



Physical Properties Test Report

Link Test Report: 260682-02
Test Description: SAE J661-2021
Purpose of Test: To Evaluate the Characteristics of Brake Materials
Material Identification: XBP CERAMIC
Test Date: 07/24/2026 - 07/25/2026

Requested By:

International Motor Products, Inc.
宋中宇

Tested By

Testing Coordination and Facility

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SAE J661-2021

Test Information

Customer Name	International Motor Products, Inc.
Requestor	宋中宇
Program Number	J661noinsp.chp
Test Coordinator	Fiona Song
Test Equipment	Chase Machine
Test Dates	07/24/2026 - 07/25/2026
Datalogger	v1.0.23
Template Version	1.83

Setup Details

Sample Material	XBP CERAMIC
Sample Size	1 inch x 1 inch
Sample Manufacturer	International Motor Products, Inc.
Test Pressure	150.0 psi

Sample Test Summary

Normal Friction Coefficient	0.474	Pass
Normal Friction Class	G	
Hot Friction Coefficient	0.439	Pass
Hot Friction Class	F	
Minimum Bold Coefficient	0.387	Pass
Max Variation Below Average for Bold Readings	0.044	Pass
Max % Variation for Bold Readings	9.95%	Pass

Pass / Fail

Pass

Comments:

N/A

Created by:	Fiona Song	Signature:		Date	7/30/2026
Reviewed by:	Duel Tang	Signature:		Date	7/30/2026



Test Number

Sample 1 Sample 2 Sample 3 Sample 4 Sample 5
260682-02-A 260682-02-B 260682-02-C 260682-02-D 260682-02-E

Manufacturer:
**International Motor
Products, Inc.**
Material:
XBP CERAMIC

Initial Baseline

Application	<u>Sample 1</u>	<u>Sample 2</u>	<u>Sample 3</u>	<u>Sample 4</u>	<u>Sample 5</u>
1	0.290	0.226	0.248	0.223	0.256
20	0.314	0.262	0.283	0.270	0.289

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	0.293	0.245	0.263	0.259	0.276
550.0	0.335	0.329	0.308	0.334	0.333

(or Temp @ 10min)

Normal **0.474** **G**

Hot **0.439** **F**

First Recovery

Temp (°F)	<u>Sample 1</u>	<u>Sample 2</u>	<u>Sample 3</u>	<u>Sample 4</u>	<u>Sample 5</u>	Average	Norm/Hot
500.0	0.354	0.363	0.334	0.360	0.355	0.353	
400.0	0.381	0.372	0.360	0.374	0.370	0.371	Hot
300.0	0.395	0.346	0.334	0.339	0.360	0.355	Hot
200.0	0.361	0.311	0.295	0.294	0.303	0.313	

Wear

Application	<u>Sample 1</u>	<u>Sample 2</u>	<u>Sample 3</u>	<u>Sample 4</u>	<u>Sample 5</u>
1	0.387	0.357	0.360	0.369	0.386
100	0.495	0.506	0.528	0.499	0.515

Second Fade

Temp (°F)	<u>Sample 1</u>	<u>Sample 2</u>	<u>Sample 3</u>	<u>Sample 4</u>	<u>Sample 5</u>	Average	Max Var. < Average	Norm/Hot	% Var
200.0	0.409	0.393	0.410	0.391	0.406	0.402	0.011	Normal	3%
250.0	0.420	0.461	0.470	0.477	0.475	0.461	0.041	Normal	9%
300.0	0.467	0.509	0.509	0.489	0.495	0.494	0.027	Normal	5%
350.0	0.482	0.517	0.513	0.529	0.517	0.512	0.030	-	6%
400.0	0.538	0.545	0.543	0.530	0.547	0.541	0.011	Normal	2%
450.0	0.528	0.538	0.539	0.524	0.556	0.537	0.013	Hot	2%
500.0	0.493	0.518	0.514	0.505	0.537	0.513	0.020	Hot	4%
550.0	0.447	0.458	0.442	0.454	0.498	0.460	0.018	Hot	4%
600.0	0.397	0.420	0.407	0.389	0.415	0.406	0.017	Hot	4%
650.0	0.340	0.373	0.372	0.362	0.388	0.367	0.027	Hot	7%

