



Sample Lab Test Report

Link Test Report:	133612-3
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:	SFTZS HD32AP
Test Date(s):	11/27/2013 to 12/2/2013

Requested By

ZHONGSHAN SAFETY AUTO SPARE PARTS CO., LTD
CONNIE JIE
PING DONG INDUSTRIAL AREA
SAN XIANG ZHEN, ZHONGHSHAN CITY
GUANGDONG PROVINCE
CHINA

Tested By:

Testing Coordination and Facility
North America Laboratory Test Operations
13840 Elmira Ave.
Detroit, MI 48227
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Phone: (313) 933-4900
Fax: (313) 933-0710



Test Number
133612-3

Customer Reference
SFTZS HD32AP

SAE J661 Rev Feb 1997 Brake Lining Quality Test

Test Information

Customer Name	Zhongshan Safety Auto Spare Parts Co., Ltd
Requestor	Connie Jie
Test Procedure	SAE J661
Program Number	J661noinsp.chp
Test Coordinator	COLEMAN, TIM
Test Equipment	Chase Machine 0012
Test Dates	11/27/2013 to 12/2/2013
Datalogger	v1.0.10
Template Version	2.01

Setup Details

Sample Material	SFTZS HD32AP
Sample Size	25.4mm x 25.4mm
Sample Manufacturer	Zhongshan Safety Auto Spare Parts Co., Ltd
Test Pressure	1034.21 kPa

Sample Test Summary

Normal Friction Coefficient	0.370	Pass
Normal Friction Class	F	
Hot Friction Coefficient	0.309	Pass
Hot Friction Class	E	
Minimum Bold Coefficient	0.286	Pass
Max Variation Below Average	0.029	Pass
Max % Variation for Bold Readings	0%	Pass

Pass / Fail

Pass

Comments:

Created by:	Timothy Coleman (313) 625-4000	Title	Lead Technician	Date	12/3/2013
Reviewed by:	Timothy Coleman (313) 625-4000	Title	Lead Technician	Date	12/3/2013

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
133612-3

Customer Reference
SFTZS HD32AP

Test Number

Sample 1 Sample 2 Sample 3 Sample 4 Sample 5
133612- C1 133612- C2 133612- C3 133612- C4 133612- C5

Manufacturer
ZHONGSHAN SAFETY
AUTO
Material
SFTZS HD32AP

Initial Baseline

Application	<u>Sample 1</u>	<u>Sample 2</u>	<u>Sample 3</u>	<u>Sample 4</u>	<u>Sample 5</u>
1	0.264	0.303	0.256	0.272	0.303
20	0.326	0.305	0.266	0.272	0.294

Normal **0.370** **F**

First Fade

Temp (°C)	<u>Sample 1</u>	<u>Sample 2</u>	<u>Sample 3</u>	<u>Sample 4</u>	<u>Sample 5</u>
93.3	0.324	0.312	0.270	0.279	0.316
260.0	0.313	0.293	0.283	0.289	0.293

(or Temp @ 10min)

Hot **0.309** **E**

First Recovery

Temp (°C)	<u>Sample 1</u>	<u>Sample 2</u>	<u>Sample 3</u>	<u>Sample 4</u>	<u>Sample 5</u>	Average	Norm/Hot
260.0	0.300	0.295	0.272	0.262	0.289	0.284	
204.4	0.323	0.297	0.292	0.270	0.297	0.296	Hot
148.9	0.326	0.303	0.292	0.273	0.304	0.300	Hot
93.3	0.328	0.324	0.305	0.278	0.311	0.309	

Wear

Application	<u>Sample 1</u>	<u>Sample 2</u>	<u>Sample 3</u>	<u>Sample 4</u>	<u>Sample 5</u>
1	0.344	0.313	0.299	0.312	0.329
100	0.391	0.339	0.347	0.340	0.377

Second Fade

Temp (°C)	<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
93.3	0.378	0.340	0.347	0.352	0.349	0.353	0.013	Normal	
121.1	0.412	0.383	0.363	0.375	0.395	0.386	0.023	Normal	
148.9	0.402	0.389	0.359	0.372	0.376	0.380	0.021	Normal	
176.7	0.413	0.343	0.346	0.374	0.383	0.372	0.029	Normal	
204.4	0.399	0.345	0.340	0.357	0.358	0.360	0.020	Normal	
232.2	0.376	0.329	0.318	0.344	0.352	0.344	0.026	Hot	
260.0	0.353	0.327	0.303	0.321	0.335	0.328	0.025	Hot	
287.8	0.350	0.293	0.286	0.307	0.308	0.309	0.023	Hot	
315.6	0.320	0.287	0.272	0.283	0.284	0.289	0.017	Hot	
343.3	0.323	0.264	0.257	0.268	0.274	0.277	0.020	Hot	

(or Temp @ 10min)

