KCP Activities Supporting the W76LEP Stress Cushions and LK3626 RTV Replacement Material Development

- Data Retrieval for 115 Sets of W76-0 Stress Cushions
- Stress Cushion Shrinkage Study “Cinderella Molds”
- Establishing Material Standards Requirements for the RTV Material Reactants

Federal Manufacturing & Technologies

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Abstract

The S-5370 RTV blown foam previously produced by Dow Corning is no longer commercially available. The S-5370 material has been used on all of Los Alamos National Laboratory (LANL) programs to manufacture Stress Cushions up through the W88. The Kansas City Plant (KCP) did not have a sufficient supply of S-5370 material to cover the schedule requirements for the Program. This report provides information on the numerous activities conducted at KCP involving the development of the Program Stress Cushion and replacement RTV material.

Summary

LANL requested numerous activities from KCP during the development of the Program Stress Cushion and replacement RTV blown foam material. This report describes several of the requested activities. The first activity requested by LANL was the retrieval of the original load deflection acceptance data for 115 sets of the Number 1 and Number 2 Program Stress Cushions. At a later date, additional material information was requested for these sets, including the material type, lot number of the RTV resin and catalyst, date molded (month/year), resin and catalyst weights, and final trimmed part weight for each part number and serial number. Also described in this report are activities involved in determining the shrinkage of the stress cushion based on the LK3626 RTV foam. Parts were fitted to various cavity contours to determine the best fit and the resulting total shrink factor for molding the Stress Cushion. In addition, this report contains information concerning the establishment of the material standards for the starting reactants for the RTV blown foam. Included is the data from gel permeation chromatography (GPC) analytical tests that were used to establish some of the material standards requirements.

Discussion

Data Retrieval for 115 Sets of Program Stress Cushions

On June 3, 2003, KCP received a fax from LANL listing 115 serial numbers for the Number 1 and Number 2 Program Stress Cushions. The request was to provide LANL with the WR load deflection acceptance data, and was the first activity involving KCP for the Program. Examples of the data provided for a Number 1 and Number 2 are shown in Appendix A and B, respectively. The analysis of this data was completed by LANL and was referred to as the 115 Serial Number Data Set. Requests for information regarding these 115 sets of serial numbers continued to grow, and included resin type, resin lot number, catalyst lot number, date code, resin weight, catalyst weight, and trimmed part weight. The complete listing is shown in Appendix C. KCP was required to provide data only and was not involved in any analysis of the load deflection or material information.

Stress Cushion Shrinkage Study “Cinderella Mold”

In the October, 2004, time frame, LANL indicated to KCP that the Program stress cushions being provided to them for evaluation purposes did not fit the inner contour of the next assembly. The parts were loose or small and tended to pull away from the next

assembly waist area. A review of the KCP tool drawing indicated a 2% shrinkage factor, or 0.020 inch / inch. This is the same shrinkage factor that has been used on all KCP RTV blown foam contour tooling starting with the Program in approximately 1976.

With the extreme flexibility of these stress cushions, it is impossible to obtain any direct measurement from a part. The part is flexible enough to stretch over a slightly larger contour than what it was designed for. So, for determination of fit, the part would need to be evaluated in an inner contour situation. KCP devised a plan to evaluate the stress cushion to the next assembly inner contour. The inner contour would be machined into a clear material, so the stress cushion fit could be evaluated from all angles. A total of four acrylic molds, deemed the Cinderella molds, were machined at various contours. The four inner contours were based on variations from the nominal contour of the next assembly. The first mold was machined to the exact nominal contour and would be considered 100% or no shrinkage. The second mold was machined at 99% of the contour or 1% shrinkage. The third mold was cut to 98.5% of the contour or 1.5% shrinkage. The fourth mold was cut to 98% of the contour or 2% shrinkage.

When these Cinderella molds were completed, LANL representatives evaluated the fit of approximately 80 stress cushions produced under various conditions. The stress cushions were molded between May 21 and December 9, 2004, at pour weights between 37.0 and 44.5 grams. The catalyst levels were varied from 5% to 7% and all of these conditions were based on seven different lots of LK3626 resin formulated at KCP. The review sheets, provided to LANL personnel on December 16, 2004, containing this part information are shown in Appendix D. An analysis of the data was performed by LANL to determine the appropriate material shrinkage. The results of the capability analysis for the Cinderella test are shown in Appendix E. Statistically, 3.5% shrinkage was optimum as determined by LANL. This is based on 2% from the perform mold and 1.5% from the Cinderella mold. KCP presented a slide on April 13, 2005, summarizing the test conditions and results, as shown in Appendix F. The WR perform mold, initial molding of the stress cushion, and the WR compression set molds are all designed with the 3.5% shrink factor applied.

Establishing Material Standards Requirements for the RTV Material Reactants

Prior Work

In the late 1970s, Dr. G. Keith Baker, a polymer chemist with Bendix, initiated work to de-engineer the S-5370 formulation. Dr. Baker's formulation consisted of the following materials: low molecular weight silanol, high molecular weight silanol, polymethylhydrosiloxane, tetrapropoxysilane, diphenylmethysilanol, and diatomaceous earth.¹

Cindy W. Sandoval (LANL) led several efforts to optimize this formulation. The resulting replacement material for the S-5370 was deemed LK3626. The resulting LK3626 formulation is: low molecular weight silanol, low / high molecular weight

silanol, high molecular weight silanol, polymethylhydrosiloxane, tetrapropoxysilane, diphenylmethylsilanol, and diatomaceous earth.^{2,3}

Activity

The LK3626 is based on the following materials: three different molecular weight polydimethylsiloxanediols designated as low molecular weight siloxane (LMWS), low high molecular weight siloxane (LHMWS), high molecular weight siloxane (HMWS), polymethylhydrosiloxane (PMHS), tetrapropoxysilane (TPS), diphenylmethylsilanol (DPMS), and diatomaceous earth (DE). These materials are all available commercially from a minimum of two sources, except the DPMS.

