



Physical Properties Test Report

Link Test Report: 230368-03
Test Description: SAE J661-2012
Purpose of Test: To Evaluate the Characteristics of Brake Materials
Material Identification: RZZW ZWC
Test Date: 07/16/2023 - 07/17/2023

Requested By

**Rizhao Zhongwei Automobile Part Co., Ltd.
Han Songhua**

Tested By

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SAE J661-2012

Test Information

Customer Name	Rizhao Zhongwei Automobile Part Co., Ltd.
Requestor	Han Songhua
Program Number	J661noinsp.chp
Test Coordinator	Bunny Lu
Test Equipment	Chase Machine
Test Dates	07/16/2023 - 07/17/2023
Datalogger	v1.0.23
Template Version	1.79

Setup Details

Sample Material	RZZW ZWC
Sample Size	1 inch x 1 inch
Sample Manufacturer	Rizhao Zhongwei Automobile Part Co., Ltd.
Test Pressure	150.0 psi

Sample Test Summary

Normal Friction Coefficient	0.503	Pass
Normal Friction Class	G	
Hot Friction Coefficient	0.535	Pass
Hot Friction Class	G	
Minimum Bold Coefficient	0.371	Pass
Max Variation Below Average for Bold Readings	0.0260	Pass
Max % Variation for Bold Readings	5.79%	Pass

Pass / Fail

Pass

Comments:

N/A

Created by: Bunny Lu **Signature:** **Date:** 7/18/2023

Reviewed by: Duel Tang **Signature:** **Date:** 7/18/2023

Issue Date: 07/18/2023



Test Number

Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
230368-03-A	230368-03-B	230368-03-C	230368-03-D	230368-03-E

Manufacturer:
**Rizhao Zhongwei
Automobile Part Co., Ltd.**
Material:
RZZW ZWC

Initial Baseline

Application	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
1	0.246	0.262	0.214	0.268	0.282
20	0.343	0.458	0.454	0.463	0.433

Normal **0.503** **G**

First Fade

Temp (°F)	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
200.0	0.328	0.457	0.445	0.442	0.432
550.0	0.455	0.513	0.524	0.496	0.515

(or Temp @ 10min)

Hot **0.535** **G**

First Recovery

Temp (°F)	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Average	Norm/Hot
500.0	0.478	0.554	0.556	0.525	0.547	0.532	
400.0	0.482	0.544	0.558	0.519	0.535	0.528	Hot
300.0	0.484	0.500	0.518	0.478	0.493	0.495	Hot
200.0	0.451	0.475	0.468	0.460	0.474	0.466	

Wear

Application	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
1	0.466	0.490	0.491	0.474	0.485
100	0.571	0.558	0.593	0.564	0.595

Second Fade

Temp (°F)	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Average	Max Var. < Average	Norm/Hot	% Var
200.0	0.393	0.371	0.386	0.373	0.384	0.381	0.010	Normal	3%
250.0	0.524	0.478	0.482	0.471	0.485	0.488	0.017	Normal	3%
300.0	0.606	0.539	0.561	0.540	0.529	0.555	0.026	Normal	5%
350.0	0.618	0.575	0.584	0.586	0.568	0.586	0.018	-	3%
400.0	0.602	0.563	0.607	0.591	0.571	0.587	0.024	Normal	4%
450.0	0.595	0.561	0.592	0.583	0.567	0.580	0.019	Hot	3%
500.0	0.568	0.541	0.567	0.564	0.539	0.556	0.017	Hot	3%
550.0	0.550	0.551	0.547	0.546	0.533	0.545	0.012	Hot	2%
600.0	0.543	0.520	0.540	0.513	0.525	0.528	0.015	Hot	3%
650.0	0.538	0.536	0.527	0.523	0.539	0.533	0.010	Hot	2%

(or Temp @ 10min)

Second Recovery

Temp (°F)	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Average	Max Var. < Average	Norm/Hot	% Var
600.0	0.561	0.539	0.561	0.554	0.555	0.554	0.015	-	3%
500.0	0.578	0.556	0.560	0.532	0.558	0.557	0.025	Hot	4%
400.0	0.589	0.534	0.549	0.521	0.541	0.547	0.026	Hot	5%
300.0	0.508	0.472	0.485	0.455	0.480	0.480	0.025	Hot	5%
200.0	0.479	0.445	0.445	0.423	0.453	0.449	0.026	-	6%

