



Test Request #:
082067-1

Link Testing Laboratories, Inc.
Brake Dynamometer Testing

Customer Ref.:
N/A

Test Description:
FMVSS-121 APTA RP-002

Customer: FRICCIONES TECNICAS Y MAQUINADOS S.A. DE VENUSTIANO CARRANZA N. 18 COL. EX EJIDO SANTA MARIA AZTAHUACAN DELEGACION IZTAPALAPA CODIGO, 09570 MEXICO, D.F.	Testing Facility, and Report Prepared By: DE LINK TESTING LABORATORIES 13840 ELMIRA AVE. DETROIT, MI 48227 USA
Requested By: CRISTINA CASIMIRO	Test Coordinator: JEFF LESKO

Test Information

Test Procedure:
FMVSS-121 RP628

Link Control Program: W05002A0	Brake Name: MERITOR "W" BRAKE	Datalog/Report Version: 2.66
Date Test Parts Rec'd / Started / Completed: 3/21/2008 / 04/06/08 / 04/08/08		

Brake A Test Conditions

Gross Axle Weight: 26,000 lb	Gross Vehicle Weight: 0 lb	Required / Actual Wheel Load: 13,000.0 / 13,057.8 lb
Required / Actual Inertia: 1,156.86 / 1,162.00 slug-ft ²	Rolling Radius: 515.6 mm	Brake Orientation: LEFT
Dynamometer: 70	Brake Type: AIR	Axle Position: DRIVE

Caliper/Brake/Fixture Information

Caliper Brake Part ID: N/A	Caliper Condition/Description: N/A	Air Chamber: MGM 30/30
Brake Hose Part Number: N/A	Fixture ID / Fixture Design: 60106 / N/A	Brake Size: 14.5 x 10
Brake Type: DRUM	Slack Adjuster: 7.0" HALDEX AUTOMATIC	

Rotor/Drum/Lining Information

Drum/Rotor Type: CAST	Rotor/Drum Number: WEBB 64115F	Rotor/Drum Finish: NEW
Pri/Lead/Inner Lining: BN6	Pri/Lead/Inner Lining FMSI: 4592AD	Insulator Type/Size (Pri/Lead/Inner): N/A
Chamfer Type/Size (Pri/Lead/Inner): N/A	Additional Comments (Pri/Lead/Inner): N/A	
Sec/Trail/Outer Lining: BN6	Sec/Trail/Outer Lining FMSI: 4592AD	Insulator Type/Size (Sec/Trail/Outer): N/A
Chamfer Type/Size (Sec/Trail/Outer): N/A	Additional Comments (Sec/Trail/Outer): N/A	

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.