During development of the LK3626, numerous lots of starting materials were obtained by KCP for evaluation and the establishment of material standards acceptance criteria. The nonproduction part numbers and the WR material standards for each of the constituents of the LK3626 are shown in Table 1.

Table 1. Starting Materials for the Formulation of the LK3626

Material	Designation	Vendor	Vendor ID	Material Standard	Non Production #
Polydimethylsiloxanediol (low molecular weight)	LMWS	NuSil	PLY 7601	4003028	57010379
Polydimethylsiloxanediol (low molecular weight)	LMWS	UCT	PS 340	4003028	57010386
Polydimethylsiloxanediol (low high molecular weight)	LHMWS	NuSil	PLY 7608	4003029	57010380
Polydimethylsiloxanediol (low high molecular weight)	LHMWS	UCT	PS 342.5	4003029	57010387
Polydimethylsiloxanediol (high molecular weight)	HMWS	NuSil	PLY 7609	4003030	57010381
Polydimethylsiloxanediol (high molecular weight)	HMWS	UCT	PS 343.8	4003030	57010388
Polymethylhydrogensiloxane (trimethyl endblocked)	PMHS	NuSil	XL-132	4003031	57010382
Polymethylhydrogensiloxane (trimethyl endblocked)	PMHS	UCT	PS 120	4003031	57010389
Polymethylhydrogensiloxane (trimethyl endblocked)	PMHS	Dow Corning	DC 1107	4003031	57010391
Diphenylmethylsilanol	DPMS	NuSil	PLY 7602	4003032	57010383
Tetrapropoxysilane	TPS	NuSil	XL-121	4003033	57010384
Tetrapropoxysilane	TPS	UCT	T2090	4003033	57010390
Diatomaceous Earth	DE	Celite	Celite 350	8603133	57010385

NuSil – NuSil Silicone Technology
 UCT – United Chemical Technologies
 Celite – Celite Corporation

Analytical Evaluation

Polydimethylsiloxanediol – 4003028 through 4003030

GPC was utilized to determine the molecular weight for the following polydimethylsiloxanediol materials: LMWS, LHMWS, and HMWS. The GPC results for all three materials are shown in Appendixes G – I, respectively. It should be noted that for the 4003028, LMWS, only the NuSil material was available for evaluation. Samples from NuSil and United Chemical Technologies were available for evaluation for the LHMWS 4003029 and the HMWS 4003030.

Jim Wyckoff, KCP Statistician, evaluated the GPC results and established weight average molecular weights and tolerances based on a 95% probability. These values, shown in Table 3, were reviewed and slightly rounded.

Table 2. 95% Probability Molecular Weights – Finalized for 4003028 through 4003030

Material – Part Number	Weight Average Molecular Weight	Drawing Requirement
LMWS - 4003028-a	2,352 ± 579	2,350 ± 580
LHMWS – 4003029-a	29,377 ± 3696	29,400 ± 3700
HMWS – 4003030-a	54,291 ± 6990	54,300 ± 7000

Additional testing of these three materials includes visual, viscosity, and moisture determination. The visual requirement is clear and free of particulates. The requirements for viscosity and moisture are to determine and report only.

A sample from 40% of the containers, rounded up to the next whole number, shall be taken for molecular weight and visual requirements. A sample from 25% of the containers, rounded up to the next whole number, shall be taken for the viscosity and moisture determination.

The shelf life of this material is six months from the date of shipment. Any material exceeding this age shall be reinspected to the requirements of molecular weight, visual, viscosity, and moisture. If the material passes, the shelf life may be extended six months. By retesting, the shelf life may be extended for six month intervals indefinitely. Material failing the requirements of molecular weight, visual, viscosity, and moisture shall be scrapped.

Polymethylhydrogensiloxane – 4003031

Gel permeation chromatography (GPC) was utilized to determine the molecular weight for this polymethylhydrogensiloxane material, PMHS. The GPC results for the PMHS material from the three vendors NuSil, United Chemical Technologies, and Dow Corning are shown in Appendix J.

Jim Wyckoff, KCP Statistician, evaluated the GPC results and established weight average molecular weights and tolerances based on a 95% probability. These values, shown in Table 3, were reviewed and slightly rounded.

Table 3. 95% Probability Molecular Weights – Finalized for 4003031

Material – Part Number	Weight Average Molecular Weight	Drawing Requirement
PMHS - 4003031-a	12,152.5 ± 5899.5	12,150 ± 5900

Additional testing of these three materials includes visual, viscosity, and moisture determination. The visual requirement is clear and free of particulates. The requirements for viscosity and moisture are to determine and report only.

A sample from 40% of the containers, rounded up to the next whole number, shall be taken for molecular weight and visual requirements. A sample from 25% of the containers, rounded up to the next whole number, shall be taken for the viscosity and moisture determination.

The shelf life of this material is six months from the date of shipment. Any material exceeding this age shall be reinspected to the requirements of molecular weight, visual, viscosity, and moisture. If the material passes, the shelf life may be extended six months. By retesting, the shelf life may be extended for six month intervals indefinitely. Material failing the requirements of molecular weight, visual, viscosity, and moisture shall be scrapped.