Final Baseline

Application	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
1	0.487	0.475	0.465	0.447	0.479
20	0.498	0.496	0.515	0.500	0.500

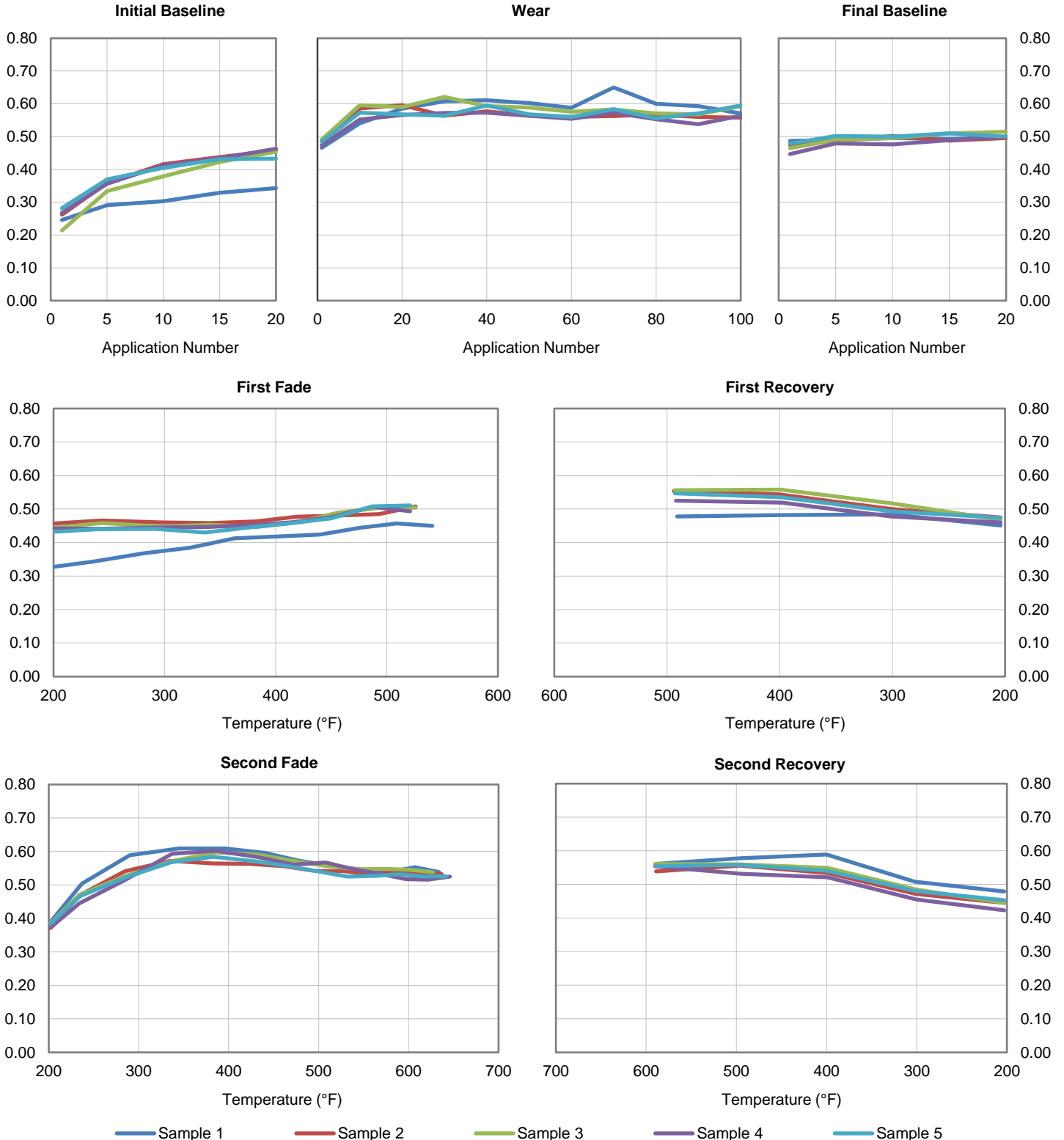


Manufacturer: Rizhao Zhongwei Automobile Part Co., Ltd.
 Material: RZZW ZWC
 Test Pressure: 150.0 psi

