Sample Lab Test Report

Link Test Report #:	172601-1
Test Description:	SAE J661 Rev Feb 1997 Brake Lining Quality Test
Purpose of Test	To Evaluate the Characteristics of Brake Materials
Program #:	J661noinsp.chp
Lining Material:	RBP1210
Test Date(s):	05/07/2017 - 05/07/2017

Requested By:

ROYAL BRAKES CANADA
QUALITY CONTROL DEPARTMENT
1500-701 WEST GEORGIA STREET
VANCOUVER BC V7Y 1C6
CANADA

Tested By:

Testing Coordination and Facility
Dearborn Technical Center
401 Southfield Road
Dearborn, MI. 48120
www.linkeng.com
(313) 625-4000

SAE J661 Rev Feb 1997 Brake Lining Quality Test

Test Information

Customer Name	ROYAL BRAKES CANADA
Requestor	Quality Control Department
Test Procedure	SAE J661
Program Number	J661noinsp.chp
Test Coordinator	Chris Arquette
Test Equipment	Chase Machine #5531
Test Dates	05/07/2017 - 05/07/2017
Datalogger	v1.0.10
Template Version	3.00

Setup Details

Sample Material	RBP1210
Sample Size	25.4 mm x 25.4 mm
Sample Manufacturer	ROYAL BRAKES CANADA
Test Pressure	1034 kPa

Sample Test Summary

Normal Friction Coefficient	0.469	Pass
Normal Friction Class	G	
Hot Friction Coefficient	0.351	Pass
Hot Friction Class	F	
Minimum Bold Coefficient	0.367	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:	05/08/2017
Reviewed by:	Radoslaw Markiewicz (313) 625-4000	Title:	Supervising Engineer	Date:	05/08/2017

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
172601-A1

Manufacturer
ROYAL BRAKES CANADA

Initial Baseline

Material
RBP1210

Application	Sample 1
1	0.314
20	0.312

Normal **0.469** **G**

First Fade

Temp (°C)	Sample 1
93.3	0.318
287.8	0.327
(or Temp @ 10min)	

Hot **0.351** **F**

First Recovery

Temp (°C)	Sample 1	Average	Norm/Hot
260.0	0.276	0.276	
204.4	0.287	0.287	Hot
148.9	0.293	0.293	Hot
93.3	0.292	0.292	

Wear

Application	Sample 1
1	0.340
100	0.430

Second Fade

Temp (°C)	Sample 1	Average	Max Var. < Average	Norm/Hot	% Var
93.3	**0.451**	**0.451**	**0.000**	**Normal**	**0%**
121.1	**0.479**	**0.479**	**0.000**	**Normal**	**0%**
148.9	**0.489**	**0.489**	**0.000**	**Normal**	**0%**
176.7	**0.486**	**0.486**	**0.000**	**-**	**0%**
204.4	**0.459**	**0.459**	**0.000**	**Normal**	**0%**
232.2	**0.446**	**0.446**	**0.000**	**Hot**	**0%**
260.0	**0.406**	**0.406**	**0.000**	**Hot**	**0%**
287.8	**0.367**	**0.367**	**0.000**	**Hot**	**0%**
315.6	0.349	0.349	0.000	Hot	0%
343.3	0.322	0.322	0.000	Hot	0%
(or Temp @ 10min)					

Second Recovery

Temp (°C)	Sample 1	Average	Max Var. < Average	Norm/Hot	% Var
315.6	0.299	0.299	0.000	-	0%
260.0	0.330	0.330	0.000	Hot	0%
204.4	0.340	0.340	0.000	Hot	0%
148.9	**0.371**	**0.371**	**0.000**	**Hot**	**0%**
93.3	**0.387**	**0.387**	**0.000**	**-**	**0%**

Final Baseline

Application	Sample 1
1	0.377
20	0.421

Manufacturer: ROYAL BRAKES CANADA
Material: RBP1210
Test Pressure: 1034 kPa

Normal **0.469** **G**
Hot **0.351** **F**

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Sample 1 of 1

Wear

	Initial	Final	Loss	Loss / %
Weight (gram)	8.222	8.038	0.184	2.24
Thickness (mm)	0.239	0.234	0.005	2.09
Indicator	N/A	N/A	N/A	N/A

Baseline

	Initial		Final	
Event	Force (N)	μ	Force (N)	μ
1	209.7	0.314	251.8	0.377
5	209.0	0.313	255.0	0.382
10	208.8	0.314	268.9	0.402
15	209.6	0.313	274.0	0.410
20	207.6	0.312	281.3	0.421

Wear

Event	Force (N)	μ
1	226.1	0.340
10	218.6	0.328
20	226.9	0.341
30	229.8	0.344
40	232.9	0.348
50	234.4	0.351
60	223.4	0.334
70	239.5	0.359
80	237.5	0.356
90	230.4	0.345
100	288.2	0.430

First Fade

Time (sec)	Force (N)	μ	Temp (°C)
0.0	197.8	0.307	82
30.0	218.3	0.327	101
60.0	228.6	0.343	120
90.0	229.6	0.345	140
120.0	245.8	0.370	161
150.0	246.5	0.370	183
180.0	250.7	0.375	205
210.0	244.5	0.366	225
240.0	233.4	0.350	245
270.0	224.0	0.336	265
300.0	219.2	0.328	284
306.5	217.0	0.297	288

