

August 19, 2008

▪ **TEST REPORT** ▪

**PN 80130**

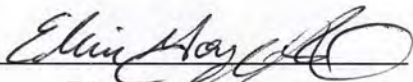
*PO 4899*

**Engineering Department**  
**Dynamic Characterization**

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**Subject:** Dynamic Characterization and Coefficient of Friction

**Received:** One (1) material identified as LP-13,  $\frac{3}{4}$  inch thick

**Dynamic Characterization:**

Test Parameters:

Specimen:	2.0 inch x 2 inch x $\frac{3}{4}$ inch thk.
Pressure Sweep:	25-500 Psi, 25 Psi increments (Compression)
Frequency Sweep:	10-60 Hz, 10 Hz increments
Amplitude:	0.001 inch (p-p)
Equipment:	MTS 831.20 Elastomer Test System
Test Fixture:	Compression Platens
Temperature:	23°C

Procedure: Each specimen was stabilized at test temperature for at least 24 hours prior to being mounted on the MTS machine for testing. The actuator was positioned, the load and displacement were zeroed, and the test was begun following the parameters above.

**Test Results:**

Specified Frequency	Specified Mean Level	Pressure	Overall Displacement	Neoprene Displacement	Damping Coefficient
Hz	N	PSI	mm	%	N-Sec/mm
10	444.82	25.00	0.18	1.40	63.69
10	889.64	50.00	0.27	2.14	65.15
10	1334.47	75.00	0.38	3.00	67.13
10	1779.29	100.00	0.51	4.01	65.04
10	2224.11	125.00	0.67	5.28	64.91
10	2668.93	150.00	0.88	6.89	65.29
10	3113.76	175.00	1.14	8.97	67.42
10	3558.58	200.00	1.48	11.62	65.72
10	4003.40	225.00	1.87	14.71	65.28
10	4448.22	250.00	2.28	17.95	69.55
10	4893.04	275.00	2.67	21.04	74.85
10	5337.87	300.00	3.04	23.95	80.57
10	5782.69	325.00	3.37	26.53	86.75
10	6227.51	350.00	3.65	28.71	89.05
10	6672.33	375.00	3.89	30.61	95.81
10	7117.15	400.00	4.09	32.22	94.04
10	7561.98	425.00	4.27	33.62	95.19
10	8006.80	450.00	4.42	34.82	97.94
10	8451.62	475.00	4.55	35.84	101.03
10	8896.44	500.00	4.67	36.74	100.75

**Figure 1: Dynamic Characterization Results At 10 Hz**

Specified Frequency	Specified Mean Level	Pressure	Overall Displacement	Neoprene Displacement	Damping Coefficient
Hz	N	PSI	mm	%	N-Sec/mm
20	444.82	25.00	0.19	1.49	31.59
20	889.64	50.00	0.29	2.25	33.04
20	1334.47	75.00	0.40	3.14	31.11
20	1779.29	100.00	0.53	4.19	32.45
20	2224.11	125.00	0.70	5.51	32.18
20	2668.93	150.00	0.91	7.20	31.42
20	3113.76	175.00	1.19	9.36	31.80
20	3558.58	200.00	1.54	12.09	34.97
20	4003.40	225.00	1.93	15.22	32.88
20	4448.22	250.00	2.35	18.47	36.28
20	4893.04	275.00	2.73	21.53	37.38
20	5337.87	300.00	3.10	24.38	37.91
20	5782.69	325.00	3.42	26.90	41.87
20	6227.51	350.00	3.69	29.03	46.18
20	6672.33	375.00	3.92	30.88	44.97
20	7117.15	400.00	4.12	32.45	44.48
20	7561.98	425.00	4.29	33.81	47.65
20	8006.80	450.00	4.44	34.99	48.50
20	8451.62	475.00	4.57	35.99	50.32
20	8896.44	500.00	4.68	36.87	43.00

**Figure 2: Dynamic Characterization Results At 20 Hz**

Specified Frequency	Specified Mean Level	Pressure	Overall Displacement	Neoprene Displacement	Damping Coefficient
Hz	N	PSI	mm	%	N-Sec/mm
30	444.82	25.00	0.20	1.55	20.73
30	889.64	50.00	0.30	2.34	21.99
30	1334.47	75.00	0.41	3.25	21.10
30	1779.29	100.00	0.55	4.34	20.30
30	2224.11	125.00	0.73	5.71	20.73
30	2668.93	150.00	0.95	7.47	20.97
30	3113.76	175.00	1.23	9.71	20.86
30	3558.58	200.00	1.59	12.51	22.16
30	4003.40	225.00	1.99	15.68	22.63
30	4448.22	250.00	2.40	18.93	24.60
30	4893.04	275.00	2.79	21.96	25.35
30	5337.87	300.00	3.15	24.77	26.50
30	5782.69	325.00	3.46	27.23	30.28
30	6227.51	350.00	3.72	29.31	27.78
30	6672.33	375.00	3.95	31.13	30.01
30	7117.15	400.00	4.15	32.66	31.58
30	7561.98	425.00	4.32	33.99	30.75
30	8006.80	450.00	4.46	35.14	33.20
30	8451.62	475.00	4.59	36.12	33.13
30	8896.44	500.00	4.70	36.98	32.20