Test Dates: 07/16/2023 - 07/17/2023

Summary of 5 Samples

Coefficient of Friction





Normal **0.531** **G**
 Hot **0.544** **G**

7/16/2023
 230368-03-A
Sample 1 of 5

Wear

	Initial	Final	Loss	Loss / %
Weight (gr)	8.080	7.490	0.590	7.30
Thickness (inch)	0.239	0.221	0.018	7.55

Baseline

Event	Initial		Final	
	Force (lb)	μ	Force (lb)	μ
1	37.3	0.246	72.9	0.487
5	43.5	0.291	74.6	0.489
10	46.3	0.303	74.2	0.496
15	50.0	0.329	74.5	0.493
20	51.1	0.343	75.1	0.498

Wear

Event	Force (lb)	μ
1	70.0	0.466
10	81.5	0.541
20	86.8	0.585
30	91.3	0.608
40	92.4	0.611
50	91.5	0.602
60	88.9	0.588
70	97.9	0.650
80	89.9	0.600
90	89.9	0.593
100	85.7	0.571

First Fade

Time (sec)	Force (lb)	μ	Temp (°F)
0.0	50.2	0.328	201
30.0	51.7	0.343	236
60.0	55.2	0.368	281
90.0	57.8	0.385	323
120.0	61.8	0.413	363
150.0	62.3	0.418	403
180.0	64.6	0.424	440
210.0	67.2	0.444	476
240.0	68.4	0.457	509
270.0	67.3	0.450	541

Second Fade

Time (sec)	Force (lb)	μ	Temp (°F)
0.0	59.8	0.393	203
30.0	75.4	0.504	237
60.0	88.3	0.589	290
90.0	91.5	0.609	345
120.0	91.8	0.609	396
150.0	89.4	0.596	440
180.0	85.6	0.572	479
210.0	83.4	0.557	514
240.0	82.7	0.546	547
270.0	81.4	0.538	578
300.0	82.8	0.553	607
330.0	80.7	0.538	634

First Recovery

Event	Force (lb)	μ	Temp (°F)
1	71.6	0.478	491
2	73.6	0.482	398
3	72.0	0.484	301
4	68.7	0.451	204

