Application Sample 1  
1 0.350  
20 0.345

Material  
**D924**

**First Fade**

Temp (°C) Sample 1  
93.3 0.359  
287.8 0.492  
(or Temp @ 10min)

Normal **0.426 F**  
  
Hot **0.494 G**

**First Recovery**

Temp (°C) Sample 1  
260.0 0.497  
204.4 0.520  
148.9 0.520  
93.3 0.457

<u>Average</u>	<u>Norm/Hot</u>
0.497	
0.520	Hot
0.520	Hot
0.457	

**Wear**

Application Sample 1  
1 0.524  
100 0.496

**Second Fade**

Temp (°C) Sample 1  
**93.3 0.357**  
**121.1 0.405**  
**148.9 0.454**  
**176.7 0.474**  
**204.4 0.488**  
**232.2 0.495**  
**260.0 0.494**  
**287.8 0.486**  
315.6 0.476  
343.3 0.471  
(or Temp @ 10min)

<u>Average</u>	<u>Max Var. &lt; Average</u>	<u>Norm/Hot</u>	<u>% Var</u>
<b>0.357</b>	<b>0.000</b>	<b>Normal</b>	<b>0%</b>
<b>0.405</b>	<b>0.000</b>	<b>Normal</b>	<b>0%</b>
<b>0.454</b>	<b>0.000</b>	<b>Normal</b>	<b>0%</b>
<b>0.474</b>	<b>0.000</b>	<b>-</b>	<b>0%</b>
<b>0.488</b>	<b>0.000</b>	<b>Normal</b>	<b>0%</b>
<b>0.495</b>	<b>0.000</b>	<b>Hot</b>	<b>0%</b>
<b>0.494</b>	<b>0.000</b>	<b>Hot</b>	<b>0%</b>
<b>0.486</b>	<b>0.000</b>	<b>Hot</b>	<b>0%</b>
0.476	0.000	Hot	0%
0.471	0.000	Hot	0%

**Second Recovery**

Temp (°C) Sample 1  
315.6 0.480  
260.0 0.495  
204.4 0.505  
**148.9 0.476**  
**93.3 0.392**

<u>Average</u>	<u>Max Var. &lt; Average</u>	<u>Norm/Hot</u>	<u>% Var</u>
0.480	0.000	-	0%
0.495	0.000	Hot	0%
0.505	0.000	Hot	0%
<b>0.476</b>	<b>0.000</b>	<b>Hot</b>	<b>0%</b>
<b>0.392</b>	<b>0.000</b>	<b>-</b>	<b>0%</b>

**Final Baseline**

Application Sample 1  
1 0.360  
20 0.339

Test Request #:  
101489-5-1



Customer Ref:  
D924

Manufacturer: ROYAL BRAKES CANADA  
Material: D924  
Test Pressure: 1034 kPa

Normal 0.426

Hot 0.494

F  
G

2/2/2019  
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### Wear

	Initial	Final	Loss	Loss / %
Weight (gram)	11.250	11.250	0.000	0.00
Thickness (mm)	6.550	6.550	0.000	0.00
Indicator	N/A	N/A	N/A	N/A

### Baseline

Event	Initial		Final	
	Force (N)	$\mu$	Force (N)	$\mu$
1	234.5	0.350	240.2	0.360
5	238.9	0.358	237.0	0.354
10	238.2	0.356	229.3	0.342
15	235.5	0.352	226.3	0.340
20	230.4	0.345	225.6	0.339

### Wear

Event	Force (N)	$\mu$
1	350.2	0.524
10	343.5	0.516
20	344.2	0.516
30	353.9	0.530
40	340.1	0.509
50	338.5	0.507
60	340.5	0.509
70	333.7	0.501
80	332.4	0.498
90	333.0	0.499
100	332.2	0.496

### First Fade

Time (sec)	Force (N)	$\mu$	Temp (°C)
0.0	223.4	0.340	82
30.0	246.8	0.371	105
60.0	273.4	0.411	126
90.0	306.3	0.458	149
120.0	331.5	0.496	175
150.0	344.3	0.515	201
180.0	338.9	0.506	226
210.0	339.3	0.510	248
240.0	332.8	0.499	272
262.6	325.9	0.447	289

### Second Fade

Time (sec)	Force (N)	$\mu$	Temp (°C)
0.0	231.0	0.353	82
30.0	251.7	0.378	106
60.0	279.4	0.419	129
90.0	307.2	0.460	154
120.0	316.8	0.475	180
150.0	326.1	0.488	205
180.0	332.5	0.498	231
210.0	329.5	0.495	256
240.0	325.7	0.489	279
270.0	320.9	0.481	301
300.0	319.2	0.479	321
330.0	317.1	0.474	340
337.6	315.9	0.458	345

### First Recovery

Event	Force (N)	$\mu$	Temp (°C)
1	332.8	0.497	262
2	346.6	0.520	211
3	347.3	0.520	156
4	305.5	0.457	101

### Second Recovery

Event	Force (N)	$\mu$	Temp (°C)
1	321.4	0.480	317
2	330.6	0.495	265
3	336.5	0.505	211
4	318.8	0.476	156
5	261.9	0.392	99



Manufacturer: ROYAL BRAKES CANADA  
Material: D924  
Test Pressure: 1034 kPa

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**Coefficient of Friction**