Second Recovery

Temp (°C)	<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
315.6	0.308	0.274	0.263	0.270	0.282	0.279	0.016		
260.0	0.342	0.301	0.286	0.301	0.317	0.309	0.023	Hot	
204.4	0.341	0.303	0.295	0.312	0.331	0.316	0.021	Hot	
148.9	0.358	0.309	0.300	0.316	0.335	0.324	0.024	Hot	
93.3	0.338	0.304	0.295	0.320	0.347	0.321	0.026		

Final Baseline

Application	<u>Sample 1</u>	<u>Sample 2</u>	<u>Sample 3</u>	<u>Sample 4</u>	<u>Sample 5</u>
1	0.365	0.307	0.313	0.311	0.338
20	0.406	0.362	0.344	0.371	0.381



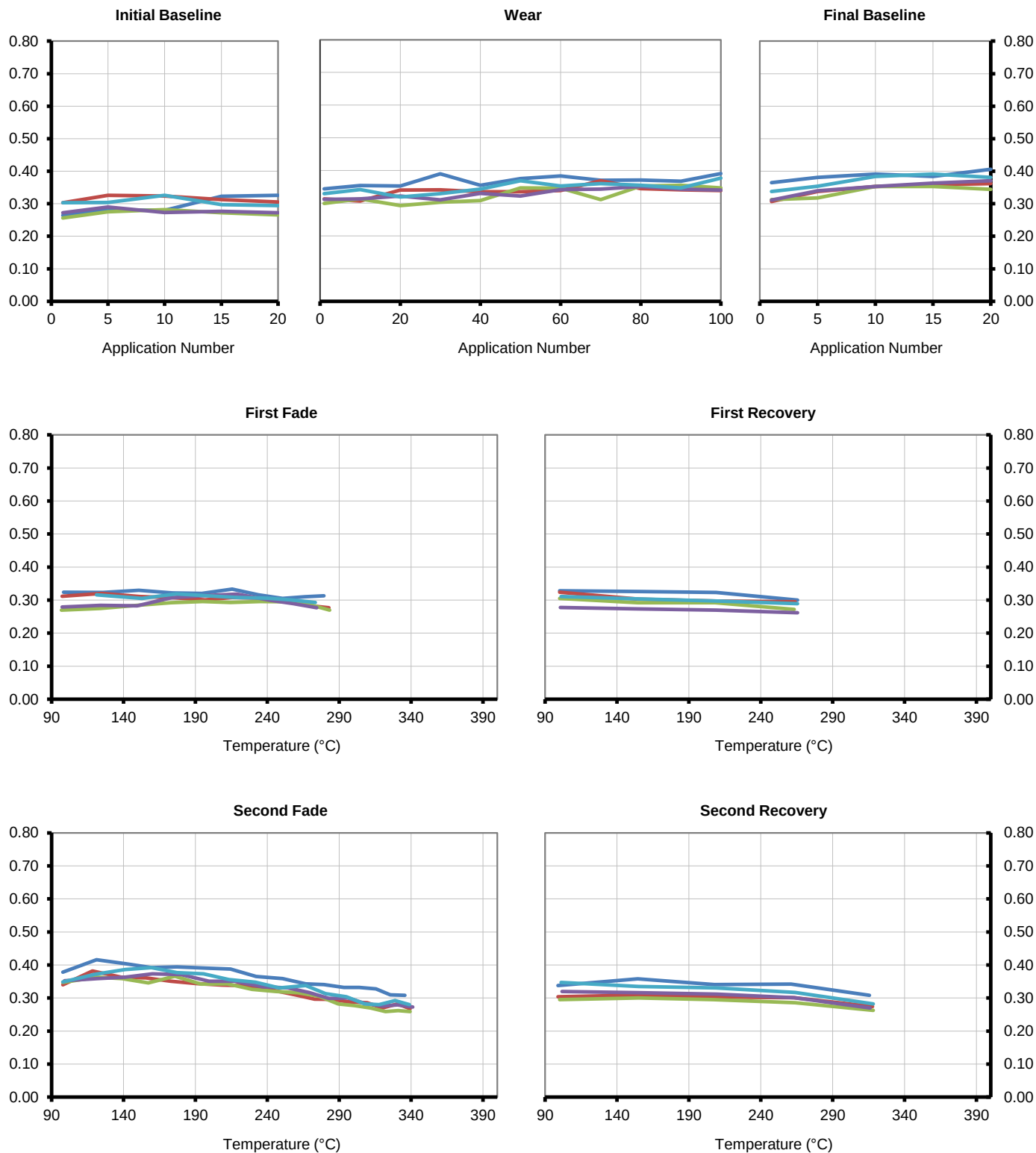
Test Number
133612-3

Customer Reference
SFTZS HD32AP

Manufacturer: ZHONGSHAN SAFETY AUTO SPARE PARTS CO., LTD
Material: SFTZS HD32AP
Test Pressure: 1034.21 kPa