Second Fade

Time (sec)	Force (N)	μ	Temp (°C)
0.0	245.6	0.376	82
30.0	311.3	0.467	107
60.0	322.2	0.484	133
90.0	318.8	0.479	158
120.0	319.8	0.477	183
150.0	306.1	0.457	206
180.0	302.4	0.453	229
210.0	277.6	0.416	251
240.0	260.6	0.391	274
270.0	242.0	0.363	295
300.0	233.8	0.351	313
330.0	224.8	0.338	331
358.2	215.0	0.293	344

First Recovery

Event	Force (N)	μ	Temp (°C)
1	183.8	0.276	260
2	191.4	0.287	207
3	195.3	0.293	153
4	195.2	0.292	99

Second Recovery

Event	Force (N)	μ	Temp (°C)
1	199.8	0.299	313
2	220.5	0.330	261
3	227.3	0.340	207
4	247.1	0.371	153
5	258.5	0.387	100

Manufacturer: ROYAL BRAKES CANADA
Material: RBP1210
Test Pressure: 1034 kPa

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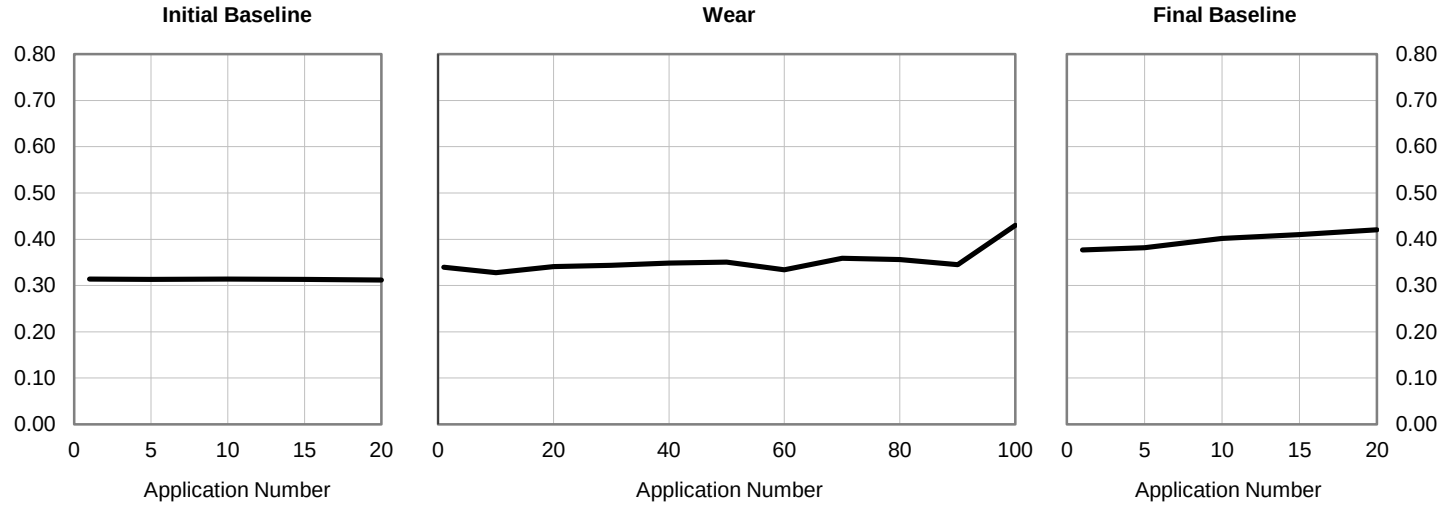
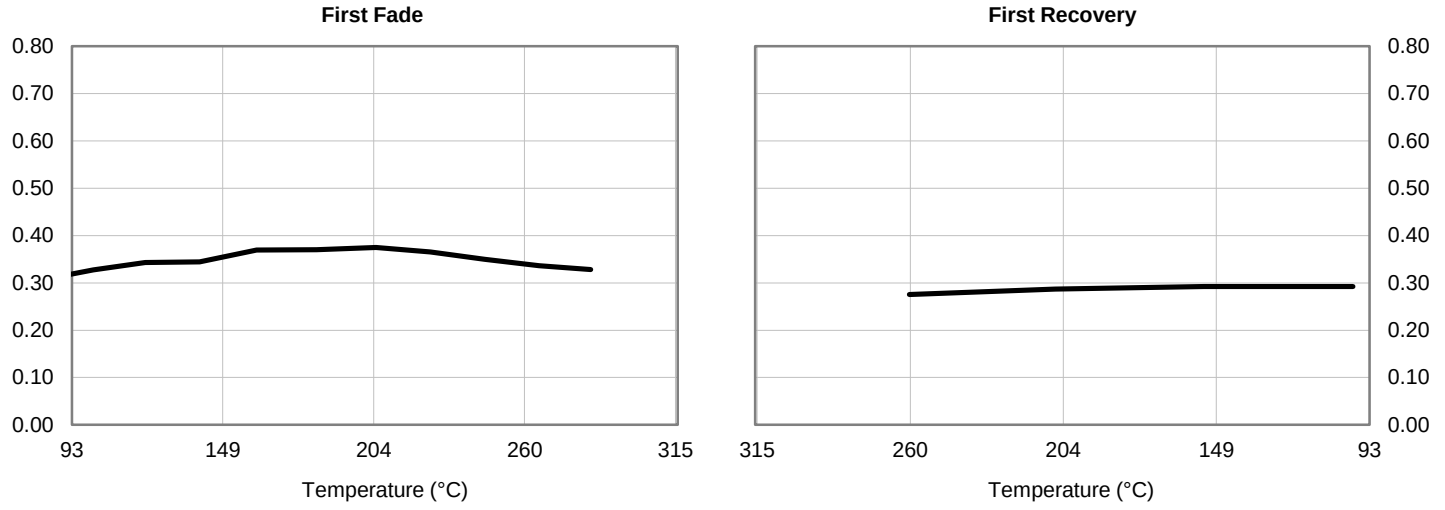
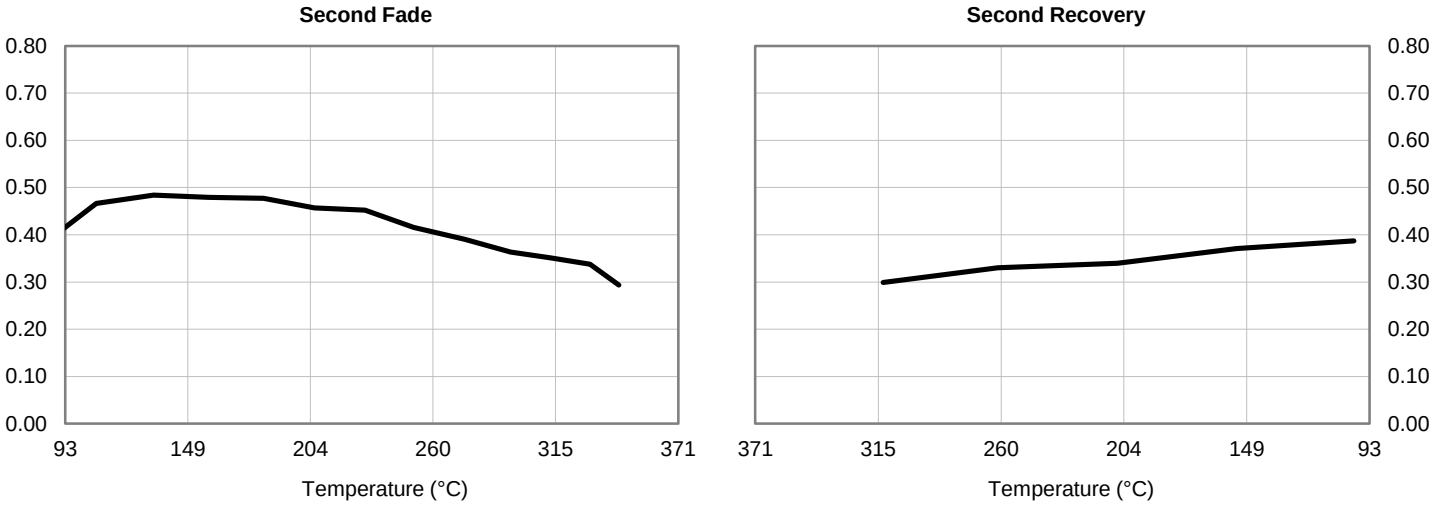
172601-A1
Sample 1 of 1