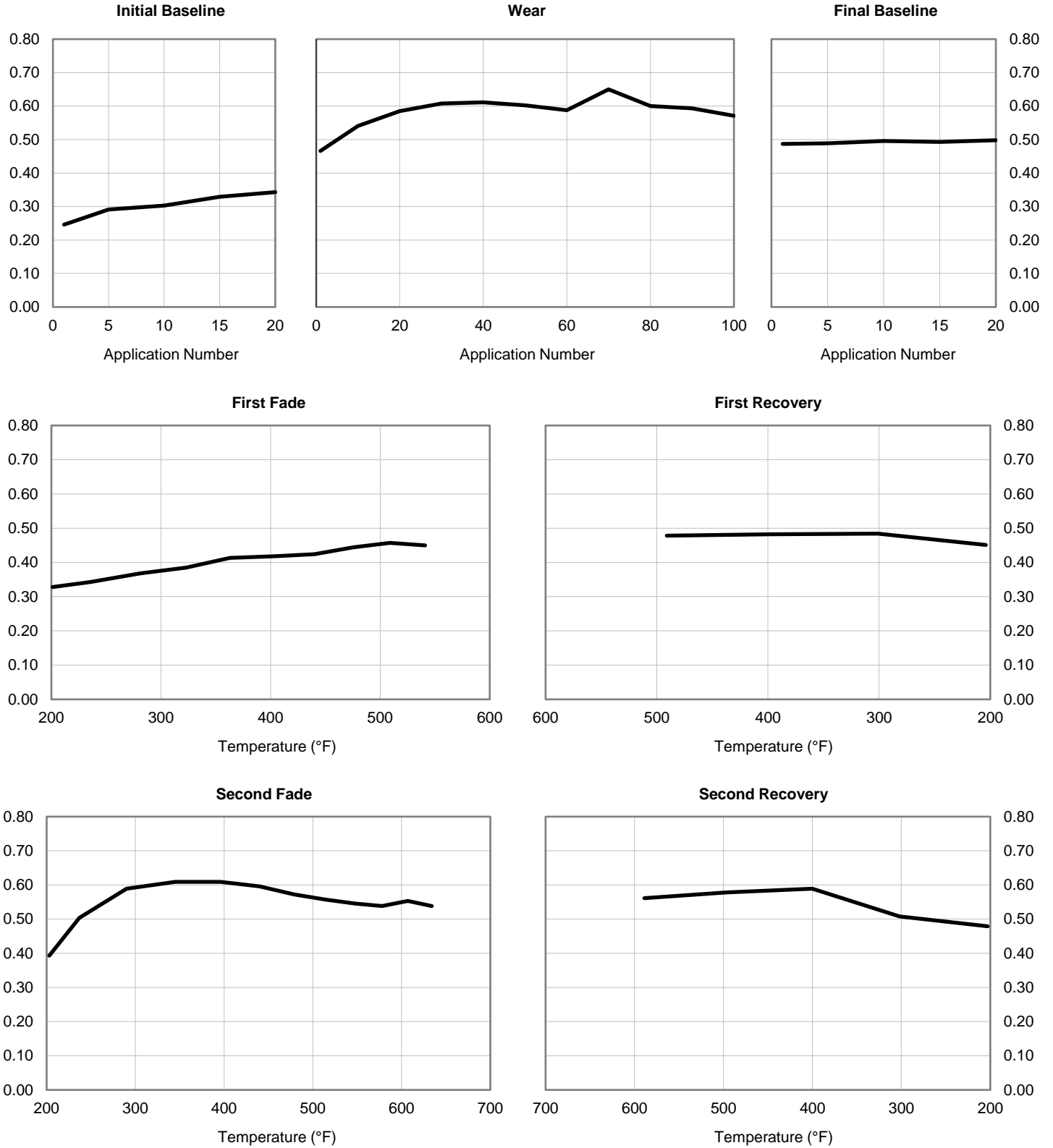
Second Recovery

Event	Force (lb)	μ	Temp (°F)
1	84.1	0.561	589
2	86.8	0.578	496
3	88.0	0.589	400
4	77.1	0.508	302
5	71.7	0.479	203



7/16/2023
230368-03-A
Sample 1 of 5

Coefficient of Friction





Normal **0.488**

G

Hot **0.532**

G

7/16/2023
230368-03-B
Sample 2 of 5

Wear

	Initial	Final	Loss	Loss / %
Weight (gr)	7.870	7.280	0.590	7.50
Thickness (inch)	0.239	0.222	0.018	7.32

Baseline

Event	Initial		Final	
	Force (lb)	μ	Force (lb)	μ
1	39.7	0.262	70.3	0.475
5	54.9	0.359	74.1	0.487
10	63.3	0.416	76.2	0.502
15	65.3	0.438	74.0	0.488
20	69.0	0.458	75.4	0.496

Wear

Event	Force (lb)	μ
1	73.4	0.490
10	88.0	0.586
20	89.5	0.596
30	84.8	0.564
40	86.5	0.577
50	85.6	0.564
60	84.6	0.560
70	84.2	0.563
80	85.8	0.567
90	84.2	0.560
100	84.6	0.558

First Fade

Time (sec)	Force (lb)	μ	Temp (°F)
0.0	69.8	0.457	201
30.0	70.4	0.466	243
60.0	69.1	0.460	295
90.0	68.5	0.458	341
120.0	68.9	0.463	382
150.0	70.6	0.477	419
180.0	73.1	0.481	456
210.0	73.1	0.485	493
240.0	75.1	0.508	526

Second Fade

Time (sec)	Force (lb)	μ	Temp (°F)
0.0	56.8	0.371	202
30.0	70.6	0.469	234
60.0	80.6	0.541	285
90.0	85.6	0.572	335
120.0	85.1	0.564	382
150.0	84.1	0.563	424
180.0	83.0	0.556	462
210.0	81.1	0.542	496
240.0	80.9	0.541	528
270.0	80.5	0.532	559
300.0	80.7	0.538	587
330.0	79.7	0.537	614
360.0	78.4	0.532	637