11/27/2013 to 12/2/2013
Summary of 5 Samples

Coefficient of Friction





Test Number
133612-3

Customer Reference
SFTZS HD32AP

Manufacturer: ZHONGSHAN SAFETY AUTO
Material: SFTZS HD32AP
Test Pressure: 1034.21 kPa

Normal

0.401

F

11/27/2013

133612- C1

Hot

0.341

E

Sample 1 of 5

Wear

	Initial	Final	Loss		Specific Wear	
Weight (gr)	10.962	10.812	0.15	1%	9.63E-02	gr/kWh
Thickness (cm)	0.62	0.607	0.013	2%	5.38E-02	cm ³ /kWh

Baseline

Event	Initial		Final	
	Force (N)	μ	Force (N)	μ
1	178	0.264	245	0.365
5	186	0.281	258	0.381
10	185	0.280	261	0.391
15	215	0.323	252	0.384
20	220	0.326	272	0.406

Wear

Event	Force (N)	μ
1	230	0.344
10	238	0.354
20	234	0.353
30	257	0.390
40	234	0.355
50	251	0.375
60	250	0.383
70	247	0.370
80	246	0.371
90	243	0.367
100	259	0.391

First Fade

Time (sec)	Force (N)	μ	Temp (°C)
0	213	0.324	98
30	216	0.323	126
60	220	0.330	151
90	214	0.322	174
120	214	0.320	194
150	222	0.333	216
180	213	0.316	234
210	206	0.305	251
240	202	0.310	266
270	205	0.313	279
300			
330			
360			
390			
420			
450			
480			
510			
540			
570			
600			

Second Fade

Time (sec)	Force (N)	μ	Temp (°C)
0	248	0.378	98
30	277	0.416	121
60	272	0.404	142
90	266	0.392	159
120	262	0.394	177
150	257	0.391	197
180	263	0.388	214
210	243	0.365	232
240	240	0.359	251
270	229	0.343	267
300	224	0.341	279
330	220	0.332	293
360	220	0.332	304
390	221	0.328	316
420	208	0.310	326
450	206	0.308	336
480			
510			
540			
570			
600			

First Recovery

Event	Force (N)	μ	Temp (°C)
1	199	0.300	266
2	218	0.323	209
3	216	0.326	154
4	222	0.328	100

Second Recovery

Event	Force (N)	μ	Temp (°C)
1	206	0.308	316
2	226	0.342	261
3	226	0.341	208
4	239	0.358	154
5	227	0.338	99