Coefficient of Friction







Manufacturer:
Material:
Test Pressure: 1034 kPa

Normal **#DIV/0!** **####**

Hot **#DIV/0!** **####**

1/0/1900

Sample 2 of 1

Wear

	Initial	Final	Loss	Loss / %	Specific Wear
Weight ()	N/A	N/A	N/A	N/A	gr/kWh
Thickness ()	N/A	N/A	N/A	N/A	cm^3/kWh
Indicator	N/A	N/A	N/A	N/A	

Baseline

	Initial		Final	
Event	Force (N)	µ	Force (N)	µ
1				
5				
10				
15				
20				

Wear

Event	Force (N)	µ
1		
10		
20		
30		
40		
50		
60		
70		
80		
90		
100		

First Fade

Time (sec)	Force (N)	µ	Temp (°C)

Second Fade

Time (sec)	Force (N)	µ	Temp (°C)

First Recovery

Event	Force (N)	µ	Temp (°C)
1			
2			
3			
4			

Second Recovery

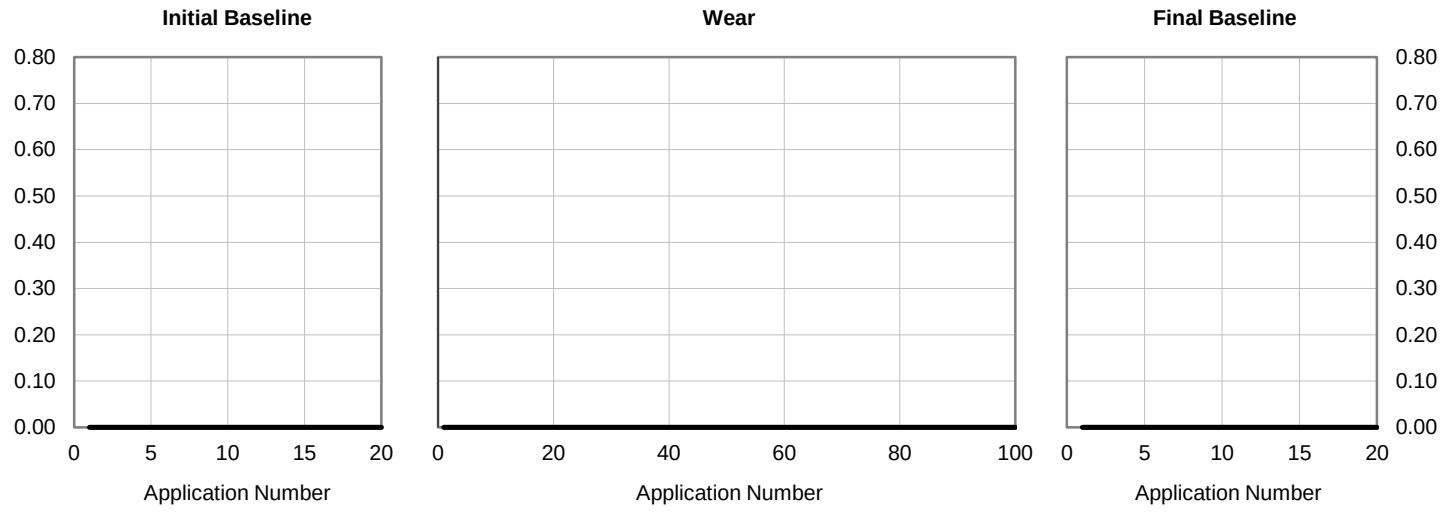
Event	Force (N)	µ	Temp (°C)
1			
2			
3			
4			
5			

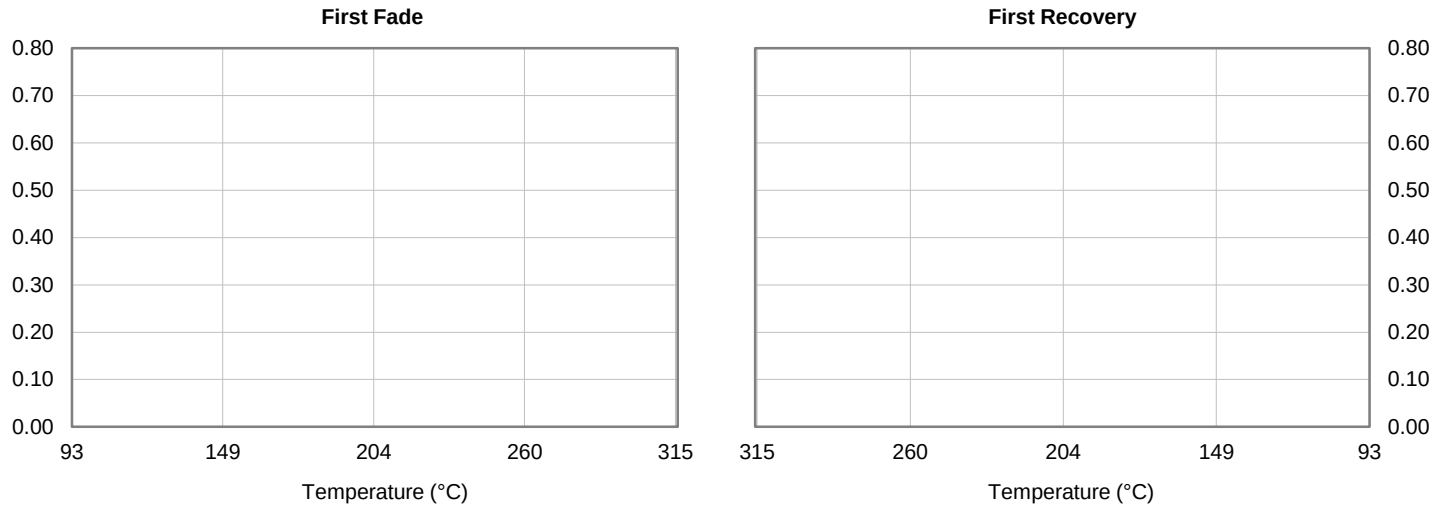
Manufacturer:
Material:
Test Pressure: 1034 kPa