First Recovery

Event	Force (lb)	μ	Temp (°F)
1	82.9	0.554	494
2	82.0	0.544	400
3	76.2	0.500	301
4	71.6	0.475	204

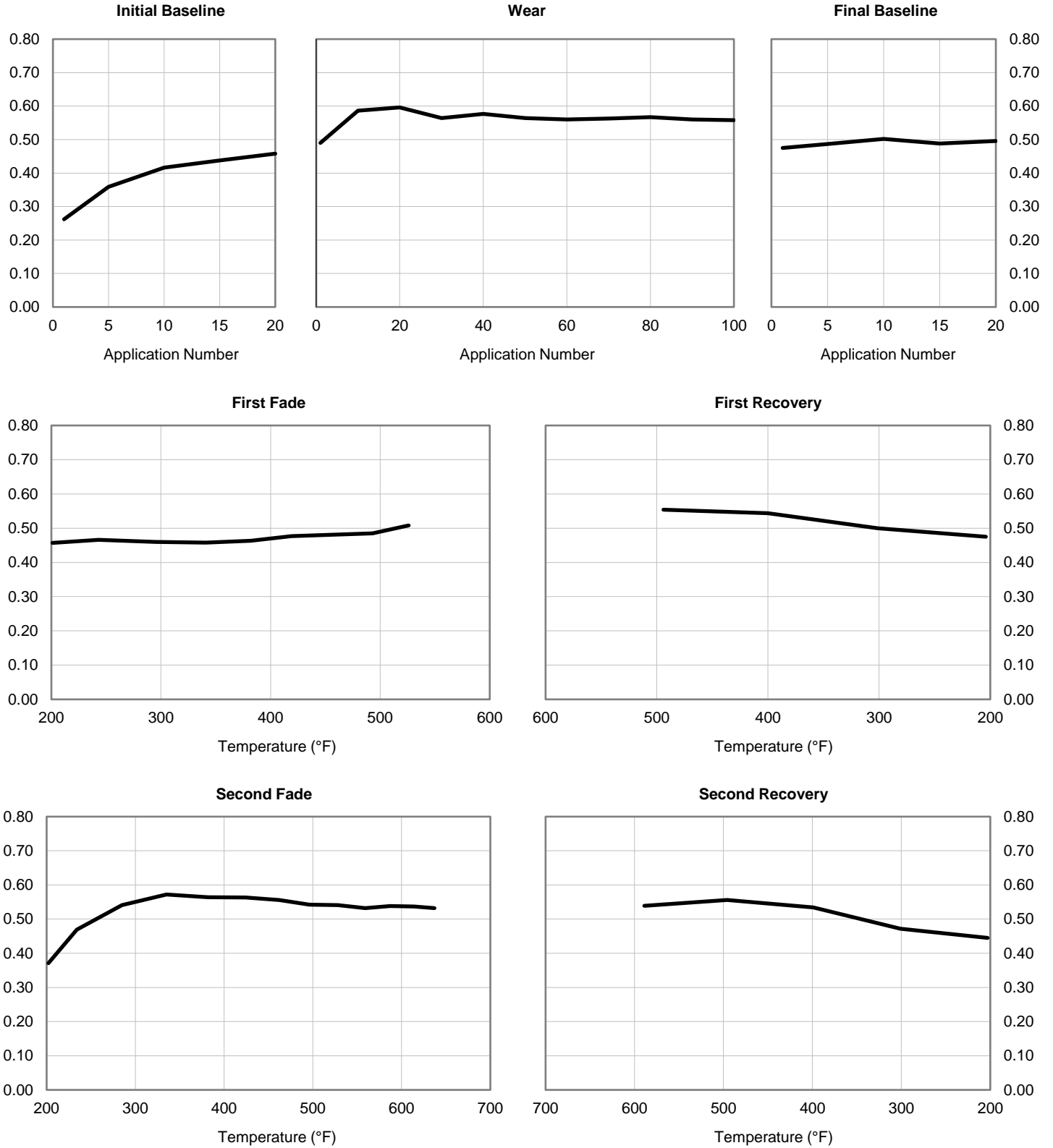
Second Recovery

Event	Force (lb)	μ	Temp (°F)
1	80.7	0.539	589
2	82.7	0.556	496
3	80.1	0.534	399
4	71.6	0.472	301
5	65.8	0.445	203