Diphenylmethylsilanol – 4003032

Gas Chromography / Mass Spectrum (GCMS) was utilized to analyze the diphenylmethylsilanol material, DPMS, for purity. The GCMS results for this material indicate that the DPMS generally consists of a combination of the following materials: diphenylmethylsilanol, methoxydiphenylmethylsilane, and ethoxydiphenylmethylsilane. Based on this information, the material standard states that the GCMS results for the DPMS shall consist of any combination of the above mentioned compounds. The visual requirement is clear and free of particulates. It should be noted that for the 4003032, DPMS, only one source, NuSil Technology, was available for this material.

A sample from each of the containers shall be taken for purity and visual requirements.

The shelf life of this material is six months from the date of shipment. Any material exceeding this age shall be reinspected to the requirements of GCMS and visual. If the material passes, the shelf life may be extended six months. By retesting, the shelf life may be extended for six month intervals indefinitely. Material failing the requirements of GCMS and visual shall be scrapped.

Tetrapropoxysilane – 4003033

GCMS was utilized to analyze the tetrapropoxysilane material, TPS, for purity. The GCMS results for this material from both NuSil Technology and United Chemical Technologies indicates that it generally is well above 95% purity. So, 95% was set as the minimum acceptable value for this material in the material standard. The visual requirement is clear and free of particulates.

A sample from 50% of the containers, rounded up to the next whole number, shall be taken for purity and visual requirements.

The shelf life of this material is six months from date of shipment. Any material exceeding this age shall be reinspected to the requirements of GCMS / purity and visual. If the material passes, the shelf life may be extended six months. By retesting, the shelf life may be extended for six months intervals indefinitely. Material failing the requirements of GCMS / purity and visual shall be scrapped.

Diatomaceous Earth – 8603133

The Celite 350 is a “Buy By Label” material with unlimited shelf life and is available from the Celite Corporation.

Accomplishments

The details of activities involved in establishing some of the material standards requirements (limits) are now documented. A review of the testing and percentage of containers tested for each material is shown in Table 4.

Table 4. Test Parameters and Percentage of Containers Tested by Material

	LMWS	LHMWS	HMWS	PMHS	DPMS	TPS	Celite 350
Molecular Wt., Mw	40 %	40 %	40 %	40%	N/A	N/A	N/A
Viscosity	25 %	25 %	25 %	25 %	N/A	N/A	N/A
Moisture	25 %	25 %	25 %	25 %	N/A	N/A	N/A
Purity	N/A	N/A	N/A	N/A	100 %	50 %	N/A
Visual	40 %	40 %	40 %	40%	100 %	50 %	N/A*

* Celite 350 is a “Buy By Label” material.

As of August 25, 2009, all starting materials for any RTV formulation have been obtained only from NuSil Technology.

References

- ¹ G. Keith Baker, Silicone Technology Development, Quarterly Report for FY-80-1, October/December, 1979.
- ² Cynthia W. Sandoval, Formulation of a Hydrogen Blown Silicone Foam, Advanced Materials Experiment, MS 790-P, 12-13-00.
- ³ LK3626 Formulation provided by AER20020300LA on 6/21/02 to KCP.

Appendix A

Complete Part Load Vs Deflection Report Part Number 1 S/N 1018

Complete Part Load Vs. Deflection Report

06/04/2003

Part Number		Material Number	4003024	Test Date	10/11/1977 10:22
Serial Number		Material Batch No.	P-00-0	Operator No.	
Lot or EP No.	000000000	Part Weight	0000.000	Test Station No.	
Date Code.	J77	Disposition Code		Measurement	Load, Millimeter
***** Position 1 *****					
Actual Thickness	01.016 mm				
Actual Cycle Point	00.425 mm	= 58.2	Percent Deflection at	504.650 KPA	
Test Point No.	*----- 1 -----*	*----- 2 -----*	*----- 3 -----*		
Test Point	00.091 mm	00.065 mm	00.051 mm		
Load Readings (KPA)					
Cycle 1	18.390	94.230	218.860		
***** Position 2 *****					
Actual Thickness	01.016 mm				
Actual Cycle Point	00.468 mm	= 53.9	Percent Deflection at	500.920 KPA	
Test Point No.	*----- 1 -----*	*----- 2 -----*	*----- 3 -----*		
Test Point	00.091 mm	00.065 mm	00.051 mm		
Load Readings (KPA)					
Cycle 1	18.610	111.270	318.220		
***** Position 3 *****					
Actual Thickness	01.016 mm				
Actual Cycle Point	00.434 mm	= 57.3	Percent Deflection at	503.550 KPA	
Test Point No.	*----- 1 -----*	*----- 2 -----*	*----- 3 -----*		
Test Point	00.091 mm	00.065 mm	00.051 mm		
Load Readings (KPA)					
Cycle 1	13.580	89.690	231.970		
***** Position 4 *****					

Complete Part Load Vs. Deflection Report

06/04/2003

Actual Thickness	01.016 mm			
Actual Cycle Point	00.448 mm	= 55.9	Percent Deflection at	501.460 KPA
Test Point No.	*----- 1 -----*	*----- 2 -----*	*----- 3 -----*	
Test Point	00.091 mm	00.065 mm	00.051 mm	
Load Readings (KPA)				

Complete Part Load Vs. Deflection Report

06/04/2003

Cycle 1	18.180	100.650	265.160	
***** Average of 4 Positions *****				
Actual Thickness	01.016 mm			
Actual Cycle Point	00.444 mm	= 56.3	Percent Deflection at	502.640 KPA
Test Point No.	*----- 1 -----*	*----- 2 -----*	*----- 3 -----*	
Test Point	00.091 mm	00.065 mm	00.051 mm	
Load Readings (KPA)				
Cycle 1	17.190	98.960	258.550	