Stop Num	Brake Speed mph	Rel. Speed mph	Stop Time sec	Avg Decel (time) ft/s ²	Min Torq. lb*ft	Avg Torq. (time) lb*ft	Max Torq. lb*ft	Min Press psi	Avg Press (time) psi	Max Press psi	Min Stroke Inch	Avg Stroke (time) Inch	Max Stroke Inch	Init Lead F	Final Lead F	Init Drum F	Final Drum F
<u>Burnish</u>																	
1	40.0	0.5	5.86	9.89	6674	7252	7676	49.8	62.1	78.9	2.135	2.177	2.235	349	400	436	555
10	40.0	0.5	5.76	10.06	6384	7317	8680	27.2	38.6	56.0	1.766	1.867	1.953	352	402	378	528
20	40.0	0.5	5.76	10.06	6151	7296	8634	20.5	32.5	50.9	1.669	1.793	1.900	352	405	386	532
30	40.1	0.5	5.75	10.10	5439	7291	8955	19.0	32.2	49.1	1.619	1.791	1.902	351	404	388	543
40	40.0	0.5	5.77	10.04	5939	7296	8787	21.5	33.7	49.9	1.704	1.841	1.946	350	406	384	541
50	40.1	0.5	5.75	10.11	6463	7320	8424	26.2	36.4	51.7	1.798	1.877	1.940	349	411	386	546
60	39.7	0.5	5.74	10.03	6356	7316	8499	26.0	37.3	51.9	1.832	1.909	1.966	352	408	385	529
70	40.1	0.5	5.75	10.10	6502	7336	8276	27.9	41.2	51.6	1.876	1.955	1.993	348	408	382	543
80	39.9	0.5	5.75	10.04	6503	7308	8297	28.2	40.7	51.2	1.858	1.954	2.010	351	412	382	539
90	39.7	0.5	5.76	10.00	6459	7302	8452	27.3	40.2	50.3	1.832	1.941	1.980	351	406	385	529
100	39.9	0.5	5.73	10.08	6450	7329	8318	27.8	42.5	50.9	1.841	1.943	1.985	348	404	388	532
110	39.9	0.5	5.75	10.05	6462	7301	8526	26.1	41.8	52.4	1.798	1.918	1.995	350	406	391	539
120	39.9	0.5	5.75	10.04	6559	7300	8466	26.7	42.9	54.1	1.811	1.932	2.018	352	402	391	529
130	40.1	0.5	5.75	10.11	6431	7308	8349	26.2	45.4	51.4	1.787	1.926	1.974	350	402	391	523
140	40.0	0.5	5.75	10.08	6557	7309	8288	27.7	44.3	51.3	1.818	1.933	1.986	350	402	391	522
150	39.9	0.5	5.76	10.03	6546	7293	8465	25.0	45.8	58.2	1.791	1.933	2.012	352	401	389	516
160	40.0	0.5	5.75	10.08	6506	7286	8353	24.6	40.5	45.8	1.463	1.593	1.634	351	397	384	511
170	40.0	0.5	5.76	10.06	6461	7287	8349	23.7	41.7	47.9	1.468	1.611	1.662	351	396	380	504
180	39.9	0.5	5.77	10.00	6467	7263	8375	24.3	40.9	50.0	1.478	1.615	1.693	350	398	382	525
190	39.9	0.5	5.77	10.01	6323	7259	8498	22.8	38.6	51.7	1.465	1.611	1.708	352	401	385	509
200	40.1	0.5	5.77	10.07	6488	7262	8404	22.1	40.2	48.2	1.476	1.620	1.677	349	399	383	506
210	39.9	0.5	5.84	9.89	6485	7236	7646	55.9	80.1	100.3	1.877	2.094	2.241	499	554	583	702
220	39.7	0.5	5.81	9.91	6551	7242	8313	28.3	54.0	71.3	1.624	1.813	1.946	500	550	540	663
230	39.9	0.5	5.81	9.94	6627	7290	7804	33.4	51.1	59.3	1.749	1.811	1.852	500	559	540	681
240	39.9	0.5	5.79	9.98	6637	7288	7918	27.6	46.5	57.4	1.677	1.769	1.834	503	555	543	681
250	40.1	0.5	5.78	10.06	6683	7309	7770	26.4	44.7	56.5	1.656	1.749	1.794	501	556	546	654
260	40.0	0.5	5.76	10.05	6680	7328	7755	25.9	39.8	56.5	1.658	1.732	1.796	500	556	544	670
270	39.7	0.5	5.79	9.95	6496	7282	8175	21.9	38.0	57.2	1.603	1.725	1.802	502	557	545	664
280	40.0	0.5	5.78	10.03	6529	7293	8277	20.9	37.1	58.0	1.593	1.724	1.814	503	557	542	663
290	39.9	0.5	5.78	10.00	6466	7282	8283	20.3	38.5	57.0	1.586	1.727	1.812	499	556	545	661
300	40.1	0.5	5.75	10.10	6767	7323	7973	20.5	34.4	58.3	1.618	1.718	1.831	501	555	547	659
310	39.9	0.5	5.77	10.00	6584	7292	8158	18.4	34.8	57.9	1.574	1.716	1.831	497	555	546	657
320	40.0	0.5	5.78	10.03	6613	7290	8175	18.3	34.6	58.4	1.570	1.719	1.837	502	557	548	643
330	40.0	0.5	5.76	10.06	6469	7305	8340	18.0	38.4	58.3	1.559	1.728	1.823	504	557	549	654
340	39.7	0.5	5.78	9.97	6258	7284	8549	18.1	38.9	57.8	1.564	1.729	1.822	500	557	546	636
350	40.0	0.5	5.76	10.07	6473	7310	8466	18.4	37.7	58.6	1.561	1.726	1.823	501	556	545	648
360	39.9	0.5	5.77	10.00	6500	7299	8200	19.0	36.0	59.1	1.603	1.723	1.844	500	556	545	661
370	39.9	0.5	5.77	10.01	6635	7292	8155	16.6	34.1	60.2	1.556	1.718	1.851	501	556	543	650
380	40.0	0.5	5.78	10.03	6546	7293	8203	16.9	35.5	59.7	1.556	1.725	1.850	501	556	549	662
390	40.0	0.5	5.77	10.03	6594	7293	8144	16.6	35.0	59.9	1.554	1.723	1.850	502	556	551	650
400	40.0	0.5	5.76	10.06	6120	7327	8188	17.4	37.5	58.5	1.561	1.737	1.843	500	556	545	658