Figure 3: Dynamic Characterization Results At 30 Hz

Specified Frequency	Specified Mean Level	Pressure	Overall Displacement	Neoprene Displacement	Damping Coefficient
Hz	N	PSI	mm	%	N-Sec/mm
40	444.82	25.00	0.20	1.59	15.68
40	889.64	50.00	0.31	2.41	16.66
40	1334.47	75.00	0.43	3.35	16.07
40	1779.29	100.00	0.57	4.47	15.63
40	2224.11	125.00	0.75	5.89	15.98
40	2668.93	150.00	0.98	7.71	15.15
40	3113.76	175.00	1.27	10.04	15.97
40	3558.58	200.00	1.64	12.89	16.50
40	4003.40	225.00	2.04	16.10	17.83
40	4448.22	250.00	2.46	19.34	18.29
40	4893.04	275.00	2.84	22.35	19.71
40	5337.87	300.00	3.19	25.11	20.04
40	5782.69	325.00	3.50	27.52	21.24
40	6227.51	350.00	3.75	29.57	22.50
40	6672.33	375.00	3.98	31.34	22.66
40	7117.15	400.00	4.17	32.84	22.75
40	7561.98	425.00	4.34	34.15	25.29
40	8006.80	450.00	4.48	35.27	24.05
40	8451.62	475.00	4.60	36.23	23.25
40	8896.44	500.00	4.71	37.09	24.32

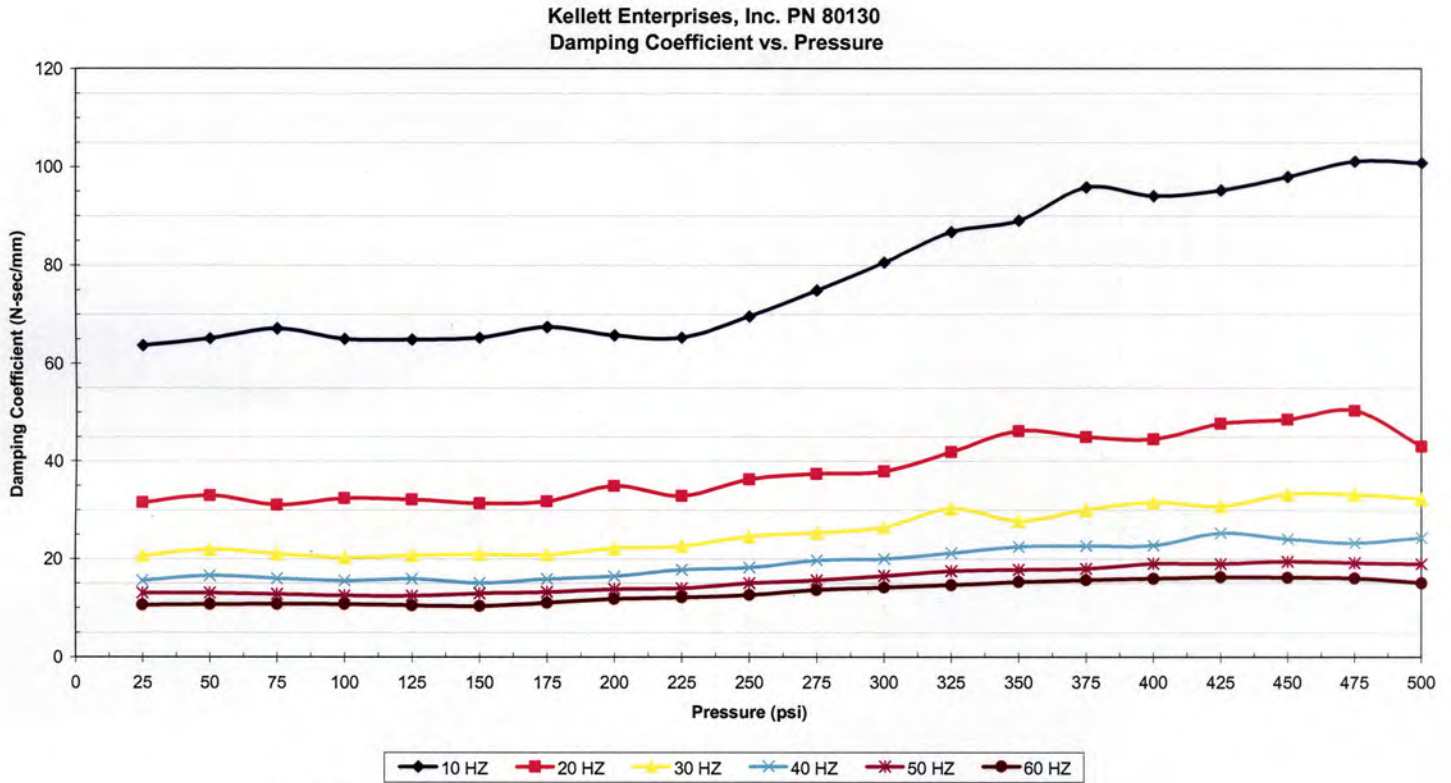
Figure 4: Dynamic Characterization Results At 40 Hz