(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>	Average	Max Var. < Average	Norm/Hot	% Var
600.0	0.398	0.427	0.428	0.418	0.429	0.420	0.022	-	5%
500.0	0.422	0.471	0.466	0.456	0.467	0.456	0.034	Hot	8%
400.0	0.422	0.507	0.494	0.481	0.488	0.478	0.056	Hot	12%
300.0	0.402	0.441	0.467	0.476	0.446	0.446	0.044	Hot	10%
200.0	0.387	0.419	0.414	0.403	0.425	0.410	0.023	-	6%

Final Baseline

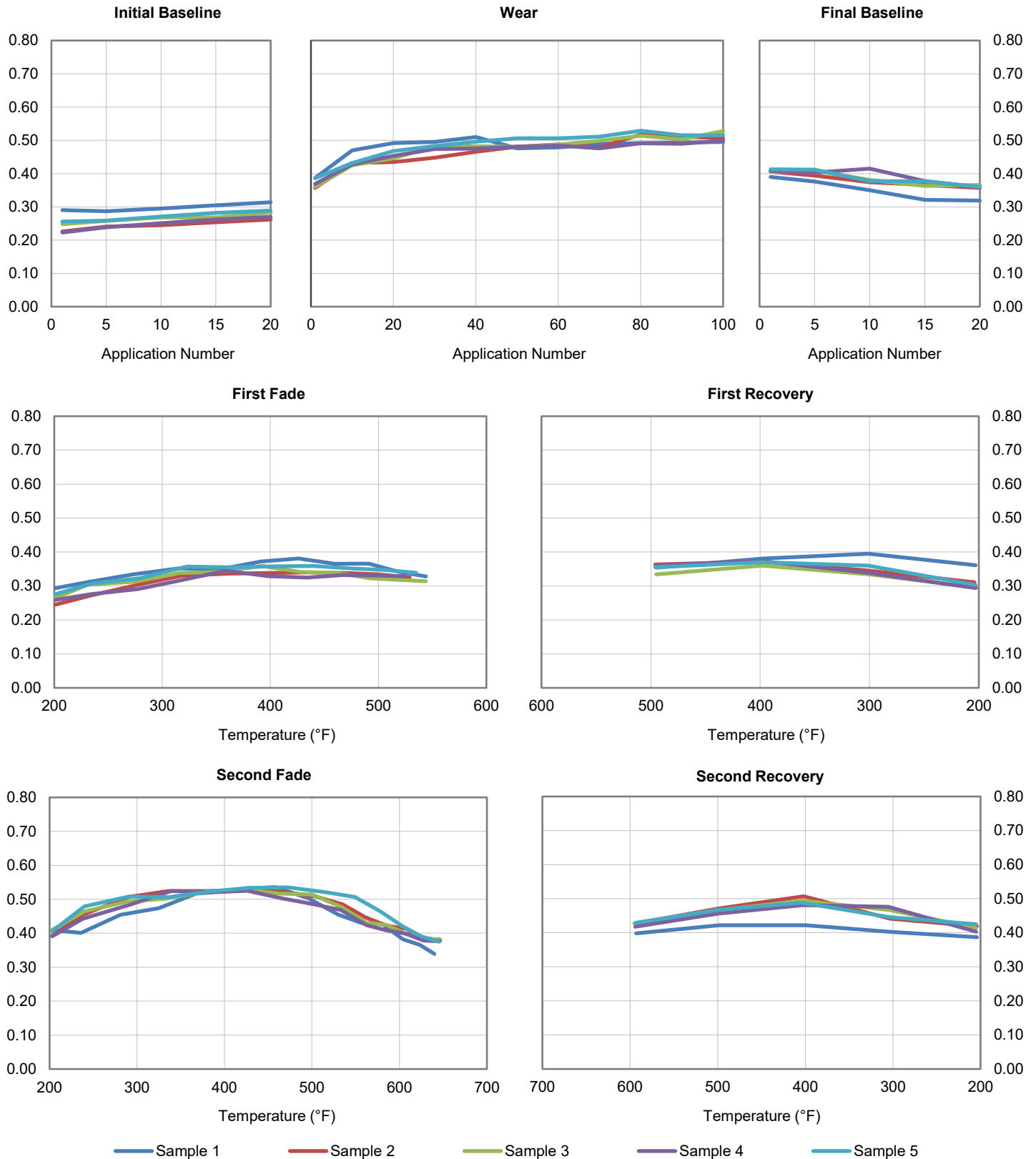
Application	<u>Sample 1</u>	<u>Sample 2</u>	<u>Sample 3</u>	<u>Sample 4</u>	<u>Sample 5</u>
1	0.390	0.406	0.405	0.408	0.413
20	0.319	0.357	0.366	0.359	0.360