Stop Num	Brake Speed mph	Rel. Speed mph	Stop Time sec	Avg Decel (time) ft/s ²	Min Torq. lb*ft	Avg Torq. (time) lb*ft	Max Torq. lb*ft	Avg Press (time) psi	Min Stroke inch	Avg Stroke (time) inch	Max Stroke inch	Min Req'd Retard Ratio	Ret Ratio Act	Ret Force Lb	Init Lead F	Final Lead F	Init Drum F	Final Drum F
Brake Retardation																		
1	49.8	0.5	12.9	5.60	3173	3933	4716	20.0	0.839	0.921	0.963	0.050	0.178	2325	172	378	185	344
2	50.0	0.5	10.1	7.16	4277	5054	5912	30.0	0.986	1.061	1.104	0.120	0.229	2988	173	277	178	261
3	50.0	0.5	8.1	8.94	5497	6329	7467	40.0	1.127	1.190	1.237	0.180	0.287	3741	173	217	177	362
4	50.0	0.5	6.5	11.10	7227	7946	9073	50.0	1.267	1.327	1.379	0.250	0.360	4697	172	281	179	471
5	49.9	0.5	5.7	12.69	8321	9173	10888	60.0	1.388	1.438	1.496	0.310	0.415	5422	169	224	174	527
6	49.8	0.5	4.9	14.72	9759	10775	12386	70.0	1.512	1.561	1.614	0.370	0.488	6369	170	272	175	407
7	49.9	0.5	4.4	16.61	11035	12293	14057	80.1	1.626	1.679	1.735	0.410	0.557	7267	173	256	178	445



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Stop Num	Brake Speed mph	Rel. Speed mph	Stop Time sec	Avg Decel (time) ft/s ²	Min Torq. lb*ft	Avg Torq. (time) lb*ft	Max Torq. lb*ft	Min Press psi	Avg Press (time) psi	Max Press psi	Min Stroke Inch	Avg Stroke (time) Inch	Max Stroke Inch	Init Lead F	Final Lead F	Init Drum F	Final Drum F
Brake Power																	
1	50.0	15.0	5.65	9.09	5976	6664	7667	23.8	40.5	48.0	1.078	1.225	1.288	151	311	151	291
2	50.0	15.0	5.65	9.10	5905	6667	7573	23.2	44.1	51.7	1.159	1.353	1.431	203	231	213	536
3	50.0	15.0	5.69	9.03	5900	6677	7656	25.1	47.9	57.5	1.259	1.455	1.533	235	278	264	447
4	49.9	15.0	5.70	8.98	5959	6651	7695	24.3	46.5	51.7	1.316	1.483	1.544	261	283	312	397
5	49.9	15.0	5.74	8.92	6137	6651	7451	29.4	48.4	54.5	1.399	1.531	1.605	276	299	344	415
6	49.9	15.0	5.72	8.96	6001	6677	7796	25.7	51.0	57.9	1.411	1.597	1.682	295	319	380	452
7	49.8	15.0	5.74	8.89	6123	6682	7537	31.0	51.7	59.1	1.474	1.622	1.707	317	344	408	499
8	49.9	15.0	5.71	8.96	6171	6720	7581	32.0	51.3	59.2	1.508	1.642	1.735	341	371	436	543
9	49.9	15.0	5.69	9.00	6035	6741	7845	26.0	49.8	58.0	1.488	1.657	1.755	364	399	462	573
10	49.8	15.0	5.68	8.99	6104	6738	7728	26.3	50.9	60.7	1.514	1.684	1.795	389	427	487	608
Hot Stop																	
1	19.9	0.5	2.05	13.89	9757	11322	11932	58.8	65.6	89.6	1.930	1.958	2.037	415	422	516	554
Recovery																	
1	30.1	0.5	3.61	12.02	8203	8960	9868	33.2	49.1	64.9	1.588	1.671	1.763	396	423	475	550
2	30.0	0.5	3.62	11.96	7534	8966	10047	32.4	43.2	58.0	1.562	1.637	1.695	407	431	476	547
3	30.0	0.5	3.59	12.03	7683	8975	9702	38.2	47.7	59.5	1.574	1.639	1.691	411	436	472	543
4	30.1	0.5	3.59	12.09	7478	8990	9986	34.1	41.7	54.8	1.552	1.616	1.679	416	438	468	543
5	30.0	0.5	3.60	12.01	7686	8990	9812	36.9	45.3	55.5	1.558	1.621	1.666	415	440	467	547
6	30.1	0.5	3.57	12.16	7966	9012	9571	39.2	47.7	55.0	1.565	1.620	1.664	418	440	465	541
7	30.0	0.5	3.59	12.03	8397	8979	9883	39.6	48.0	61.2	1.520	1.584	1.669	417	443	463	541
8	30.0	0.5	3.58	12.06	7853	9013	9716	37.0	46.0	54.6	1.515	1.573	1.621	418	443	461	543
9	30.1	0.5	3.59	12.09	8150	8972	9803	36.0	47.7	59.1	1.505	1.571	1.629	420	443	462	543
10	30.0	0.5	3.59	12.05	7950	9001	9611	33.0	45.4	54.4	1.503	1.562	1.620	420	443	462	540
11	30.0	0.5	3.57	12.12	7778	8986	9828	37.2	47.5	54.9	1.493	1.559	1.589	420	443	460	539
12	30.1	0.5	3.59	12.08	8397	8969	9785	35.3	47.7	61.2	1.484	1.558	1.645	419	443	457	541
13	30.0	0.5	3.59	12.03	8302	8991	9812	38.6	46.8	59.3	1.491	1.553	1.634	421	443	458	537
14	30.0	0.5	3.59	12.03	8170	8966	9961	33.7	46.1	59.2	1.476	1.548	1.622	420	443	457	543
15	30.1	0.5	3.60	12.06	8361	8972	9755	34.4	48.0	58.9	1.476	1.552	1.632	421	443	459	541
16	30.1	0.5	3.58	12.11	8128	8979	9533	38.4	46.9	60.6	1.481	1.546	1.635	417	443	457	537
17	29.8	0.5	3.58	12.02	8375	8971	9887	34.0	47.6	58.6	1.471	1.546	1.621	416	443	454	543
18	30.1	0.5	3.60	12.05	7957	8991	9649	35.5	44.5	53.8	1.479	1.540	1.605	418	443	456	539
19	30.0	0.5	3.60	12.01	8190	8968	9881	32.7	45.5	57.5	1.459	1.537	1.600	418	443	456	541
20	29.8	0.5	3.57	12.04	8235	8972	9903	37.3	46.3	60.4	1.468	1.537	1.641	416	441	455	534