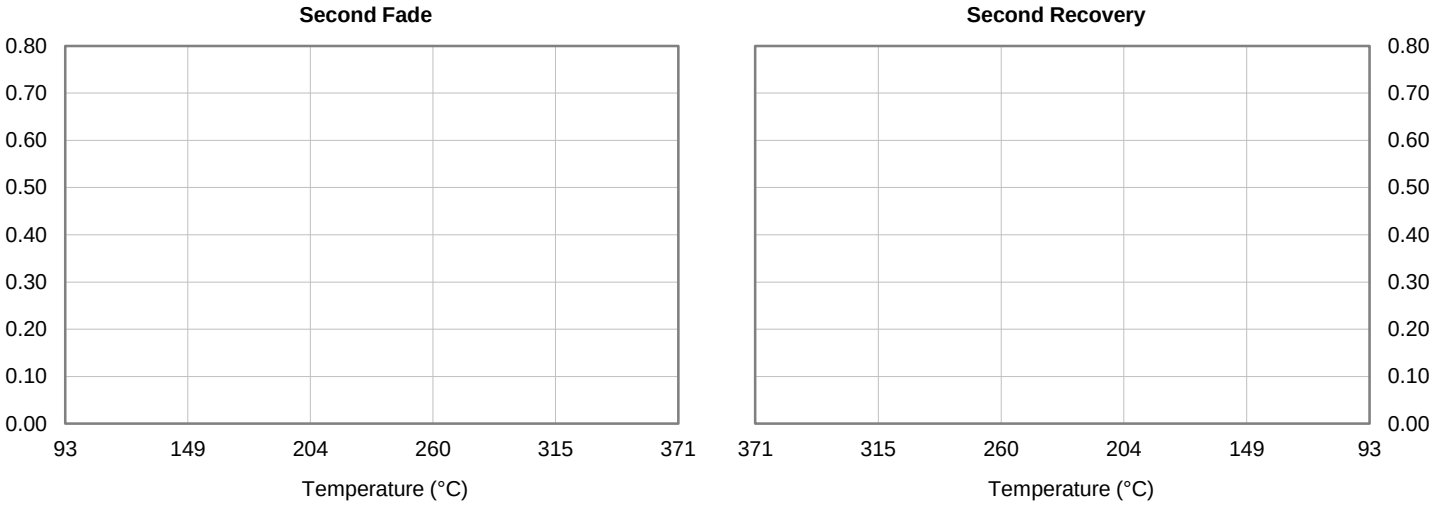
1/0/1900

Sample 2 of 1

Coefficient of Friction







Manufacturer:
Material:
Test Pressure: 1034 kPa

Normal **#DIV/0!** ####

Hot **#DIV/0!** ####

1/0/1900

Sample 3 of 1

Wear

	Initial	Final	Loss	Loss / %	Specific Wear
Weight ()	N/A	N/A	N/A	N/A	gr/kWh
Thickness ()	N/A	N/A	N/A	N/A	cm^3/kWh
Indicator	N/A	N/A	N/A	N/A	

Baseline

	Initial		Final	
Event	Force (N)	µ	Force (N)	µ
1				
5				
10				
15				
20				

Wear

Event	Force (N)	µ
1		
10		
20		
30		
40		
50		
60		
70		
80		
90		
100		

First Fade

Time (sec)	Force (N)	µ	Temp (°C)

Second Fade

Time (sec)	Force (N)	µ	Temp (°C)

First Recovery

Event	Force (N)	µ	Temp (°C)
1			
2			
3			
4			

Second Recovery

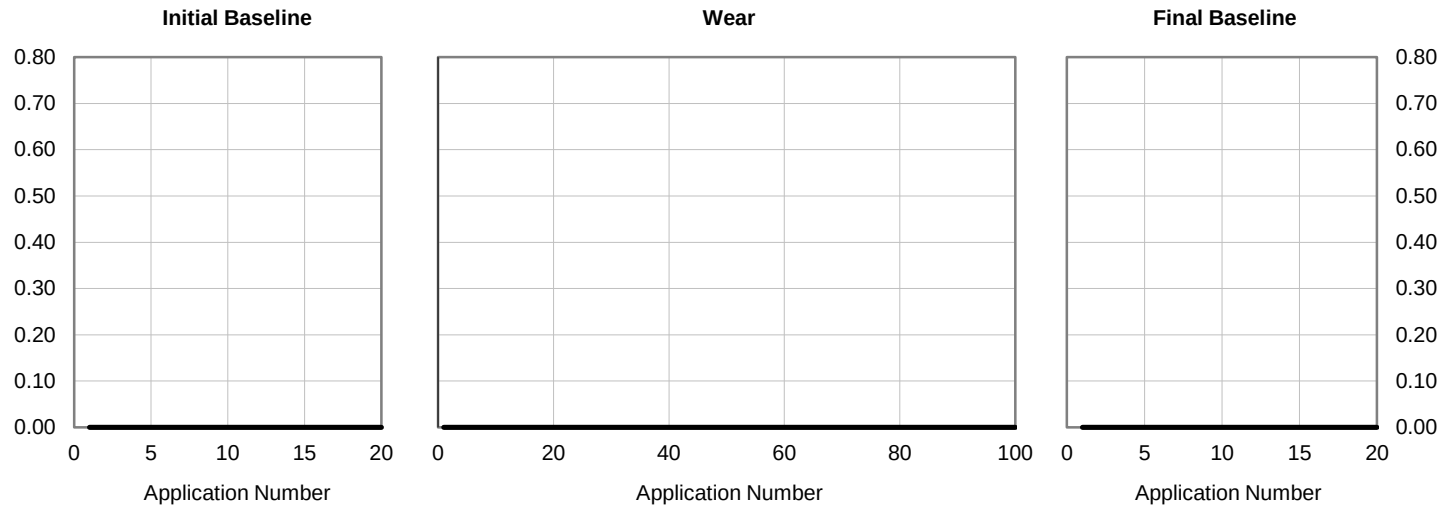
Event	Force (N)	µ	Temp (°C)
1			
2			
3			
4			
5			