7/16/2023
230368-03-B
Sample 2 of 5

Coefficient of Friction





Normal 0.509

G

Hot 0.544

G

7/16/2023
230368-03-C
Sample 3 of 5

Wear

	Initial	Final	Loss	Loss / %
Weight (gr)	8.050	7.510	0.540	6.71
Thickness (inch)	0.238	0.222	0.017	6.93

Baseline

Event	Initial		Final	
	Force (lb)	μ	Force (lb)	μ
1	32.5	0.214	69.4	0.465
5	50.2	0.334	73.2	0.490
10	57.7	0.379	74.5	0.496
15	64.5	0.423	76.4	0.510
20	69.3	0.454	77.1	0.515

Wear

Event	Force (lb)	μ
1	74.3	0.491
10	89.8	0.596
20	87.7	0.590
30	93.4	0.621
40	89.2	0.593
50	88.5	0.589
60	86.0	0.576
70	87.5	0.583
80	85.6	0.571
90	85.6	0.568
100	89.6	0.593

First Fade

Time (sec)	Force (lb)	μ	Temp (°F)
0.0	68.8	0.445	202
30.0	68.9	0.458	244
60.0	67.3	0.448	297
90.0	68.0	0.453	341
120.0	67.5	0.446	382
150.0	69.3	0.460	420
180.0	72.9	0.489	456
210.0	74.5	0.503	492
240.0	75.2	0.504	526

Second Fade

Time (sec)	Force (lb)	μ	Temp (°F)
0.0	58.4	0.386	202
30.0	70.7	0.470	234
60.0	79.4	0.528	286
90.0	85.7	0.571	337
120.0	89.4	0.597	386
150.0	87.9	0.591	432
180.0	87.2	0.571	473
210.0	81.6	0.556	510
240.0	83.6	0.547	543
270.0	80.5	0.548	572
300.0	80.2	0.545	601
330.0	81.8	0.538	627

First Recovery

Event	Force (lb)	μ	Temp (°F)
1	83.3	0.556	493
2	85.2	0.558	399
3	77.6	0.518	302
4	71.8	0.468	204