<u>Lead/Inner</u>	<u>inches</u>												Avg
	1	2	3	4	5	6	7	8	9	10	11	12	
Initial	0.935	0.931	0.927	0.963	0.960	0.950	0.928	0.935	0.935	0.961	0.962	0.950	0.945
Final	0.930	0.931	0.932	0.946	0.957	0.955	0.931	0.936	0.936	0.949	0.962	0.954	0.943
Loss	0.005	0.000	-0.005	0.017	0.003	-0.005	-0.003	-0.001	-0.001	0.012	0.000	-0.004	0.002

<u>Trail/Outer</u>	<u>inches</u>												Avg
	1	2	3	4	5	6	7	8	9	10	11	12	
Initial	0.944	0.951	0.959	0.939	0.941	0.933	0.953	0.963	0.964	0.928	0.934	0.931	0.945
Final	0.948	0.955	0.955	0.948	0.948	0.941	0.954	0.961	0.956	0.937	0.937	0.928	0.947
Loss	-0.004	-0.004	0.004	-0.009	-0.007	-0.008	-0.001	0.002	0.008	-0.009	-0.003	0.003	-0.002

Weights

	Lead gr	Trail gr	Drum lb	Shoe Contact After Burnish (%)	
Initial	10097	10096	173.678	Leading Shoe	0
Final	10039	10059	173.498	Trailing Shoe	0
Loss	58	37	0.180	Drum Runout	0.009 Inch
				Brinell Hardness	286

Drum/Rotor Diameter inches

3 equally spaced positions

	In	Out	In	Out	In	Out
	1	2	3	4	5	6
Initial	14.546	14.547	14.545	14.546	14.545	14.546
Final	14.545	14.546	14.544	14.545	14.544	14.545
Loss	0.001	0.001	0.001	0.001	0.001	0.001