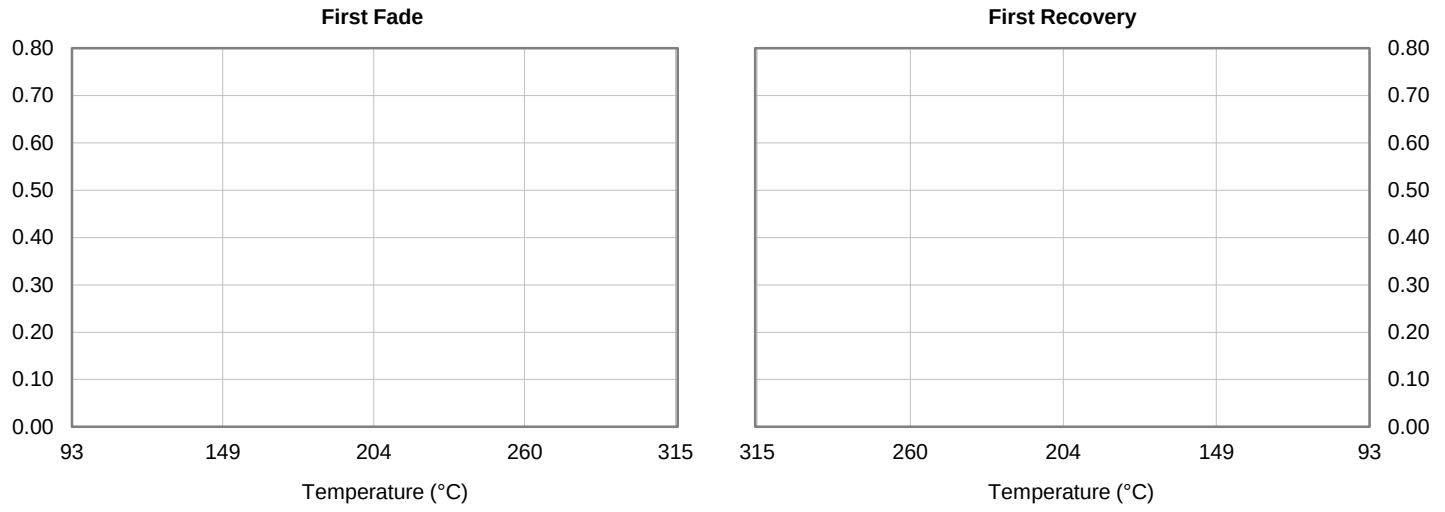
Manufacturer:
Material:
Test Pressure: 1034 kPa