Complete Part Load Vs. Deflection Report

06/04/2003

Percent Deflection	*----- Position 1 -----*		*----- Position 2 -----*		*----- Position 3 -----*		*----- Position 4 -----*		*----- Average -----*	
	Gap (mm)	Load (KPA)	Gap (mm)	Load (KPA)	Gap (mm)	Load (KPA)	Gap (mm)	Load (KPA)	Gap (mm)	Load (KPA)
1	01.006	00.370	01.006	00.320	01.006	00.000	01.006	00.430	01.006	00.280
2	00.996	00.430	00.996	00.430	00.996	00.000	00.996	00.470	00.996	00.330
3	00.986	00.530	00.986	00.470	00.986	00.370	00.986	00.580	00.986	00.490
4	00.975	00.800	00.975	00.740	00.975	00.430	00.975	00.850	00.975	00.710
5	00.965	01.600	00.965	01.170	00.965	00.580	00.965	01.710	00.965	01.260
6	00.955	03.360	00.955	02.510	00.955	01.060	00.955	03.250	00.955	02.550
7	00.945	06.200	00.945	05.180	00.945	02.510	00.945	05.930	00.945	04.950
8	00.935	09.620	00.935	08.710	00.935	05.130	00.935	09.190	00.935	08.160
9	00.925	13.210	00.925	12.830	00.925	08.500	00.925	12.730	00.925	11.820
10	00.914	17.000	00.914	17.050	00.914	12.190	00.914	16.790	00.914	15.760
11	00.904	20.580	00.904	20.800	00.904	15.660	00.904	20.210	00.904	19.310
12	00.894	23.850	00.894	24.550	00.894	18.870	00.894	23.580	00.894	22.710
13	00.884	26.850	00.884	28.070	00.884	22.140	00.884	26.900	00.884	25.990
14	00.874	29.730	00.874	31.340	00.874	24.970	00.874	29.890	00.874	28.980
15	00.864	32.360	00.864	34.380	00.864	27.850	00.864	32.780	00.864	31.840
16	00.853	35.140	00.853	37.650	00.853	30.540	00.853	35.770	00.853	34.770
17	00.843	37.590	00.843	40.690	00.843	32.990	00.843	38.610	00.843	37.470
18	00.833	39.890	00.833	43.360	00.833	35.290	00.833	41.070	00.833	39.910
19	00.823	42.300	00.823	46.050	00.823	37.700	00.823	43.470	00.823	42.380
20	00.813	44.440	00.813	48.830	00.813	40.060	00.813	45.830	00.813	44.790
21	00.803	46.630	00.803	51.500	00.803	42.080	00.803	48.180	00.803	47.100
22	00.792	49.300	00.792	54.330	00.792	44.600	00.792	50.800	00.792	49.760
23	00.782	51.560	00.782	57.060	00.782	46.790	00.782	53.210	00.782	52.150
24	00.772	54.170	00.772	59.950	00.772	49.040	00.772	55.680	00.772	54.710

Complete Part Load Vs. Deflection Report

06/04/2003

Percent Deflection	*----- Position 1 -----*		*----- Position 2 -----*		*----- Position 3 -----*		*----- Position 4 -----*		*----- Average -----*	
	Gap (mm)	Load (KPA)	Gap (mm)	Load (KPA)	Gap (mm)	Load (KPA)	Gap (mm)	Load (KPA)	Gap (mm)	Load (KPA)
25	00.762	56.530	00.762	62.670	00.762	51.450	00.762	58.290	00.762	57.240
26	00.752	59.150	00.752	65.770	00.752	53.960	00.752	61.130	00.752	60.000
27	00.742	61.770	00.742	69.090	00.742	56.470	00.742	63.800	00.742	62.780
28	00.732	64.550	00.732	72.410	00.732	59.360	00.732	66.850	00.732	65.790
29	00.721	67.980	00.721	76.050	00.721	62.520	00.721	70.480	00.721	69.260
30	00.711	71.130	00.711	79.790	00.711	65.720	00.711	73.960	00.711	72.650
31	00.701	74.440	00.701	84.120	00.701	68.930	00.701	77.550	00.701	76.260
32	00.691	77.330	00.691	88.350	00.691	72.300	00.691	81.340	00.691	79.830
33	00.681	81.130	00.681	93.750	00.681	76.100	00.681	85.300	00.681	84.070
34	00.671	84.880	00.671	98.610	00.671	79.850	00.671	90.220	00.671	88.390
35	00.660	89.470	00.660	105.170	00.660	84.820	00.660	94.980	00.660	93.610
36	00.650	94.230	00.650	111.270	00.650	89.690	00.650	100.650	00.650	98.960
37	00.640	98.830	00.640	118.120	00.640	94.770	00.640	106.440	00.640	104.540
38	00.630	104.090	00.630	125.740	00.630	100.430	00.630	112.760	00.630	110.760
39	00.620	109.780	00.620	133.560	00.620	106.440	00.620	119.940	00.620	117.430
40	00.610	115.140	00.610	143.550	00.610	112.870	00.610	127.450	00.610	124.750
41	00.599	122.540	00.599	153.510	00.599	120.910	00.599	136.260	00.599	133.300
42	00.589	129.390	00.589	164.870	00.589	128.530	00.589	145.460	00.589	142.060
43	00.579	137.420	00.579	177.510	00.579	137.530	00.579	155.970	00.579	152.110
44	00.569	146.230	00.569	191.890	00.569	147.610	00.569	166.580	00.569	163.080
45	00.559	155.120	00.559	207.000	00.559	157.160	00.559	179.550	00.559	174.710
46	00.549	165.310	00.549	224.180	00.549	170.030	00.549	193.390	00.549	188.220
47	00.538	179.250	00.538	246.730	00.538	184.270	00.538	211.060	00.538	205.330
48	00.528	192.200	00.528	269.220	00.528	198.740	00.528	227.140	00.528	221.830