Surfometer uinch

3 equally spaced positions

	1	3	5
Initial	163	150	151
Final	13	11	10

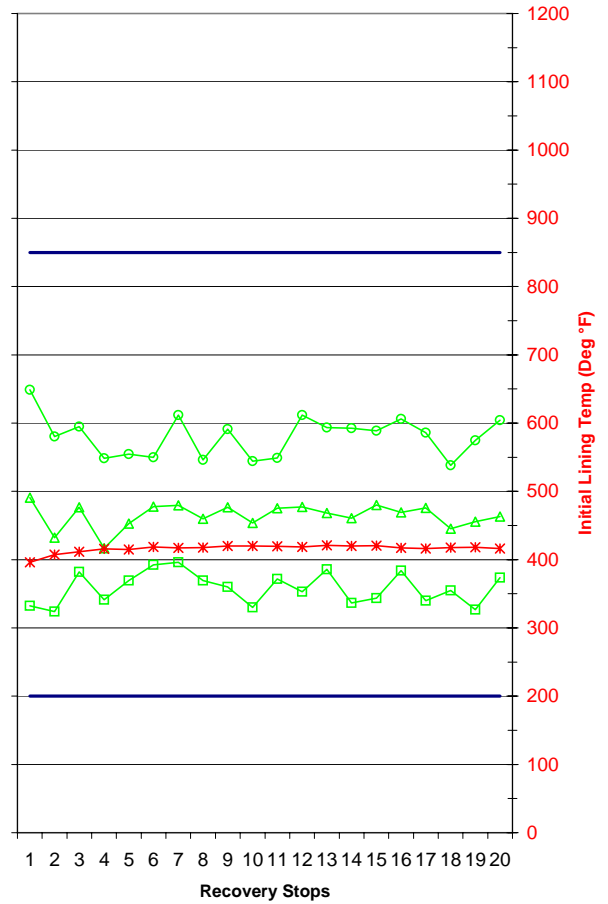
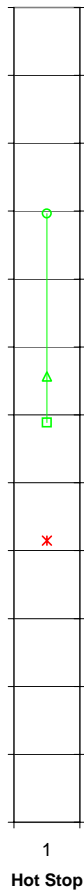
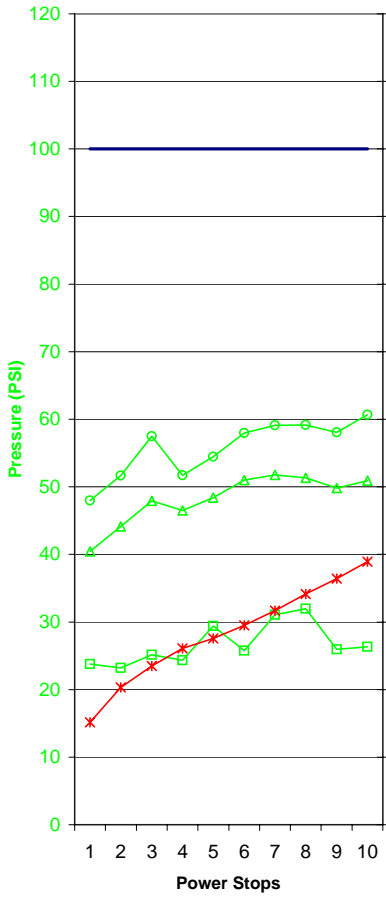
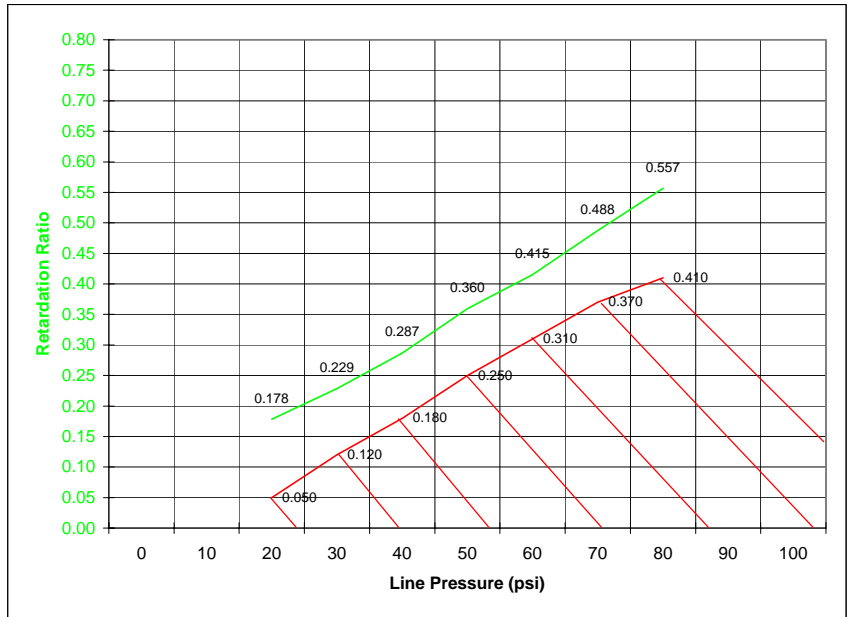