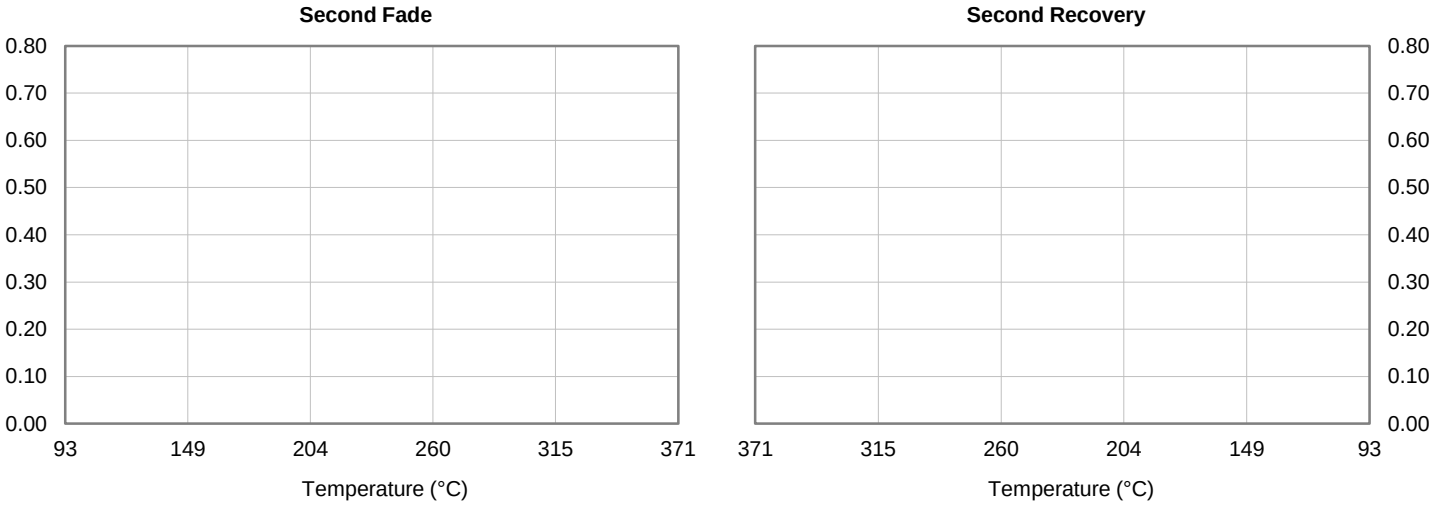
1/0/1900

Sample 3 of 1

Coefficient of Friction







Manufacturer:
Material:
Test Pressure: 1034 kPa

Normal **#DIV/0!** **####**

Hot **#DIV/0!** **####**

1/0/1900

Sample 4 of 1

Wear

	Initial	Final	Loss	Loss / %	Specific Wear
Weight ()	N/A	N/A	N/A	N/A	gr/kWh
Thickness ()	N/A	N/A	N/A	N/A	cm^3/kWh
Indicator	N/A	N/A	N/A	N/A	

Baseline

	Initial		Final	
Event	Force (N)	µ	Force (N)	µ
1				
5				
10				
15				
20				

Wear

Event	Force (N)	µ
1		
10		
20		
30		
40		
50		
60		
70		
80		
90		
100		

First Fade

Time (sec)	Force (N)	µ	Temp (°C)

Second Fade

Time (sec)	Force (N)	µ	Temp (°C)

First Recovery

Event	Force (N)	µ	Temp (°C)
1			
2			
3			
4			

Second Recovery

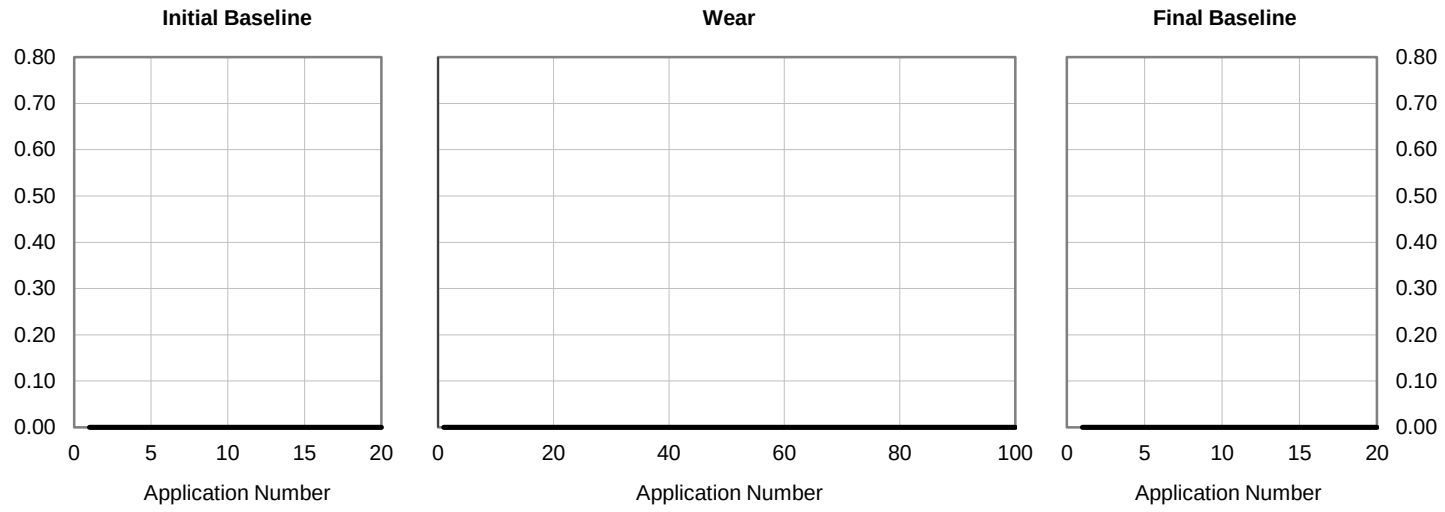
Event	Force (N)	µ	Temp (°C)
1			
2			
3			
4			
5			