Manufacturer: International Motor Products, Inc.
Material: XBP CERAMIC
Test Pressure: 150.0 psi

Test Dates: 07/24/2026 - 07/25/2026

Summary of 5 Samples

Coefficient of Friction





Normal **0.459**

G

Hot **0.423**

F

7/24/2026
260682-02-A
Sample 1 of 5

Wear

	Initial	Final	Loss	Loss / %
Weight (gr)	8.78	8.34	0.44	5.01
Thickness (inch)	0.239	0.230	0.009	3.97

Baseline

Event	Initial		Final	
	Force (lb)	μ	Force (lb)	μ
1	43.5	0.290	58.1	0.390
5	43.8	0.287	57.7	0.376
10	44.9	0.295	52.6	0.350
15	46.6	0.305	48.8	0.321
20	47.6	0.314	48.2	0.319

Wear

Event	Force (lb)	μ
1	59.5	0.387
10	71.4	0.470
20	76.1	0.492
30	75.8	0.495
40	76.9	0.510
50	72.3	0.476
60	72.2	0.479
70	74.2	0.489
80	74.8	0.492
90	75.0	0.493
100	74.4	0.495

First Fade

Time (sec)	Force (lb)	μ	Temp (°F)
0.0	44.3	0.293	200.0
30.0	48.7	0.312	232.0
60.0	50.1	0.334	273.0
90.0	52.0	0.352	315.0
120.0	52.5	0.350	354.0
150.0	55.4	0.372	391.0
180.0	55.9	0.381	426.0
210.0	54.5	0.365	460.0
240.0	54.2	0.366	491.0
270.0	51.1	0.342	519.0
300.0	49.1	0.328	544.0

Second Fade

Time (sec)	Force (lb)	μ	Temp (°F)
0.0	62.4	0.409	203.0
30.0	61.7	0.401	236.0
60.0	67.2	0.454	281.0
90.0	69.9	0.474	325.0
120.0	76.8	0.516	367.0
150.0	78.8	0.528	416.0
180.0	80.2	0.536	458.0
210.0	75.6	0.503	496.0
240.0	69.3	0.455	530.0
270.0	65.5	0.430	557.0
300.0	64.5	0.426	581.0
330.0	57.5	0.382	604.0
360.0	55.0	0.366	623.0
390.0	50.9	0.339	640.0