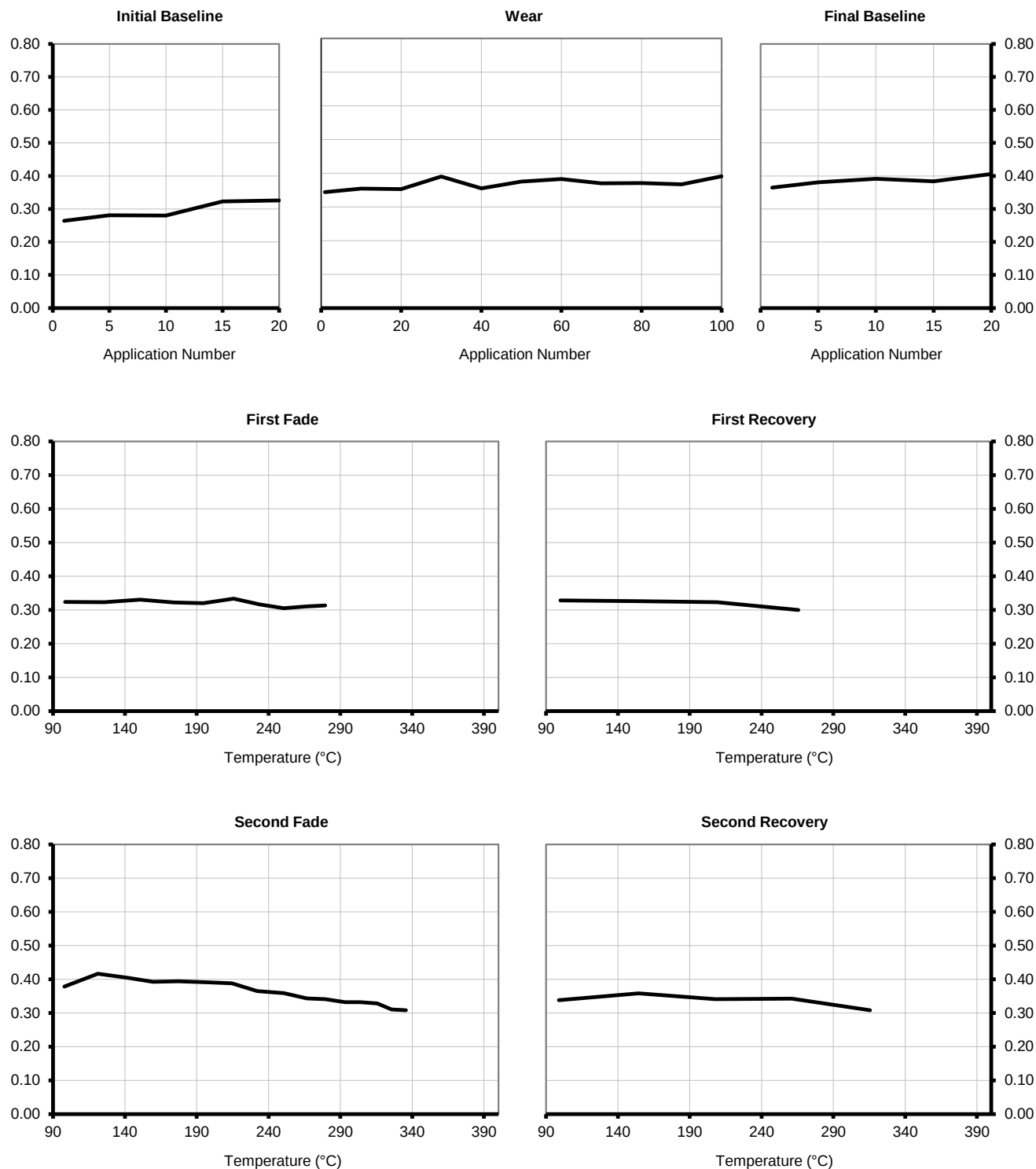
Test Number
133612-3

Customer Reference
SFTZS HD32AP

Manufacturer: ZHONGSHAN SAFETY AUTO
Material: SFTZS HD32AP
Test Pressure: 1034.21 kPa

11/27/2013
133612- C1
Sample 1 of 5

Coefficient of Friction





Test Number
133612-3

Customer Reference
SFTZS HD32AP

Manufacturer: ZHONGSHAN SAFETY AUTO
Material: SFTZS HD32AP
Test Pressure: 1034.21 kPa

Normal

0.360

F

11/27/2013

133612- C2

Sample 2 of 5

Hot

0.301

E

Wear

	Initial	Final	Loss		Specific Wear	
Weight (gr)	11.18	11.032	0.148	1%	1.03E-01	gr/kWh
Thickness (cm)	0.625	0.612	0.013	2%	5.82E-02	cm ³ /kWh

Baseline

Event	Initial		Final	
	Force (N)	μ	Force (N)	μ
1	204	0.303	205	0.307
5	218	0.326	228	0.338
10	214	0.324	232	0.353
15	206	0.313	238	0.358
20	203	0.305	240	0.362

Wear

Event	Force (N)	μ
1	207	0.313
10	206	0.307
20	226	0.340
30	229	0.341
40	223	0.335
50	229	0.335
60	224	0.339
70	247	0.369
80	232	0.345
90	227	0.341
100	224	0.339

First Fade

Time (sec)	Force (N)	μ	Temp (°C)
0	209	0.312	97
30	214	0.320	125
60	210	0.311	151
90	206	0.307	174
120	199	0.301	197
150	202	0.308	216
180	202	0.306	235
210	198	0.300	252
240	190	0.284	267
270	190	0.277	283
300			
330			
360			
390			
420			
450			
480			
510			
540			
570			
600			

Second Fade

Time (sec)	Force (N)	μ	Temp (°C)
0	228	0.340	98
30	253	0.382	118
60	237	0.363	138
90	242	0.361	156
120	237	0.351	173
150	227	0.344	191
180	228	0.339	208
210	226	0.337	226
240	215	0.324	243
270	207	0.310	259
300	202	0.297	273
330	198	0.296	286
360	193	0.289	296
390	191	0.286	309
420	177	0.270	320
450	190	0.282	331
480	174	0.268	339
510			
540			
570			
600			

First Recovery

Event	Force (N)	μ	Temp (°C)
1	195	0.295	264
2	199	0.297	209
3	202	0.303	155
4	216	0.324	100

Second Recovery

Event	Force (N)	μ	Temp (°C)
1	186	0.274	318
2	200	0.301	263
3	205	0.303	207
4	206	0.309	154
5	199	0.304	99