Complete Part Load Vs. Deflection Report

06/04/2003

Percent Deflection	*----- Position 1 -----*		*----- Position 2 -----*		*----- Position 3 -----*		*----- Position 4 -----*		*----- Average -----*	
	Gap (mm)	Load (KPA)	Gap (mm)	Load (KPA)	Gap (mm)	Load (KPA)	Gap (mm)	Load (KPA)	Gap (mm)	Load (KPA)
49	00.518	206.890	00.518	296.270	00.518	216.990	00.518	247.220	00.518	241.840
50	00.508	222.310	00.508	323.870	00.508	236.250	00.508	269.720	00.508	263.040
51	00.498	242.390	00.498	364.300	00.498	257.150	00.498	297.310	00.498	290.290
52	00.488	263.570	00.488	404.460	00.488	283.650	00.488	327.600	00.488	319.820
53	00.478	287.440	00.478	448.900	00.478	311.800	00.478	361.610	00.478	352.440
54	00.467	320.080	00.467	350.640	00.467	407.100	00.467	359.270		
55	00.457	351.460	00.457	392.720	00.457	454.830	00.457	399.670		
56	00.447	392.170	00.447	439.250	00.447	415.710				
57	00.437	435.520	00.437	491.810	00.437	463.660				
58	00.427	489.610	00.427	489.610						

Appendix B

Complete Part Load Vs Deflection Report Part Number 2 S/N 1031

Complete Part Load Vs. Deflection Report

06/04/2003

Part Number
Serial Number
Lot or EP No.
Date Code

00001031
00000000
K77

Material Number
Material Batch No.
Part Weight
Disposition Code

4003024
O-00-0
0000.000

Test Date
Operator No.
Test Station No.
Measurement

11/14/1977 14:03

Load, Millimeter

***** Position 1 *****

Actual Thickness
Actual Cycle Point
Test Point No.
Test Point
Load Readings (KPA)
Cycle 1

01.016 mm
00.479 mm = 52.9
----- 1 ----- *----- 2 -----* *----- 3 -----*
00.091 mm 00.065 mm 00.051 mm
24.970 129.820 357.880

500.920 KPA

***** Position 2 *****

Actual Thickness
Actual Cycle Point
Test Point No.
Test Point
Load Readings (KPA)
Cycle 1

01.016 mm
00.451 mm = 55.6
----- 1 ----- *----- 2 -----* *----- 3 -----*
00.091 mm 00.065 mm 00.051 mm
19.840 115.440 278.050

503.550 KPA

***** Position 3 *****

Actual Thickness
Actual Cycle Point
Test Point No.
Test Point
Load Readings (KPA)
Cycle 1

01.016 mm
00.468 mm = 53.9
----- 1 ----- *----- 2 -----* *----- 3 -----*
00.091 mm 00.065 mm 00.051 mm
25.830 122.210 319.590

500.920 KPA

***** Position 4 *****

Complete Part Load Vs. Deflection Report

06/04/2003

Actual Thickness	01.016 mm			
Actual Cycle Point	00.450 mm	= 55.7	Percent Deflection at	502.010 KPA
Test Point No.	*----- 1 -----*	*----- 2 -----*	*----- 3 -----*	
Test Point	00.091 mm	00.065 mm	00.051 mm	
Load Readings (KPA)				

Complete Part Load Vs. Deflection Report

06/04/2003

Cycle 1	26.150	117.810	276.960	
***** Average of 4 Positions *****				
Actual Thickness	01.016 mm			
Actual Cycle Point	00.462 mm	= 54.5	Percent Deflection at	501.850 KPA
Test Point No.	*----- 1 -----*	*----- 2 -----*	*----- 3 -----*	
Test Point	00.091 mm	00.065 mm	00.051 mm	
Load Readings (KPA)				
Cycle 1	24.200	121.320	308.120	