First Recovery

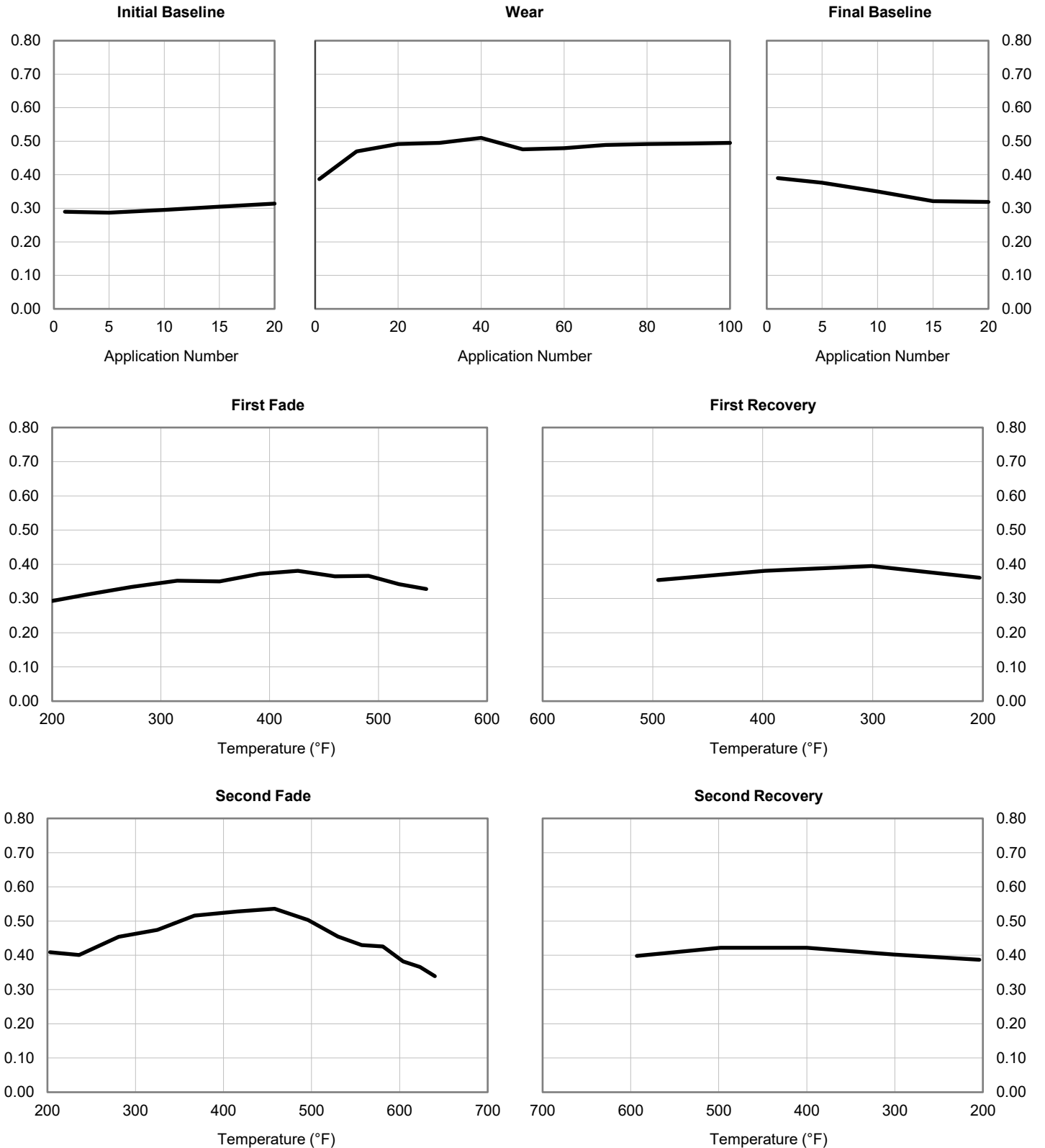
Event	Force (lb)	μ	Temp (°F)
1	54.2	0.354	495.0
2	58.1	0.381	398.0
3	59.8	0.395	301.0
4	55.0	0.361	203.0

Second Recovery

Event	Force (lb)	μ	Temp (°F)
1	59.7	0.398	593.0
2	63.6	0.422	498.0
3	63.4	0.422	400.0
4	59.9	0.402	301.0
5	57.7	0.387	204.0

7/24/2026
260682-02-A
Sample 1 of 5

Coefficient of Friction



Normal **0.477**

G

7/24/2026

260682-02-B

Sample 2 of 5

Hot **0.444**

F

Wear

	Initial	Final	Loss	Loss / %
Weight (gr)	8.52	8.14	0.38	4.46
Thickness (inch)	0.236	0.227	0.009	3.81

Baseline

	Initial		Final	
Event	Force (lb)	μ	Force (lb)	μ
1	34.2	0.226	62.0	0.406
5	36.6	0.241	59.7	0.394
10	37.3	0.245	57.1	0.374
15	38.7	0.254	55.4	0.366
20	39.7	0.262	54.0	0.357

Wear

Event	Force (lb)	μ
1	54.5	0.357
10	65.2	0.432
20	66.1	0.435
30	67.7	0.448
40	71.2	0.466
50	73.4	0.481
60	73.9	0.488
70	71.9	0.479
80	78.3	0.518
90	77.6	0.511
100	76.7	0.506

First Fade

[illegible]

Second Fade

[illegible]

First Recovery

Event	Force (lb)	μ	Temp (°F)
1	54.2	0.363	496.0
2	56.7	0.372	400.0
3	52.9	0.346	302.0
4	47.4	0.311	204.0