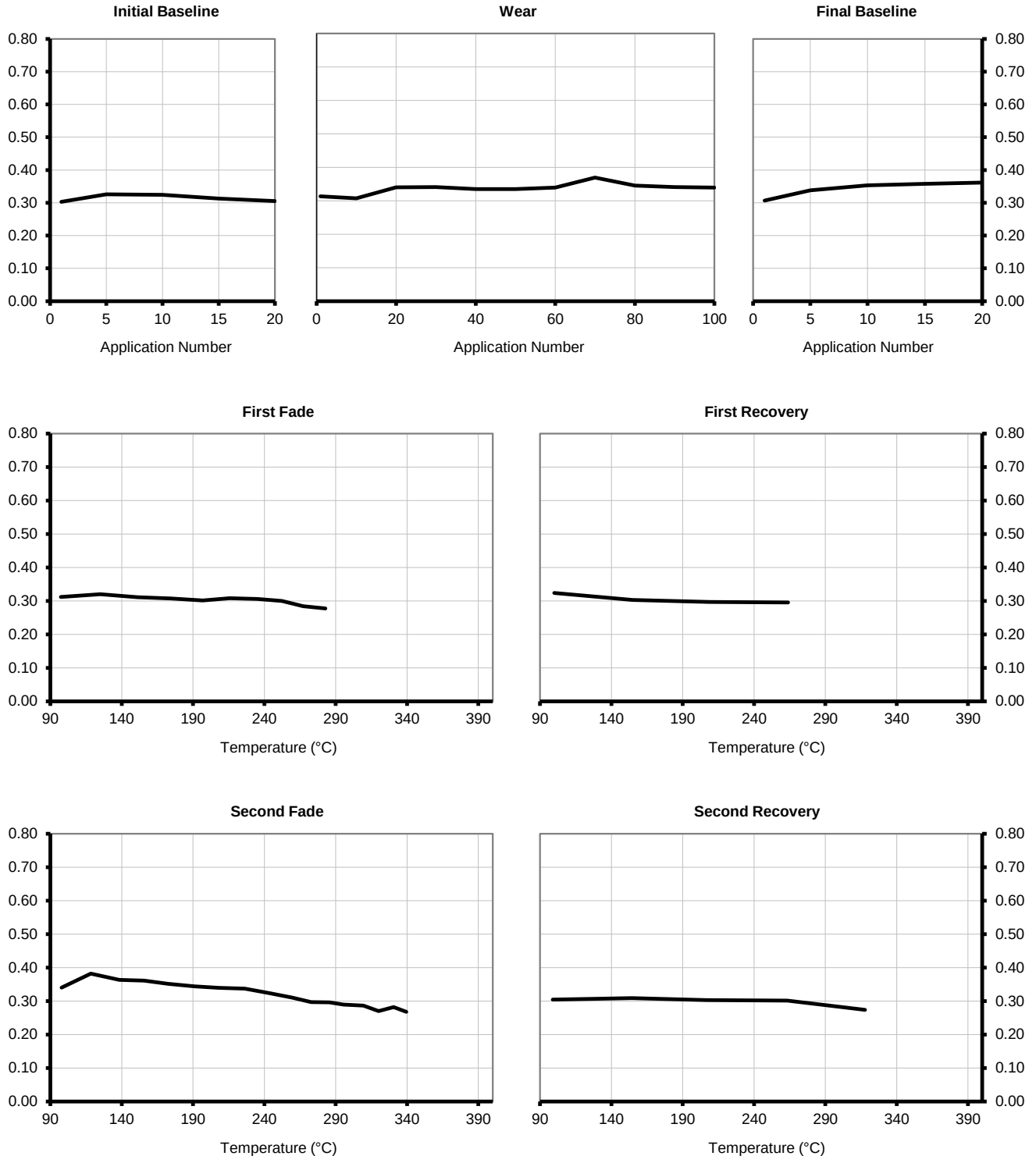
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133612-3

Customer Reference
SFTZS HD32AP

Manufacturer: ZHONGSHAN SAFETY AUTO
Material: SFTZS HD32AP
Test Pressure: 1034.21 kPa

11/27/2013
133612- C2
Sample 2 of 5

Coefficient of Friction





Test Number
133612-3

Customer Reference
SFTZS HD32AP

Manufacturer: ZHONGSHAN SAFETY AUTO
Material: SFTZS HD32AP
Test Pressure: 1034.21 kPa

Normal

0.351

F

12/1/2013

133612- C3

Hot

0.290

E

Sample 3 of 5

Wear

	Initial	Final	Loss		Specific Wear	
Weight (gr)	10.995	10.827	0.168	2%	1.21E-01	gr/kWh
Thickness (cm)	0.627	0.615	0.012	2%	5.59E-02	cm ³ /kWh

Baseline

Event	Initial		Final	
	Force (N)	μ	Force (N)	μ
1	172	0.256	209	0.313
5	184	0.275	214	0.318
10	188	0.282	237	0.353
15	181	0.272	235	0.353
20	178	0.266	229	0.344

Wear

Event	Force (N)	μ
1	200	0.299
10	209	0.313
20	194	0.293
30	202	0.303
40	208	0.308
50	233	0.347
60	232	0.346
70	210	0.311
80	236	0.353
90	240	0.355
100	231	0.347