Complete Part Load Vs. Deflection Report

06/04/2003

Percent Deflection	*----- Position 1 -----*		*----- Position 2 -----*		*----- Position 3 -----*		*----- Position 4 -----*		*----- Average -----*	
	Gap (mm)	Load (KPA)	Gap (mm)	Load (KPA)	Gap (mm)	Load (KPA)	Gap (mm)	Load (KPA)	Gap (mm)	Load (KPA)
1	01.006	00.580	01.006	00.320	01.006	00.470	01.006	00.840	01.006	00.500
2	00.996	00.640	00.996	00.470	00.996	00.690	00.996	00.800	00.996	00.650
3	00.986	00.910	00.986	00.580	00.986	01.060	00.986	01.120	00.986	00.920
4	00.975	01.820	00.975	00.800	00.975	02.340	00.975	02.140	00.975	01.770
5	00.965	03.740	00.965	01.280	00.965	04.640	00.965	04.110	00.965	03.440
6	00.955	06.940	00.955	02.400	00.955	07.960	00.955	07.110	00.955	06.100
7	00.945	11.120	00.945	04.920	00.945	11.970	00.945	10.950	00.945	09.740
8	00.935	14.810	00.935	08.760	00.935	16.090	00.935	15.240	00.935	13.720
9	00.925	18.870	00.925	13.310	00.925	20.150	00.925	19.840	00.925	18.040
10	00.914	23.310	00.914	17.850	00.914	24.170	00.914	24.270	00.914	22.400
11	00.904	27.380	00.904	22.620	00.904	28.070	00.904	28.720	00.904	26.700
12	00.894	31.060	00.894	26.680	00.894	31.340	00.894	32.450	00.894	30.380
13	00.884	34.440	00.884	30.480	00.884	34.550	00.884	36.150	00.884	33.900
14	00.874	37.650	00.874	34.170	00.874	37.590	00.874	39.520	00.874	37.230
15	00.864	40.970	00.864	37.910	00.864	40.690	00.864	42.840	00.864	40.600
16	00.853	44.270	00.853	41.500	00.853	43.850	00.853	46.200	00.853	43.960
17	00.843	47.540	00.843	44.750	00.843	46.630	00.843	49.200	00.843	47.030
18	00.833	50.750	00.833	48.020	00.833	49.300	00.833	52.080	00.833	50.040
19	00.823	53.800	00.823	51.070	00.823	52.250	00.823	54.860	00.823	53.000
20	00.813	56.790	00.813	53.900	00.813	55.190	00.813	57.590	00.813	55.870
21	00.803	60.060	00.803	56.960	00.803	58.070	00.803	60.370	00.803	58.870
22	00.792	63.690	00.792	60.220	00.792	61.230	00.792	63.580	00.792	62.180
23	00.782	67.220	00.782	63.270	00.782	64.230	00.782	66.530	00.782	65.310
24	00.772	70.540	00.772	66.530	00.772	67.590	00.772	69.630	00.772	68.570

Complete Part Load Vs. Deflection Report

06/04/2003

Percent Deflection	*----- Position 1 -----*		*----- Position 2 -----*		*----- Position 3 -----*		*----- Position 4 -----*		*----- Average -----*	
	Gap (mm)	Load (KPA)	Gap (mm)	Load (KPA)	Gap (mm)	Load (KPA)	Gap (mm)	Load (KPA)	Gap (mm)	Load (KPA)
25	00.762	74.070	00.762	69.570	00.762	70.700	00.762	72.470	00.762	71.700
26	00.752	77.980	00.752	72.950	00.752	74.280	00.752	75.880	00.752	75.270
27	00.742	81.710	00.742	76.310	00.742	77.920	00.742	78.980	00.742	78.730
28	00.732	85.830	00.732	79.740	00.732	81.770	00.732	82.300	00.732	82.410
29	00.721	90.540	00.721	83.970	00.721	86.100	00.721	86.370	00.721	86.740
30	00.711	94.920	00.711	87.870	00.711	90.280	00.711	89.850	00.711	90.730
31	00.701	99.580	00.701	91.670	00.701	94.600	00.701	93.860	00.701	94.930
32	00.691	105.260	00.691	95.570	00.691	99.200	00.691	98.030	00.691	99.510
33	00.681	110.200	00.681	100.000	00.681	104.400	00.681	102.360	00.681	104.240
34	00.671	115.990	00.671	104.950	00.671	109.560	00.671	107.080	00.671	109.390
35	00.660	123.280	00.660	110.310	00.660	116.190	00.660	112.460	00.660	115.560
36	00.650	129.820	00.650	115.440	00.650	122.210	00.650	117.810	00.650	121.320
37	00.640	137.110	00.640	121.660	00.640	128.860	00.640	123.700	00.640	127.830
38	00.630	145.150	00.630	127.670	00.630	136.350	00.630	129.820	00.630	134.750
39	00.620	153.710	00.620	134.960	00.620	144.180	00.620	136.460	00.620	142.330
40	00.610	163.590	00.610	141.920	00.610	152.660	00.610	143.550	00.610	150.430
41	00.599	175.380	00.599	151.030	00.599	163.260	00.599	152.550	00.599	160.560
42	00.589	186.730	00.589	159.840	00.589	173.980	00.589	161.440	00.589	170.500
43	00.579	200.460	00.579	169.590	00.579	185.770	00.579	170.880	00.579	181.670
44	00.569	215.340	00.569	180.210	00.569	199.180	00.569	181.820	00.569	194.140
45	00.559	232.520	00.559	191.450	00.559	213.200	00.559	193.280	00.559	207.610
46	00.549	251.280	00.549	205.620	00.549	230.870	00.549	206.780	00.549	223.640
47	00.538	274.540	00.538	222.310	00.538	251.010	00.538	222.860	00.538	242.680
48	00.528	300.000	00.528	239.480	00.528	272.130	00.528	240.030	00.528	262.910

Complete Part Load Vs. Deflection Report

06/04/2003

Percent Deflection	*----- Position 1 -----*		*----- Position 2 -----*		*----- Position 3 -----*		*----- Position 4 -----*		*----- Average -----*	
	Gap (mm)	Load (KPA)	Gap (mm)	Load (KPA)	Gap (mm)	Load (KPA)	Gap (mm)	Load (KPA)	Gap (mm)	Load (KPA)
49	00.518	331.380	00.518	260.390	00.518	298.410	00.518	260.110	00.518	287.570
50	00.508	364.580	00.508	282.610	00.508	325.180	00.508	281.510	00.508	313.470
51	00.498	406.110	00.498	309.380	00.498	359.750	00.498	306.970	00.498	345.550
52	00.488	450.550	00.488	337.800	00.488	399.640	00.488	338.080	00.488	381.520
53	00.478	374.510	00.478	445.170	00.478	370.230	00.478	396.640		
54	00.467	421.030	00.467	413.570	00.467	417.300				
55	00.457	469.310	00.457	462.840	00.457	466.080				