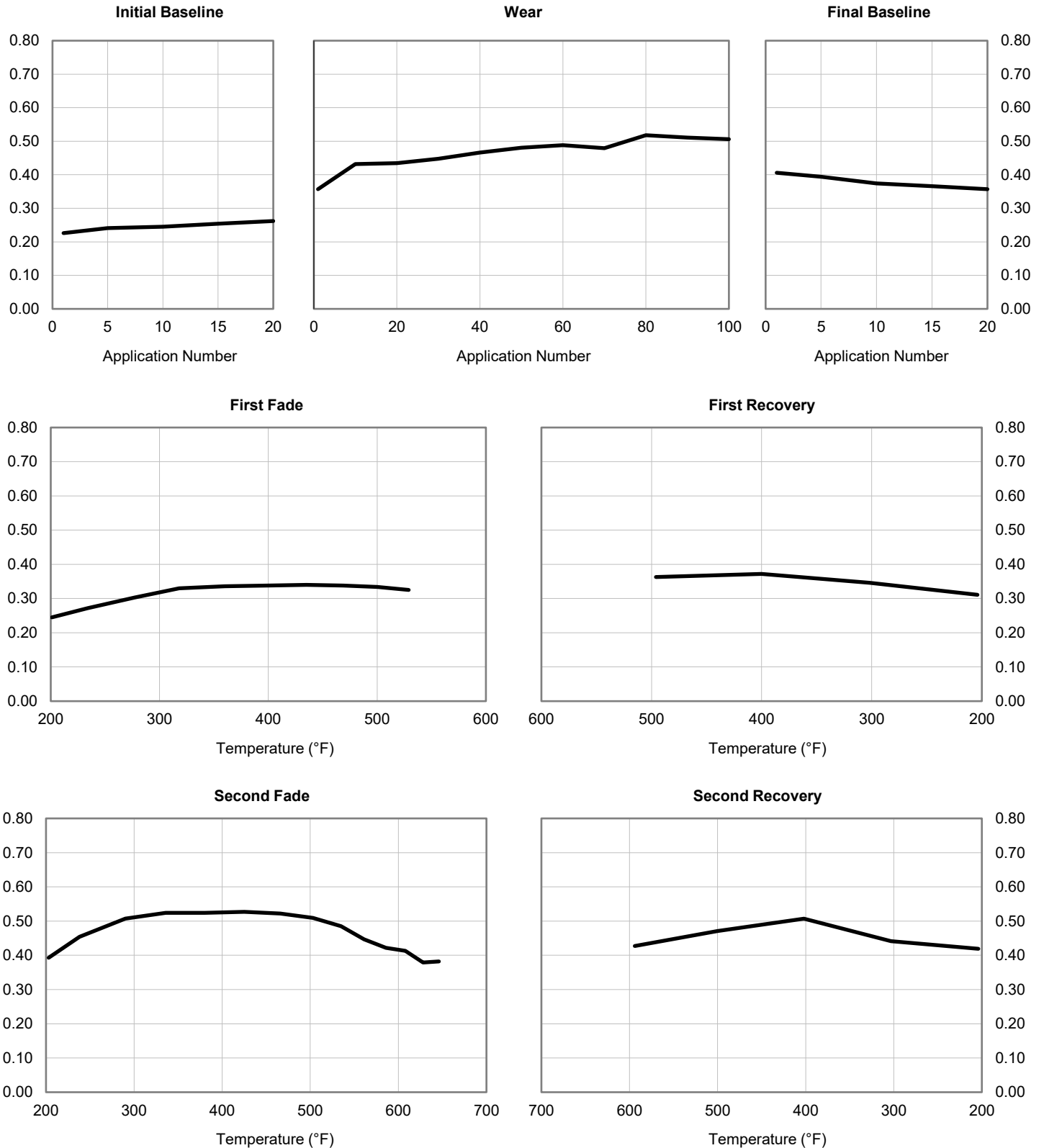
Second Recovery

Event	Force (lb)	μ	Temp (°F)
1	63.9	0.427	594.0
2	72.3	0.471	500.0
3	76.1	0.507	402.0
4	66.6	0.441	303.0
5	63.7	0.419	204.0



7/24/2026
260682-02-B
Sample 2 of 5

Coefficient of Friction





Normal **0.483**

G

Hot **0.440**

F

7/24/2026
260682-02-C
Sample 3 of 5

Wear

	Initial	Final	Loss	Loss / %
Weight (gr)	8.74	8.37	0.37	4.23
Thickness (inch)	0.243	0.232	0.011	4.54

Baseline

Event	Initial		Final	
	Force (lb)	μ	Force (lb)	μ
1	37.2	0.248	61.4	0.405
5	39.3	0.258	62.5	0.409
10	40.6	0.268	57.3	0.381
15	40.7	0.268	55.3	0.363
20	43.3	0.283	55.3	0.366