First Fade

Time (sec)	Force (N)	μ	Temp (°C)
0	181	0.270	97
30	184	0.275	124
60	190	0.284	149
90	194	0.292	173
120	198	0.296	195
150	195	0.293	214
180	195	0.296	235
210	198	0.295	253
240	192	0.288	268
270	180	0.270	283
300			
330			
360			
390			
420			
450			
480			
510			
540			
570			
600			

Second Fade

Time (sec)	Force (N)	μ	Temp (°C)
0	234	0.347	98
30	242	0.363	121
60	239	0.359	139
90	230	0.346	157
120	239	0.366	176
150	230	0.342	194
180	229	0.343	212
210	221	0.326	229
240	216	0.320	246
270	212	0.316	261
300	205	0.305	276
330	192	0.282	289
360	188	0.277	301
390	177	0.270	312
420	175	0.259	322
450	175	0.262	331
480	172	0.259	339
510			
540			
570			
600			

First Recovery

Event	Force (N)	μ	Temp (°C)
1	183	0.272	263
2	195	0.292	208
3	196	0.292	154
4	205	0.305	100

Second Recovery

Event	Force (N)	μ	Temp (°C)
1	175	0.263	318
2	190	0.286	264
3	196	0.295	207
4	202	0.300	155
5	198	0.295	100



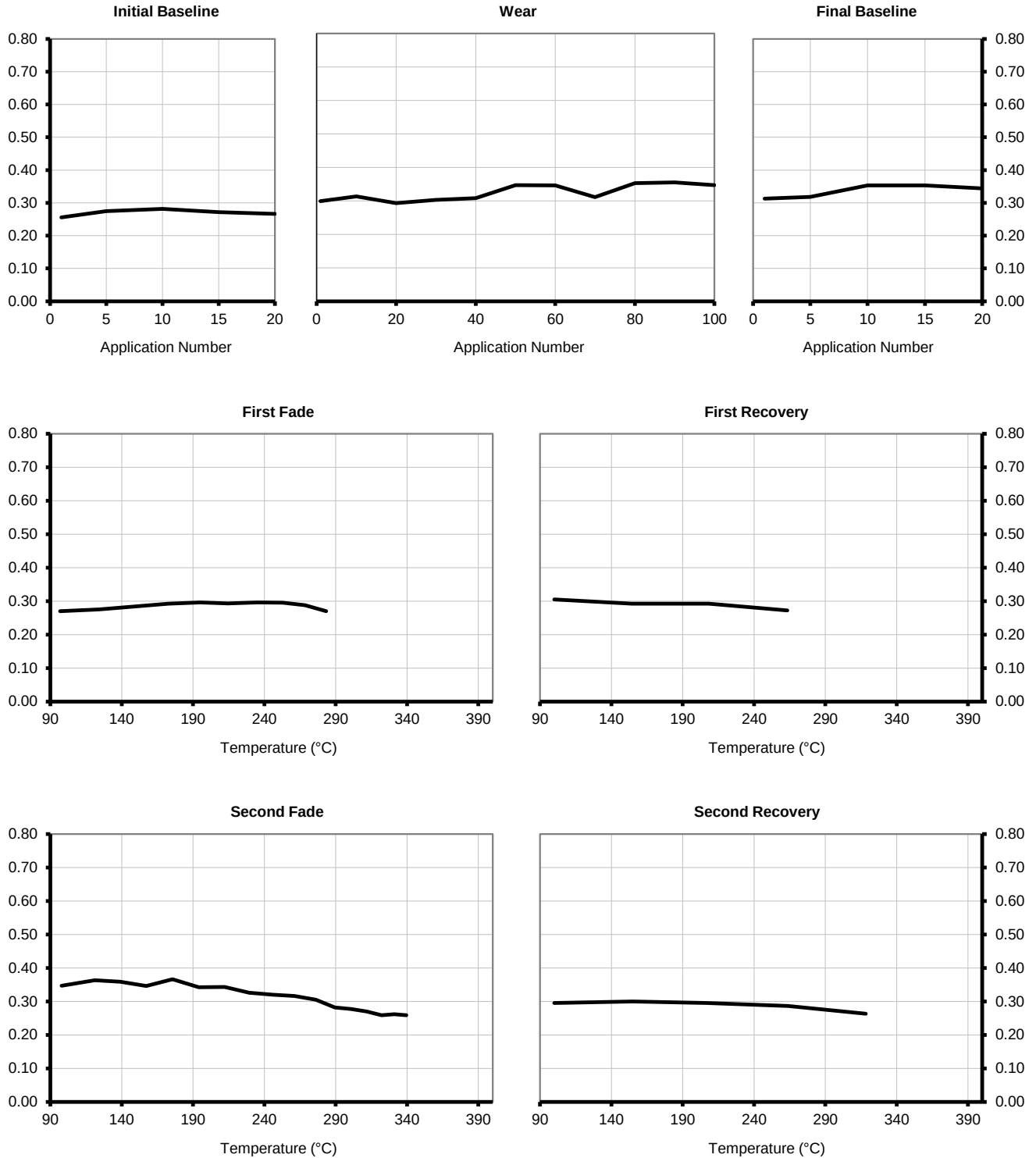
Test Number
133612-3

Customer Reference
SFTZS HD32AP

Manufacturer: ZHONGSHAN SAFETY AUTO
Material: SFTZS HD32AP
Test Pressure: 1034.21 kPa