Appendix C

Listing of 115 Data Set with Complete Material Information

Listing of 115 Data Set with Complete Material Information

Number 1										Number 2									
#	Material	Resin Lot #	Catalyst #	Month/Year	Serial No	Resin Weight	Weight	Weight (g)	Final Part	Material	Resin Lot #	Catalyst #	Month/Year	Serial No	Resin Weight	Weight	Weight (g)	Final Part	Final Part
1	Silastic 386	HH0067	HH0073	I77	1018	38.0	1.9	30.3	Silastic 386	2	HH0075	K77	1031	38.0	1.9	31.0			
2	Silastic 386	7	HH0075	C78	1122	38.0	1.9	30.1	Silastic 386	7	HH0075	C78	1133	37.5	1.8	29.2			
3	Silastic 386	15	H01875	H78	1208	37.0	1.8	28.9	Silastic 386	13	H01875	F78	1238	37.0	1.8	29.0			
4	Silastic 386	H058072	HH0077	J78	1381	37.0	1.8	29.5	Silastic 386	20	H01875	H78	1336	37.0	1.8	29.1			
5	Silastic 386	H058072	HH0077	J78	1384	37.0	1.8	29.8	Silastic 386	H058072	HH0077	J78	1390	37.0	1.8	29.8			
6	Silastic 386	16	HH0077	I78	1356	37.0	1.8	29.6	Silastic 386	16	H01875	H78	1297	37.0	1.8	27.7			
7	Silastic 386	H058072	HH0077	L78	1458	35.0	1.8	27.9	Silastic 386	H058072	HH0077	L78	1517	34.0	1.7	??			
8	Silastic 386	H058072	HH0077	A79	1701	32.0	1.6	25.8	Silastic 386	H058072	HH0077	A79	1621	33.0	1.6	26.8			
9	Silastic 386	H058072	HH0077	A79	1676	32.0	1.6	26.1	Silastic 386	H058072	HH0077	A79	1601	33.0	1.6	26.7			
10	Silastic 386	H058072	HH0077	A79	1762	33.0	1.6	26.9	Silastic 386	H058072	HH0077	B79	1711	33.0	1.6	26.3			
11	Silastic 386	H088074	HH0077	C79	2011	33.0	1.6	26.8	Silastic 386	H058072	HH0077	A79	1650	32.0	1.6	26.0			
12	Silastic 386	H058072	HH0077	B79	1946	33.0	1.6	26.5	Silastic 386	H88074	HH0077	B79	1865	33.0	1.6	26.3			
13	Silastic 386	H088074	HH0077	C79	2156	33.0	1.6	27.0	Silastic 386	H088074	HH0077	C79	2096	33.0	1.6	26.8			
14	Silastic 386	H088074	HH0077	C79	2074	33.0	1.6	26.7	Silastic 386	H058072	HH0077	B79	1707	33.0	1.6	25.9			
15	Silastic 386	H088074	HH0077	C79	2116	33.0	1.6	27.0	Silastic 386	H088074	HH0077	C79	1907	33.0	1.6	26.9			
16	Silastic 386	H088074	HH0077	C79	2199	33.0	1.6	27.0	Silastic 386	H088074	HH0077	C79	1932	33.0	1.6	26.7			
17	Silastic 386	H059004	H118081	I79	2548	33.0	1.6	26.5	Silastic 386	H059004	H118081	H79	2296	33.0	1.6	26.9			
18	Silastic 386	H059004	H118081	I79	2566	33.0	1.6	28.5	Silastic 386	H089006	H039081	J79	2598	33.0	1.6	26.7			
19	Silastic 386	H059004	H118081	I79	2551	33.0	1.6	28.1	Silastic 386	H088074	HH0077	C79	2160	33.0	1.6	26.7			
20	Silastic 386	H088074	HH0077	C79	2149	33.0	1.6	26.8	Silastic 386	H059004	H118081	H79	2299	33.0	1.6	27.1			
21	Silastic 386	H059004	H118081	H79	2400	33.0	1.6	27.1	Silastic 386	H088074	HH0077	C79	2187	33.0	1.6	27.0			
22	Silastic 386	H089006	H039081	L79	2726	33.0	1.6	27.1	Silastic 386	H089006	H039081	J79	2581	33.0	1.6	27.0			
23	Silastic 386	H089006	H039081	L79	2684	33.0	1.6	26.3	Silastic 386	H089006	H039081	A80	2638	33.0	1.6	26.7			
24	Silastic 386	H089006	H039081	A80	2745	33.0	1.6	26.5	Silastic 386	H089006	H039081	A80	2712	33.0	1.6	26.4			
25	Silastic 386	H089006	H039081	A80	2765	33.0	1.6	27.0	Silastic 386	H089006	H039081	A80	2679	33.0	1.6	26.2			
26	Silastic 386	H089006	H039081	A80	2861	32.0	1.6	25.9	Silastic 386	H089006	H039081	A80	2644	33.0	1.6	26.2			
27	Silastic 386	H089006	H039081	A80	2906	33.0	1.6	26.1	Silastic 386	H089006	H039081	A80	2632	33.0	1.6	26.5			
28	Silastic 386	H0109007	H019080	C80	3045	33.0	1.6	26.3	Silastic 386	H0109007	H019080	B80	3042	33.0	1.6	27.0			
29	Silastic 386	H089006	H039081	A80	2870	33.0	1.6	26.8	Silastic 386	H0109007	H019080	B80	2926	33.0	1.6	26.6			