Wear

Event	Force (lb)	μ
1	54.2	0.360
10	63.9	0.425
20	68.1	0.446
30	72.8	0.482
40	72.6	0.482
50	73.1	0.481
60	74.2	0.487
70	75.4	0.499
80	77.5	0.514
90	76.6	0.503
100	79.7	0.528

First Fade

Time (sec)	Force (lb)	μ	Temp (°F)
0.0	39.8	0.263	200.0
30.0	44.7	0.304	231.0
60.0	46.9	0.313	275.0
90.0	50.5	0.338	316.0
120.0	51.8	0.342	354.0
150.0	53.7	0.359	392.0
180.0	51.7	0.341	428.0
210.0	51.1	0.339	461.0
240.0	48.5	0.323	492.0
270.0	47.4	0.318	519.0
300.0	47.1	0.314	544.0

Second Fade

Time (sec)	Force (lb)	μ	Temp (°F)
0.0	61.9	0.410	203.0
30.0	70.4	0.464	240.0
60.0	76.4	0.493	289.0
90.0	76.5	0.502	334.0
120.0	78.0	0.522	379.0
150.0	79.6	0.529	422.0
180.0	77.2	0.517	462.0
210.0	76.1	0.514	500.0
240.0	70.7	0.477	534.0
270.0	65.7	0.431	562.0
300.0	63.7	0.424	586.0
330.0	60.2	0.397	608.0
360.0	58.6	0.387	628.0
390.0	57.1	0.380	647.0

First Recovery

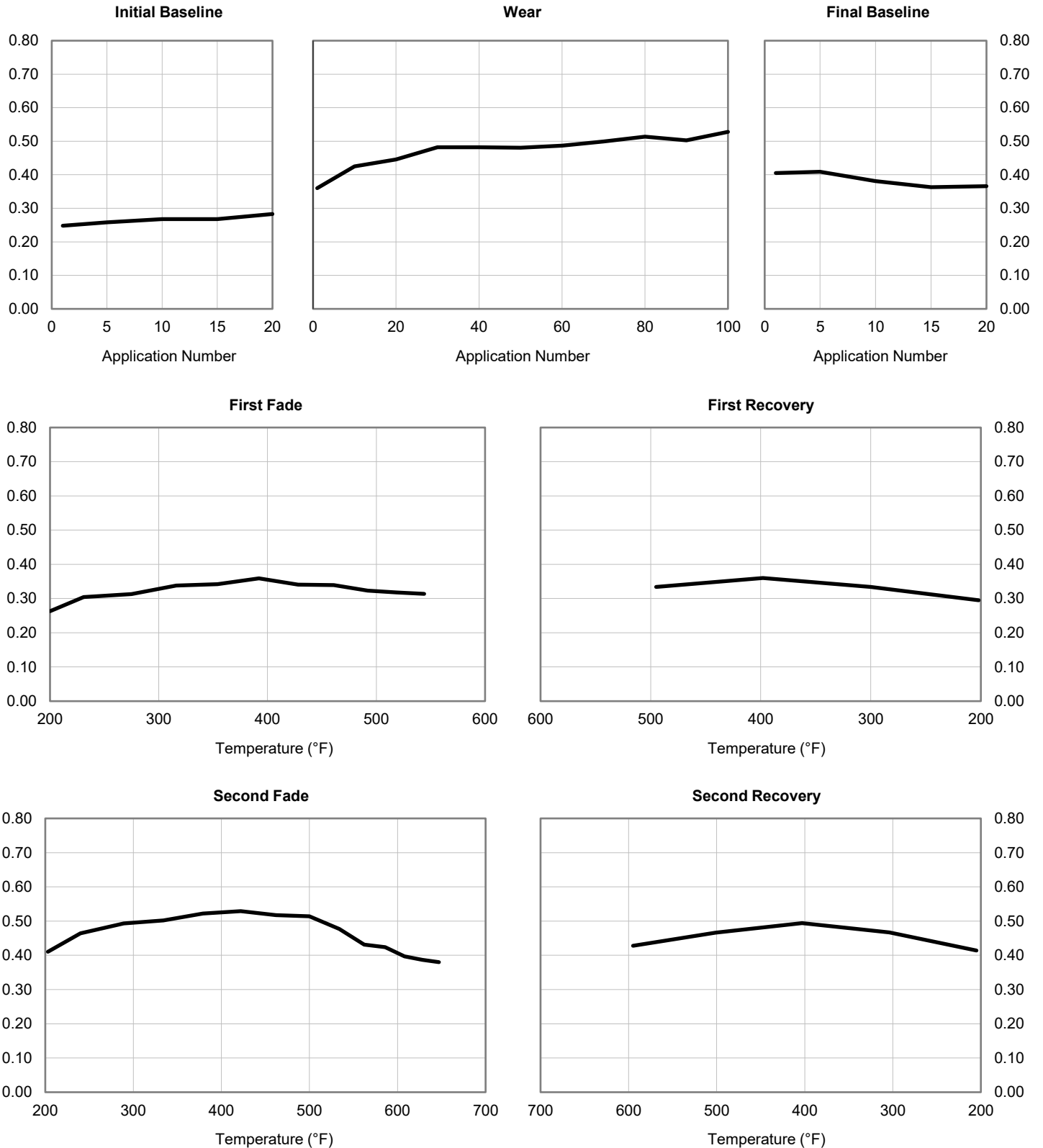
Event	Force (lb)	μ	Temp (°F)
1	50.3	0.334	495.0
2	54.7	0.360	398.0
3	50.3	0.334	300.0
4	44.7	0.295	202.0