Specified Frequency	Specified Mean Level	Pressure	Overall Displacement	Neoprene Displacement	Damping Coefficient
Hz	N	PSI	mm	%	N-Sec/mm
50	444.82	25.00	0.21	1.62	13.07
50	889.64	50.00	0.31	2.46	13.10
50	1334.47	75.00	0.44	3.43	12.83
50	1779.29	100.00	0.58	4.59	12.55
50	2224.11	125.00	0.77	6.06	12.50
50	2668.93	150.00	1.01	7.93	12.95
50	3113.76	175.00	1.31	10.34	13.21
50	3558.58	200.00	1.68	13.26	13.81
50	4003.40	225.00	2.09	16.49	13.99
50	4448.22	250.00	2.51	19.74	15.01
50	4893.04	275.00	2.89	22.72	15.62
50	5337.87	300.00	3.23	25.44	16.49
50	5782.69	325.00	3.53	27.80	17.46
50	6227.51	350.00	3.79	29.80	17.71
50	6672.33	375.00	4.01	31.55	17.91
50	7117.15	400.00	4.19	33.02	18.96
50	7561.98	425.00	4.36	34.30	18.91
50	8006.80	450.00	4.50	35.40	19.36
50	8451.62	475.00	4.62	36.35	19.10
50	8896.44	500.00	4.72	37.19	18.86

Figure 5: Dynamic Characterization Results At 50 Hz

Specified Frequency	Specified Mean Level	Pressure	Overall Displacement	Neoprene Displacement	Damping Coefficient
Hz	N	PSI	mm	%	N-Sec/mm
60	444.82	25.00	0.21	1.66	10.59
60	889.64	50.00	0.32	2.51	10.75
60	1334.47	75.00	0.45	3.51	10.78
60	1779.29	100.00	0.60	4.70	10.73
60	2224.11	125.00	0.79	6.22	10.54
60	2668.93	150.00	1.04	8.15	10.36
60	3113.76	175.00	1.35	10.63	11.03
60	3558.58	200.00	1.73	13.60	11.81
60	4003.40	225.00	2.14	16.87	12.11
60	4448.22	250.00	2.55	20.10	12.64
60	4893.04	275.00	2.93	23.06	13.66
60	5337.87	300.00	3.27	25.73	14.11
60	5782.69	325.00	3.56	28.06	14.62
60	6227.51	350.00	3.81	30.03	15.23
60	6672.33	375.00	4.03	31.74	15.63
60	7117.15	400.00	4.21	33.19	15.92
60	7561.98	425.00	4.37	34.44	16.23
60	8006.80	450.00	4.51	35.53	16.12
60	8451.62	475.00	4.63	36.46	15.95
60	8896.44	500.00	4.74	37.28	15.03

Figure 6: Dynamic Characterization Results At 60 Hz



**Figure 7: Dynamic Characterization Damping Coefficient vs. Pressure**

**Coefficient Of Friction, ASTM D 1894-99 (Modified):**

Procedure: Two specimens were prepared from each submitted sample by mounting a 2" x 2" section on a steel plate. Each specimen was pulled at 6 in/min. across a cold-rolled, high carbon steel substrate, polished smooth to the touch. The sample was loaded with a 200-gram weight. The average was reported.

<u>SAMPLE ID</u>	<u>STATIC, <math>\mu</math></u>	<u>DYNAMIC, <math>\mu</math></u>
LP-13, 3/4 inch thick	0.936	0.886

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