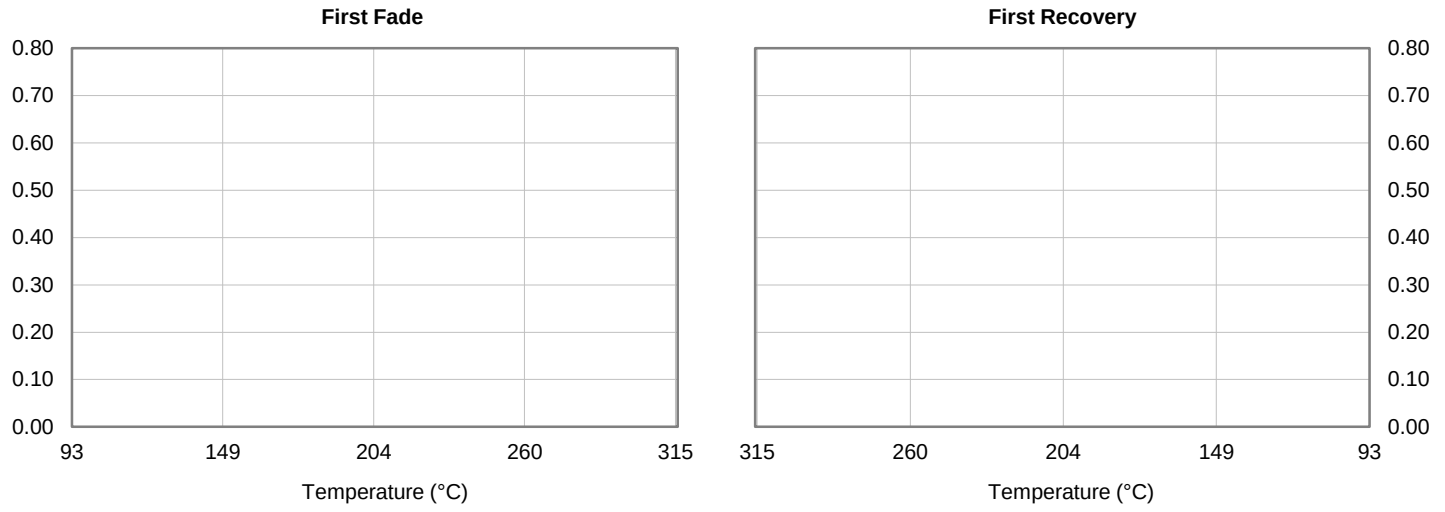
Manufacturer:
Material:
Test Pressure: 1034 kPa

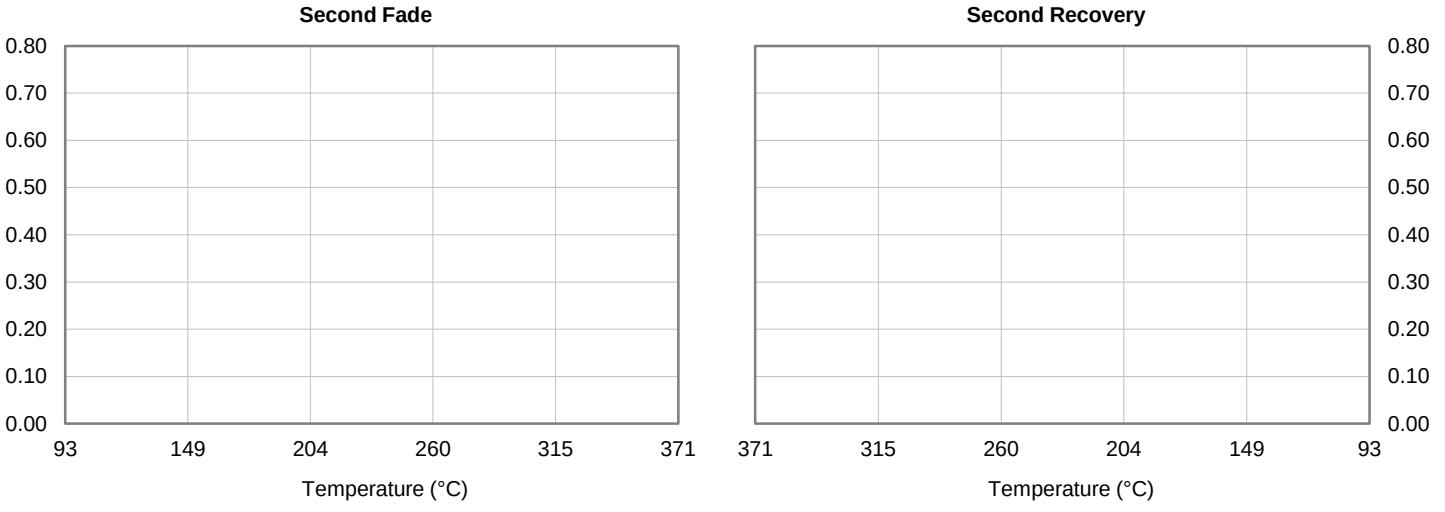
1/0/1900

Sample 4 of 1

Coefficient of Friction







Manufacturer:
Material:
Test Pressure: 1034 kPa

Normal **#DIV/0!** ####

Hot **#DIV/0!** ####

1/0/1900

Sample 5 of 1

Wear

	Initial	Final	Loss	Loss / %	Specific Wear
Weight ()	N/A	N/A	N/A	N/A	gr/kWh
Thickness ()	N/A	N/A	N/A	N/A	cm^3/kWh
Indicator	N/A	N/A	N/A	N/A	

Baseline

	Initial		Final	
Event	Force (N)	µ	Force (N)	µ
1				
5				
10				
15				
20				

Wear

Event	Force (N)	µ
1		
10		
20		
30		
40		
50		
60		
70		
80		
90		
100		

First Fade

Time (sec)	Force (N)	µ	Temp (°C)

Second Fade

Time (sec)	Force (N)	µ	Temp (°C)

First Recovery

Event	Force (N)	µ	Temp (°C)
1			
2			
3			
4			

Second Recovery

Event	Force (N)	µ	Temp (°C)
1			
2			
3			
4			
5			

Manufacturer:
Material:
Test Pressure: 1034 kPa

1/0/1900

Sample 5 of 1

Coefficient of Friction