Second Recovery

Event	Force (lb)	μ	Temp (°F)
1	64.1	0.428	595.0
2	70.8	0.466	501.0
3	75.7	0.494	403.0
4	72.0	0.467	304.0
5	62.5	0.414	205.0

7/24/2026
260682-02-C
Sample 3 of 5

Coefficient of Friction



Normal **0.472**

G

7/25/2026

Hot **0.436**

F

260682-02-D

Sample 4 of 5

Wear

	Initial	Final	Loss	Loss / %
Weight (gr)	8.75	8.37	0.38	4.34
Thickness (inch)	0.240	0.229	0.012	4.79

Baseline

	Initial		Final	
Event	Force (lb)	μ	Force (lb)	μ
1	33.3	0.223	60.8	0.408
5	36.1	0.239	61.5	0.403
10	38.2	0.251	62.6	0.415
15	39.3	0.262	57.4	0.378
20	40.9	0.270	54.6	0.359

Wear

Event	Force (lb)	μ
1	55.8	0.369
10	64.4	0.428
20	68.8	0.453
30	71.1	0.474
40	72.7	0.475
50	72.4	0.481
60	73.2	0.484
70	72.2	0.476
80	73.9	0.491
90	73.6	0.490
100	75.2	0.499

First Fade

[illegible]

Second Fade

[illegible]

First Recovery

Event	Force (lb)	μ	Temp (°F)
1	53.5	0.360	495.0
2	56.2	0.374	400.0
3	51.0	0.339	302.0
4	44.1	0.294	203.0