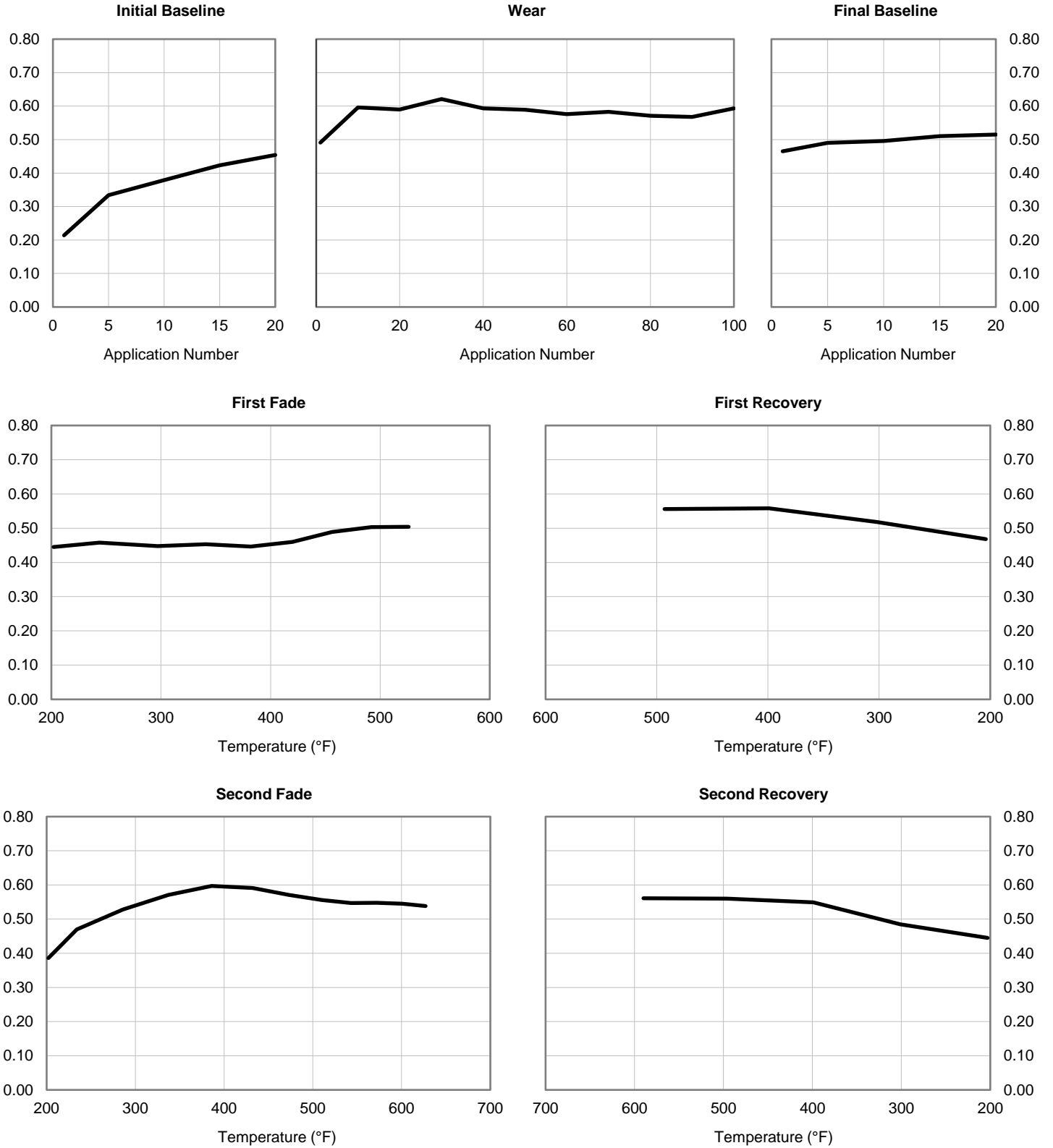
Second Recovery

Event	Force (lb)	μ	Temp (°F)
1	84.2	0.561	590
2	85.1	0.560	496
3	83.3	0.549	399
4	73.3	0.485	301
5	67.1	0.445	203



7/16/2023
230368-03-C
Sample 3 of 5

Coefficient of Friction





Normal **0.494**

G

Hot **0.523**

G

7/17/2023
230368-03-D
Sample 4 of 5

Wear

	Initial	Final	Loss	Loss / %
Weight (gr)	7.880	7.290	0.590	7.49
Thickness (inch)	0.237	0.222	0.015	6.13

Baseline

Event	Initial		Final	
	Force (lb)	μ	Force (lb)	μ
1	40.3	0.268	67.7	0.447
5	54.2	0.356	72.1	0.479
10	61.8	0.413	71.7	0.476
15	66.2	0.434	74.1	0.489
20	70.2	0.463	74.5	0.500

Wear

Event	Force (lb)	μ
1	70.7	0.474
10	83.9	0.552
20	86.2	0.566
30	85.8	0.572
40	86.4	0.573
50	85.9	0.564
60	83.1	0.554
70	86.9	0.573
80	83.7	0.553
90	80.9	0.538
100	84.6	0.564

First Fade

Time (sec)	Force (lb)	μ	Temp (°F)
0.0	66.9	0.442	201
30.0	66.4	0.441	242
60.0	66.8	0.445	293
90.0	67.3	0.446	338
120.0	68.1	0.452	377
150.0	69.2	0.460	414
180.0	71.6	0.476	450
210.0	76.3	0.507	487
240.0	74.2	0.493	521

Second Fade

Time (sec)	Force (lb)	μ	Temp (°F)
0.0	57.1	0.373	202
30.0	67.0	0.445	234
60.0	77.2	0.514	284
90.0	88.4	0.593	337
120.0	90.2	0.602	386
150.0	87.9	0.583	432
180.0	84.1	0.561	472
210.0	84.4	0.567	508
240.0	81.9	0.546	540
270.0	80.7	0.533	569
300.0	77.9	0.517	597
330.0	77.3	0.516	622
360.0	78.0	0.525	646

First Recovery

Event	Force (lb)	μ	Temp (°F)
1	79.0	0.525	492
2	78.9	0.519	398
3	71.2	0.478	301
4	68.6	0.460	204