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Brake Dynamometer Testing

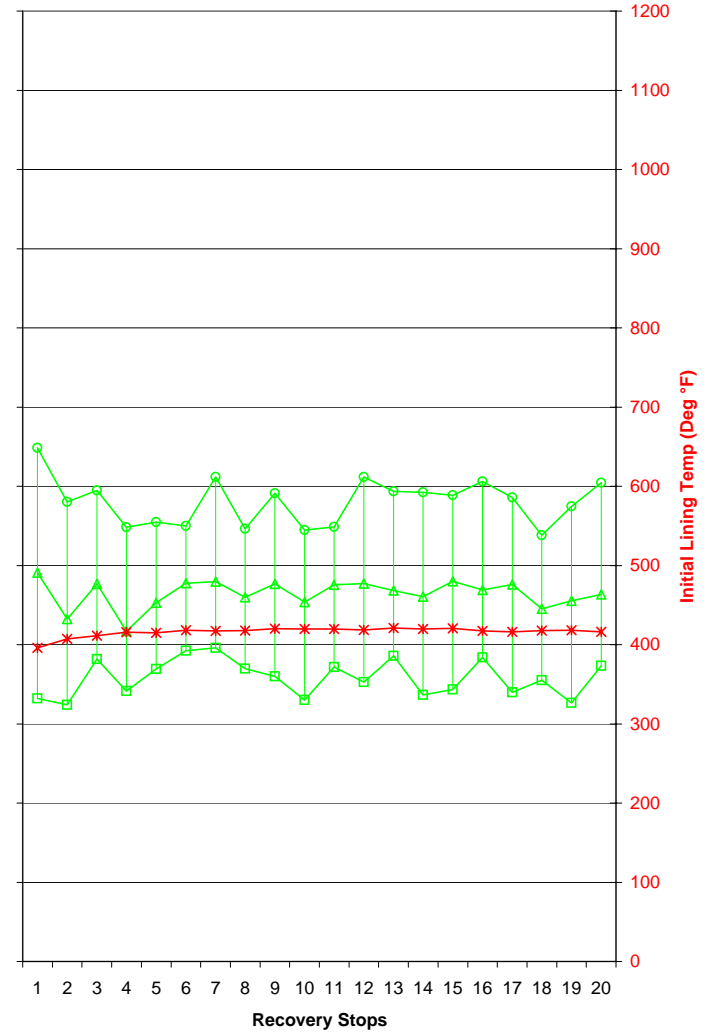
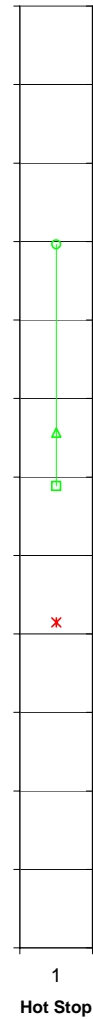
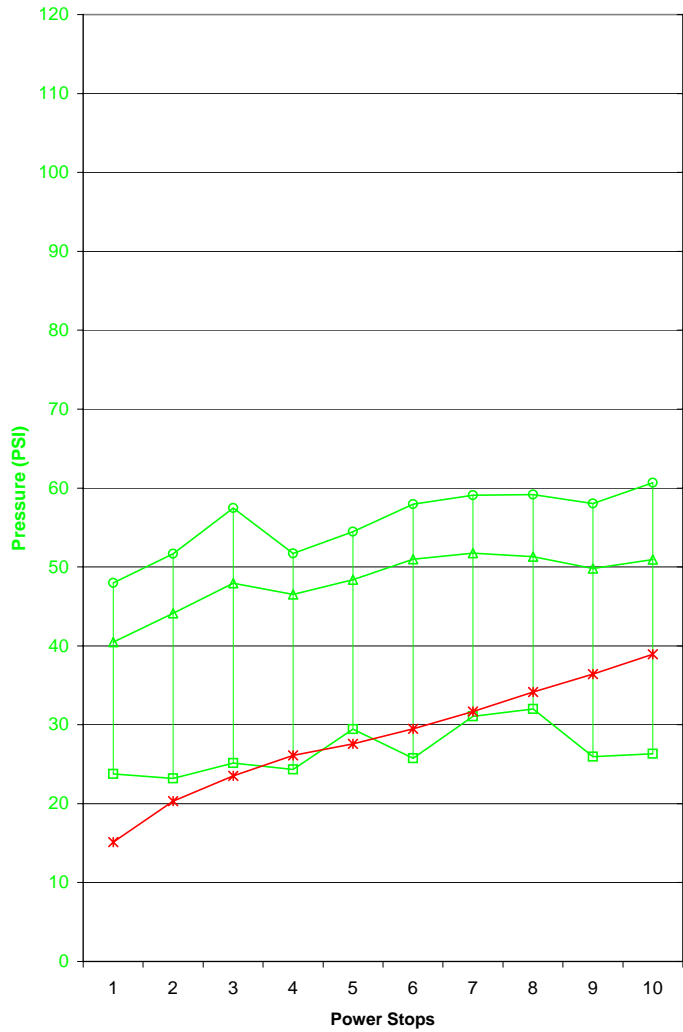
Customer Ref.: N/A

BRAKE SIZE: 14.5 x 10
 BRAKE TYPE: MERITOR "W" BRAKE
 GAWR (lbs): 26000
 ROLLING RADIUS (in): 20.3
 LEADING LINING: BN6
 TRAILING LINING: BN6
 AIR CHAMBER: MGM 30/30
 SLACK ADJUSTER: 7.0" HALDEX AUTOMATIC



LINK TESTING LABORATORIES, INC.