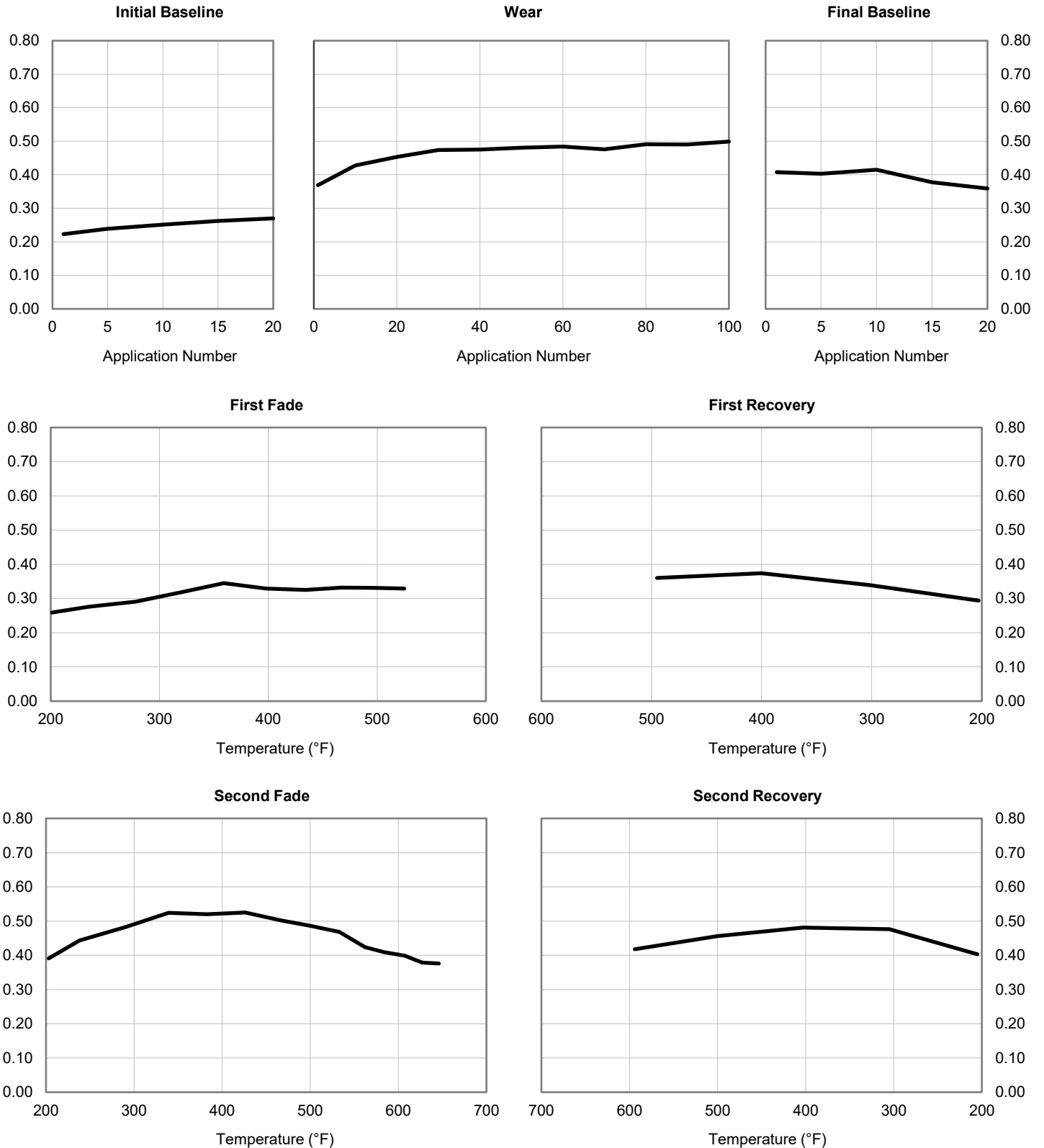
Second Recovery

Event	Force (lb)	μ	Temp ($^{\circ}\text{F}$)
1	63.3	0.418	594.0
2	69.9	0.456	500.0
3	72.9	0.481	403.0
4	72.4	0.476	305.0
5	61.4	0.403	205.0



7/25/2026
260682-02-D
Sample 4 of 5

Coefficient of Friction



Sample 5 of 5

Wear

	Initial	Final	Loss	Loss / %
Weight (gr)	8.77	8.45	0.32	3.65
Thickness (inch)	0.238	0.230	0.008	3.57

Baseline

	Initial		Final	
Event	Force (lb)	μ	Force (lb)	μ
1	38.2	0.256	62.0	0.413
5	39.2	0.259	62.8	0.412
10	40.8	0.271	57.9	0.378
15	42.3	0.282	57.1	0.377
20	44.0	0.289	54.0	0.360

Wear

Event	Force (lb)	μ
1	57.8	0.386
10	65.7	0.432
20	70.8	0.468
30	73.4	0.483
40	74.6	0.496
50	76.5	0.506
60	76.5	0.506
70	76.7	0.511
80	79.3	0.529
90	78.0	0.515
100	77.7	0.515

First Fade

[illegible]

Second Fade

[illegible]

First Recovery

Event	Force (lb)	μ	Temp (°F)
1	53.6	0.355	496.0
2	56.5	0.370	398.0
3	54.0	0.360	301.0
4	45.2	0.303	203.0

Second Recovery

Event	Force (lb)	μ	Temp (°F)
1	64.1	0.429	594.0
2	69.3	0.467	501.0
3	72.7	0.488	404.0
4	67.1	0.446	304.0
5	63.5	0.425	205.0



7/25/2026
260682-02-E
Sample 5 of 5

Coefficient of Friction