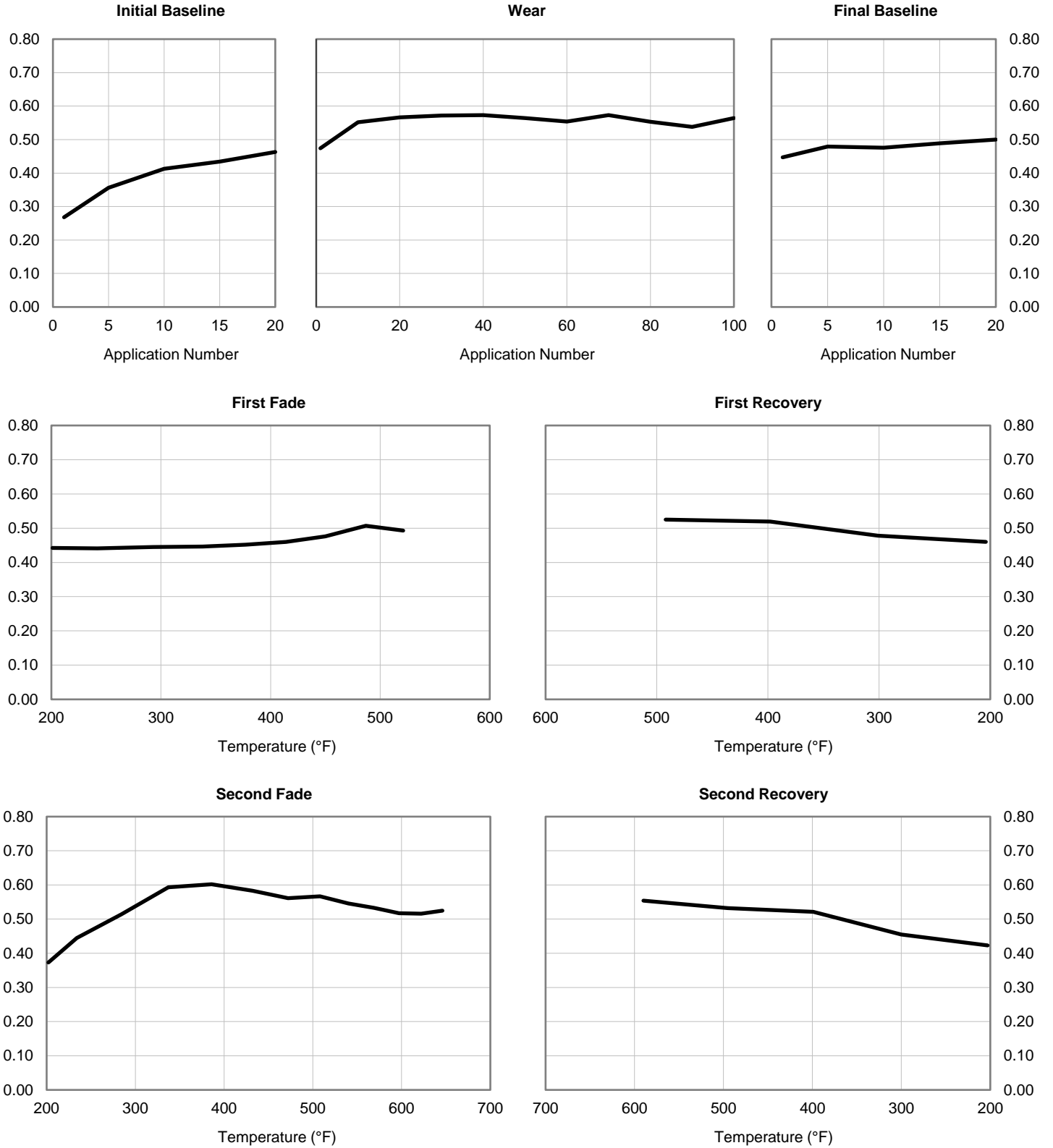
Second Recovery

Event	Force (lb)	μ	Temp (°F)
1	83.4	0.554	590
2	80.5	0.532	495
3	77.6	0.521	399
4	67.6	0.455	300
5	63.2	0.423	203



7/17/2023
230368-03-D
Sample 4 of 5

Coefficient of Friction





7/17/2023
230368-03-E
Sample 5 of 5

Coefficient of Friction