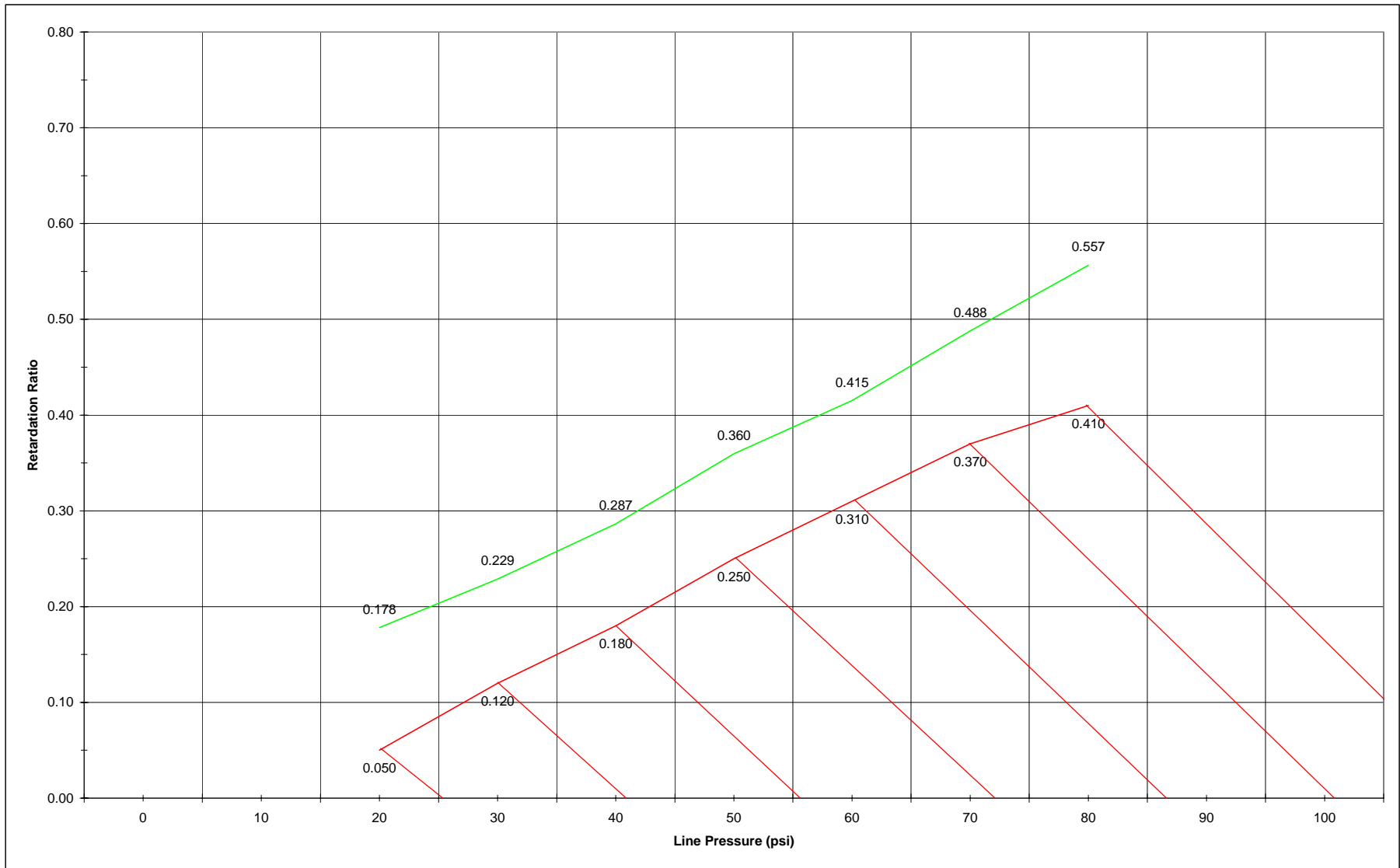
BRAKE POWER, HOT STOP & RECOVERY



Link Control Program:	W05002A0	Rolling Radius (in):	20.3	TEMP.	— x —
Actual Wheel Load (lb):	13057.8	Slack Adjuster:	7.0" HALDEX AUTOMATIC		
Actual Inertia (slug/ft²):	1162	Pri/Lead/Inner Lining:	BN6		
Brake Type:	MERITOR "W" BRAKE	Sec/Trail/Outer Lining:	BN6		
				□ MIN	△ AVG
					○ MAX