12/1/2013
133612- C3
Sample 3 of 5

Coefficient of Friction





Test Number
133612-3

Customer Reference
SFTZS HD32AP

Manufacturer: ZHONGSHAN SAFETY AUTO
Material: SFTZS HD32AP
Test Pressure: 1034.21 kPa

Normal

0.366

F

12/1/2013

133612- C4

Hot

0.300

E

Sample 4 of 5

Wear

	Initial	Final	Loss		Specific Wear	
Weight (gr)	11.349	11.168	0.181	2%	1.30E-01	gr/kWh
Thickness (cm)	0.635	0.62	0.015	2%	6.93E-02	cm ³ /kWh

Baseline

Event	Initial		Final	
	Force (N)	μ	Force (N)	μ
1	182	0.272	209	0.311
5	194	0.290	228	0.340
10	182	0.273	239	0.353
15	185	0.277	241	0.363
20	184	0.272	247	0.371

Wear

Event	Force (N)	μ
1	209	0.312
10	209	0.313
20	216	0.322
30	208	0.310
40	218	0.330
50	217	0.322
60	227	0.342
70	227	0.343
80	239	0.351
90	227	0.343
100	226	0.340

First Fade

Time (sec)	Force (N)	μ	Temp (°C)
0	187	0.279	97
30	191	0.284	124
60	188	0.283	149
90	202	0.307	173
120	208	0.314	197
150	211	0.318	219
180	202	0.300	241
210	195	0.289	258
240	183	0.277	274
270			
300			
330			
360			
390			
420			
450			
480			
510			
540			
570			
600			

Second Fade

Time (sec)	Force (N)	μ	Temp (°C)
0	231	0.352	99
30	242	0.359	122
60	242	0.363	141
90	253	0.373	160
120	250	0.371	180
150	236	0.351	199
180	233	0.351	217
210	222	0.334	237
240	224	0.331	254
270	215	0.317	269
300	202	0.299	283
330	203	0.300	296
360	192	0.284	308
390	185	0.276	320
420	184	0.279	331
450	184	0.273	341
480			
510			
540			
570			
600			

First Recovery

Event	Force (N)	μ	Temp (°C)
1	175	0.262	266
2	179	0.270	209
3	182	0.273	156
4	187	0.278	101

Second Recovery

Event	Force (N)	μ	Temp (°C)
1	182	0.270	316
2	202	0.301	263
3	209	0.312	209
4	214	0.316	156
5	210	0.320	102



