



## Sample Lab Test Report

Link Test Report: 130231-1  
Test Description: SAE J661 Rev Feb 1997 Brake Lining Quality  
Purpose of Test: To Evaluate the Characteristics of Brake  
Materials  
Program: J661noinsp.chp  
Lining Material: CERAMIC  
Test Date(s): 1/27/2013 to 1/27/2013

## Requested By

**ROYAL FRICTION PRODUCTS INCORPORATION**  
QUALITY CONTROL DEPARTMENT  
1500-701 WEST GEORGIA STREET  
VANCOUVER BC V7Y 1C6  
CANADA

## Tested By:

**Testing Coordination and Facility**  
North America Laboratory Test Operations  
13840 Elmira Ave.  
Detroit, MI 48227  
[www.linkeng.com](http://www.linkeng.com)  
Phone: (313) 933-4900  
Fax: (313) 933-0710



Test Number  
130231-1

Customer Reference  
CERAMIC

## SAE J661 Rev Feb 1997 Brake Lining Quality Test

### Test Information

Customer Name	Royal Friction Products Incorporation
Requestor	Quality Control Department
Test Procedure	SAE J661
Program Number	J661noinsp.chp
Test Coordinator	COLEMAN, TIM
Test Equipment	Chase Machine 12\1
Test Dates	1/27/2013 to 1/27/2013
Datalogger	v1.0.10
Template Version	2.01

### Setup Details

Sample Material	CERAMIC
Sample Size	25.4mm x 25.4mm
Sample Manufacturer	Royal Friction Products Incorporation
Test Pressure	1034.21 kPa

### Sample Test Summary

Normal Friction Coefficient	0.492	Pass
Normal Friction Class	G	
Hot Friction Coefficient	0.456	Pass
Hot Friction Class	G	
Minimum Bold Coefficient	0.412	Pass
Max Variation Below Average	0.000	Pass
Max % Variation for Bold Readings	0%	Pass

**Pass / Fail**

**Pass**

### Comments:

**Created by:** Timothy Coleman      **Title** Lead Technician      **Date** 1/28/2013  
(313) 625-4000

**Reviewed by:** Timothy Coleman      **Title** Lead Technician      **Date** 1/28/2013  
(313) 625-4000

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.



Test Number  
130231-1

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**Test Number**  
Sample 1 Sample 2 Sample 3 Sample 4 Sample 5  
130231-A1

Manufacturer  
**ROYAL FRICTION  
PRODUCTS INC.**  
Material  
**CERAMIC**

**Initial Baseline**  
Application Sample 1 Sample 2 Sample 3 Sample 4 Sample 5  
1 0.437  
20 0.496

Normal **0.492** **G**

**First Fade**  
Temp (°C) Sample 1 Sample 2 Sample 3 Sample 4 Sample 5  
93.3 0.454  
260.0 0.452  
(or Temp @ 10min)

Hot **0.456** **G**

**First Recovery**  
Temp (°C) Sample 1 Sample 2 Sample 3 Sample 4 Sample 5 Average Norm/Hot  
260.0 0.452 0.452  
204.4 0.489 0.489 Hot  
148.9 0.502 0.502 Hot  
93.3 0.515 0.515

**Wear**  
Application Sample 1 Sample 2 Sample 3 Sample 4 Sample 5  
1 0.535  
100 0.485

**Second Fade**  
Temp (°C) Sample 1 Sample 2 Sample 3 Sample 4 Sample 5 Average Max Var.  
< Average Norm/Hot % Var  
93.3 **0.412** **0.412** **0.000** **Normal**  
121.1 **0.521** **0.521** **0.000** **Normal**  
148.9 **0.530** **0.530** **0.000** **Normal**  
176.7 **0.500** **0.500** **0.000** **Normal**  
204.4 **0.496** **0.496** **0.000** **Normal**  
232.2 **0.476** **0.476** **0.000** **Hot**  
260.0 **0.472** **0.472** **0.000** **Hot**  
287.8 **0.447** **0.447** **0.000** **Hot**  
315.6 0.430 0.430 0.000 Hot  
343.3 0.380 0.380 0.000 Hot  
(or Temp @ 10min)

**Second Recovery**  
Temp (°C) Sample 1 Sample 2 Sample 3 Sample 4 Sample 5 Average Max Var.  
< Average Norm/Hot % Var  
315.6 0.403 0.403 0.000  
260.0 0.432 0.432 0.000 Hot  
204.4 0.457 0.457 0.000 Hot  
148.9 **0.472** **0.472** **0.000** **Hot**  
93.3 **0.472** **0.472** **0.000**

**Final Baseline**  
Application Sample 1 Sample 2 Sample 3 Sample 4 Sample 5  
1 0.451  
20 0.456



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130231-1

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Manufacturer: ROYAL FRICTION PRODUCTS INC.  
Material: CERAMIC  
Test Pressure: 1034.21 kPa

Normal  
Hot

**0.492**  
**0.456**

**G**  
**G**

1/27/2013  
130231-A1  
Sample 1 of 1

**Wear**

	Initial	Final	Loss		Specific Wear	
Weight (gr)	9.66	9.096	0.564	6%	2.91E-01	gr/kWh
Thickness (cm)	0.627	0.594	0.033	5%	1.10E-01	cm <sup>3</sup> /kWh

**Baseline**

Event	Initial		Final	
	Force (N)	$\mu$	Force (N)	$\mu$
1	291	0.437	300	0.451
5	307	0.461	296	0.446
10	323	0.483	313	0.471
15	336	0.506	316	0.474
20	332	0.496	305	0.456

**Wear**

Event	Force (N)	$\mu$
1	353	0.535
10	311	0.467
20	334	0.500
30	310	0.465
40	312	0.466
50	323	0.481
60	313	0.472
70	309	0.463
80	311	0.467
90	295	0.442
100	324	0.485

**First Fade**

Time (sec)	Force (N)	$\mu$	Temp (°C)
0	297	0.454	93
30	337	0.507	118
60	336	0.500	152
90	318	0.478	183
120	298	0.448	211
150	303	0.452	238
180	298	0.452	260
210	276	0.415	281
240			
270			
300			
330			
360			
390			
420			
450			
480			
510			
540			
570			
600			

**Second Fade**

Time (sec)	Force (N)	$\mu$	Temp (°C)
0	269	0.412	96
30	347	0.516	113
60	356	0.529	142
90	336	0.503	171
120	337	0.503	199
150	331	0.497	225
180	327	0.488	252
210	303	0.452	274
240	302	0.452	295
270	286	0.428	313
300	275	0.411	328
330	271	0.404	342
360			
390			
420			
450			
480			
510			
540			
570			
600			

**First Recovery**

Event	Force (N)	$\mu$	Temp (°C)
1	302	0.452	255
2	326	0.489	203
3	334	0.502	148
4	345	0.515	95

**Second Recovery**

Event	Force (N)	$\mu$	Temp (°C)
1	269	0.403	305
2	289	0.432	257
3	306	0.457	204
4	314	0.472	149
5	314	0.472	97



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Material: CERAMIC  
Test Pressure: 1034.21 kPa

1/27/2013  
130231-A1  
Sample 1 of 1

### Coefficient of Friction