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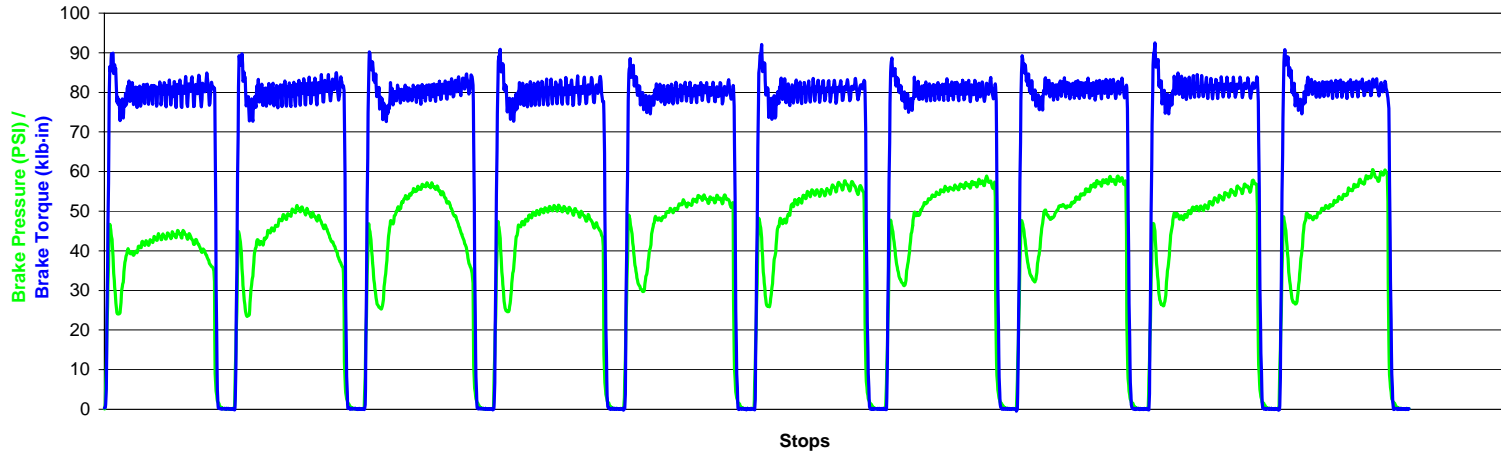
Customer Ref.:
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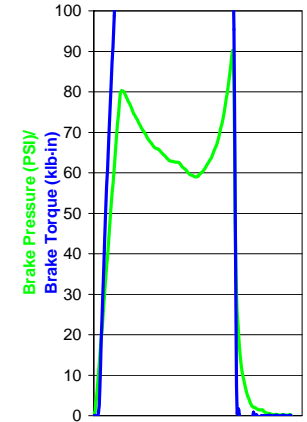
Link Control Program:	W05002A0	Rolling Radius (in):	20.3	RETARDATION RATIO
Actual Wheel Load (lb):	13057.8	Slack Adjuster:	7.0" HALDEX AUTOMATIC	
Actual Inertia (slug/ft²):	1162	Pri/Lead/Inner Lining:	BN6	
Brake Type:	MERITOR "W" BRAKE	Sec/Trail/Outer Lining:	BN6	



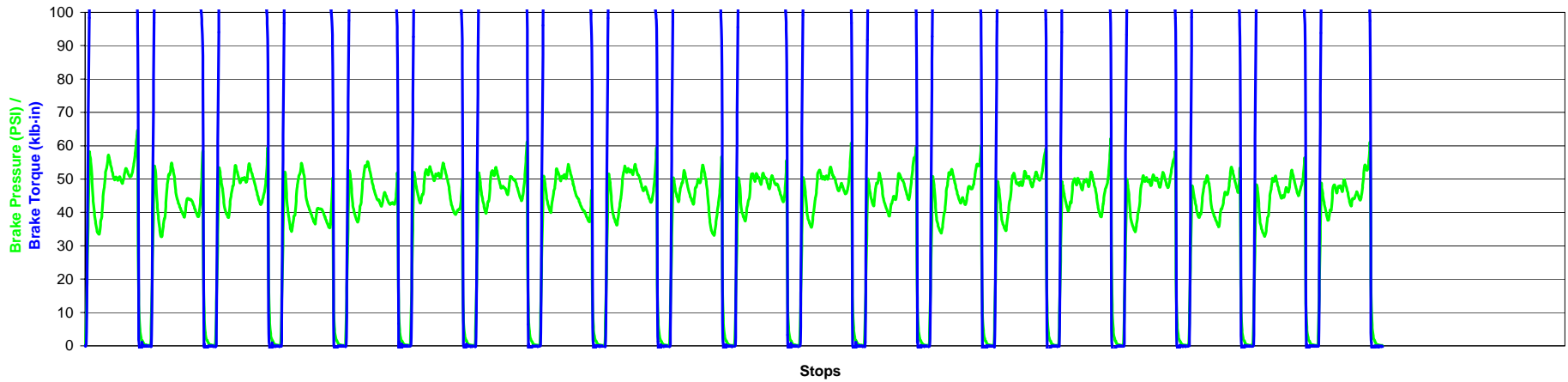
Brake Power



Hot Stop



Brake Recovery



Link Control Program:	W05002A0	Rolling Radius (in):	20.3
Actual Wheel Load (lb):	13057.82	Slack Adjuster:	7.0" HALDEX AUTOMATIC
Actual Inertia (slug/ft ²):	1162	Pri/Lead/Inner Lining:	BN6
Brake Type:	MERITOR "W" BRAKE	Sec/Trail/Outer Lining:	BN6



This report has been reviewed and verified by Link Testing Laboratories, Inc.

Comments:

Link

Signature:

Title:

Supervisor

Date:

April 10, 2008

Contact Information:

Name: JEFF LESKO

Phone #: (313) 933-4900

Email: j.lesko@linkeng.com

- END OF TEST REPORT -