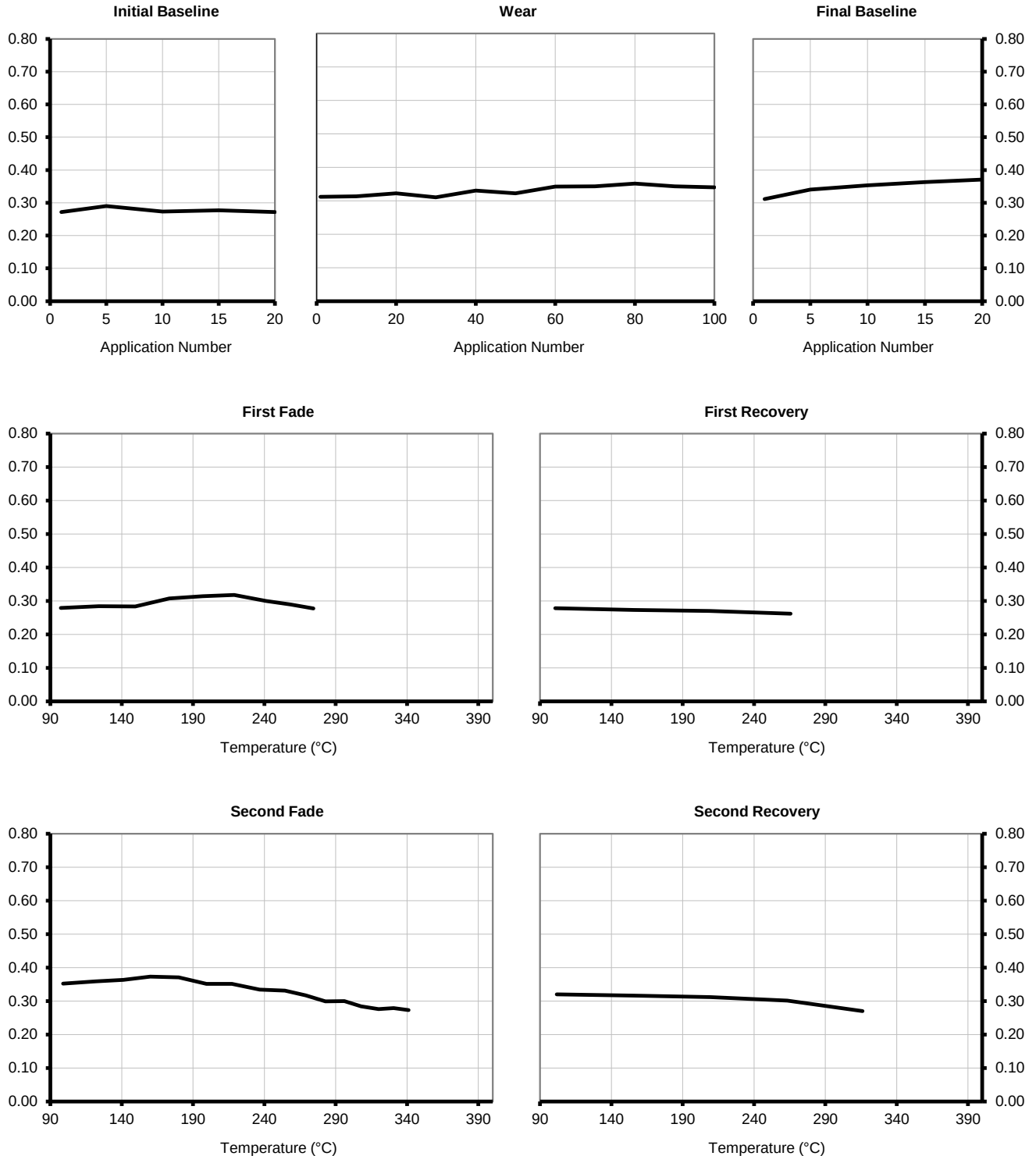
Test Number
133612-3

Customer Reference
SFTZS HD32AP

Manufacturer: ZHONGSHAN SAFETY AUTO
Material: SFTZS HD32AP
Test Pressure: 1034.21 kPa

12/1/2013
133612- C4
Sample 4 of 5

Coefficient of Friction





Test Number
133612-3

Customer Reference
SFTZS HD32AP

Manufacturer: ZHONGSHAN SAFETY AUTO
Material: SFTZS HD32AP
Test Pressure: 1034.21 kPa

Normal

0.372

F

12/2/2013

133612- C5

Hot

0.314

E

Sample 5 of 5

Wear

	Initial	Final	Loss		Specific Wear	
Weight (gr)	10.83	10.661	0.169	2%	1.15E-01	gr/kWh
Thickness (cm)	0.635	0.622	0.013	2%	5.72E-02	cm ³ /kWh

Baseline

Event	Initial		Final	
	Force (N)	μ	Force (N)	μ
1	200	0.303	227	0.338
5	202	0.304	234	0.354
10	216	0.326	256	0.384
15	197	0.297	259	0.391
20	200	0.294	255	0.381

Wear

Event	Force (N)	μ
1	222	0.329
10	227	0.342
20	211	0.319
30	219	0.329
40	226	0.343
50	245	0.369
60	236	0.353
70	241	0.360
80	238	0.355
90	231	0.347
100	247	0.377

First Fade

Time (sec)	Force (N)	μ	Temp (°C)
0	212	0.316	121
30	204	0.305	153
60	212	0.319	177
90	210	0.313	198
120	206	0.308	219
150	203	0.306	240
180	202	0.301	256
210	197	0.293	273
240			
270			
300			
330			
360			
390			
420			
450			
480			
510			
540			
570			
600			

Second Fade

Time (sec)	Force (N)	μ	Temp (°C)
0	232	0.349	98
30	247	0.372	120
60	260	0.386	141
90	261	0.392	159
120	253	0.377	177
150	246	0.373	196
180	235	0.356	213
210	229	0.348	232
240	222	0.331	248
270	225	0.338	267
300	209	0.313	281
330	202	0.304	295
360	189	0.282	308
390	187	0.280	318
420	194	0.292	329
450	186	0.280	339
480			
510			
540			
570			
600			

First Recovery

Event	Force (N)	μ	Temp (°C)
1	190	0.289	266
2	196	0.297	210
3	207	0.304	155
4	210	0.311	101

Second Recovery

Event	Force (N)	μ	Temp (°C)
1	190	0.282	318
2	215	0.317	264
3	219	0.331	209
4	223	0.335	155
5	234	0.347	101



Test Number
133612-3

Customer Reference
SFTZS HD32AP

Manufacturer: ZHONGSHAN SAFETY AUTO
Material: SFTZS HD32AP
Test Pressure: 1034.21 kPa

12/2/2013
133612- C5
Sample 5 of 5

Coefficient of Friction