30	Silastic 386	H0109007	H019080	B80	3027	33.0	1.6	27.2	Silastic 386	H089006	H039081	A80	2728	33.0	1.6	26.8			
31	Silastic 386	H0109007	H019080	C80	3362	33.0	1.6	26.7	Silastic 386	H0109007	H019080	B80	3130	33.0	1.6	26.6			
32	Silastic 386	H0109007	H019080	C80	3048	33.0	1.6	26.1	Silastic 386	H089006	H039081	A80	2814	33.0	1.6	27.0			
33	S-5370	H109008	H019080	E80	3510	33.0	1.6	27.1	S-5370	H0109007	H019080	C80	3351	33.0	1.6	26.8			
34	S-5370	H0109007	H019080	C80	3148	33.0	1.6	26.9	S-5370	H0109007	H019080	C80	3418	33.0	1.6	26.9			
35	S-5370	H0109007	H019080	C80	3157	33.0	1.6	25.8	S-5370	H0109007	H019080	D80	3641	33.0	1.6	27.0			
36	S-5370	H0109007	H019080	C80	3259	33.0	1.6	26.3	S-5370	H0109007	H019080	B80	3119	33.0	1.6	26.3			
37	S-5370	H0109007	H019080	C80	3170	33.0	1.6	26.7	S-5370	H0109007	H019080	D80	3648	33.0	1.6	27.1			
38	S-5370	H0109007	H019080	C80	3325	33.0	1.6	26.8	S-5370	H0109007	H019080	C80	3230	33.0	1.6	26.7			
39	S-5370	H0109008	H019080	D80	3448	33.0	1.6	26.4	S-5370	H0109007	H019080	C80	3566	33.0	1.6	26.4			
40	S-5370	H0109007	H019080	D40	3440	33.0	1.6	26.4	S-5370	H109008	H019080	D80	3786	33.0	1.6	26.7			
41	S-5370	H109008	H019080	D40	3475	33.0	1.6	26.5	S-5370	H0109007	H019080	C80	3542	33.0	1.6	26.7			
42	S-5370	H0109007	H019080	C80	3201	33.0	1.6	26.3	S-5370	H0109007	H019080	C80	3524	33.0	1.6	26.7			
43	S-5370	H0109007	H019080	C80	3200	33.0	1.6	26.0	S-5370	H109008	H019080	D80	3832	33.0	1.6	26.7			
44	S-5370	H109008	H019080	E80	3509	33.0	1.6	27.0	S-5370	H0109007	H019080	D80	3696	33.0	1.6	27.0			
45	S-5370	H109008	H019080	E80	3613	33.0	1.6	27.2	S-5370	H0109007	H019080	D80	3715	33.0	1.6	27.3			
46	S-5370	H109008	H019080	E80	3647	33.0	1.6	27.1	S-5370	H0109007	H019080	D80	3693	33.0	1.6	27.0			
47	S-5370	H020011	H109084	B81	3777	32.0	1.6	25.9	S-5370	H109008	H019080	E80	3884	33.0	1.6	26.6			
48	S-5370	H020011	H109084	B81	3894	32.0	1.6	26.0	S-5370	H109008	H019080	E80	4029	33.0	1.6	26.2			
49	S-5370	H020011	H109081	B81	3763	32.0	1.6	26.2	S-5370	H109008	H019080	E80	3911	33.0	1.6	26.9			
50	S-5370	H109008	H019080	E80	3634	33.0	1.6	26.9	S-5370	H0109007	H019080	D80	3682	33.0	1.6	26.8			
51	S-5370	H020011	H109084	B81	3806	32.0	1.6	26.0	S-5370	H109008	H019080	E80	4008	33.0	1.6	26.9			
52	S-5370	H020011	H109084	C81	3946	32.0	1.6	26.2	S-5370	H109008	H019080	E80	4069	33.0	1.6	26.5			
53	S-5370	H020011	H109084	G81	4185	32.0	1.6	26.1	S-5370	H020011	H109084	C81	4241	32.0	1.6	25.7			
54	S-5370	H020011	H109084	B81	3929	32.0	1.6	25.8	S-5370	H109008	H019080	E80	4134	33.0	1.6	26.3			
55	S-5370	H020011	H109084	G81	4126	32.0	1.6	25.9	S-5370	H020011	H109084	C81	4246	32.0	1.6	25.2			
56	S-5370	H020011	H109084	F81	4049	32.0	1.6	26.0	S-5370	H020011	H109084	C81	4279	32.0	1.6	25.7			
57	S-5370	H020011	H109084	F81	4008	32.0	1.6	25.7	S-5370	H020011	H109084	C81	4185	32.0	1.6	26.3			
58	S-5370	H020011	H109084	F81	3994	32.0	1.6	25.6	S-5370	H020011	H109084	C81	4174	32.0	1.6	26.1			
59	S-5370	H020011	H109084	G81	4118	32.0	1.6	26.2	S-5370	H020011	H109084	C81	4235	32.0	1.6	26.1			
60	S-5370	H020011	H109084	G81	4230	32.0	1.6	26.2	S-5370	H020011	H109084	D81	4436	32.0	1.6	25.4			
61	S-5370	H020011	H109084	G81	4121	32.0	1.6	26.3	S-5370	H020011	H109084	D81	4461	32.0	1.6	25.4			
62	S-5370	H020011	H109084	H81	4338	32.0	1.6	26.5	S-5370	HH111022	HH101093	F82	4626	33.0	1.6	26.7			
63	S-5370	H020011	H109084	G81	4260	32.0	1.6	26.3	S-5370	H119010	H109084	E81	4588	33.0	1.6	26.6			
64	S-5370	H020011	H109084	G81	4272	32.0	1.6	26.2	S-5370	H119010	H109084	E81	4610	33.0	1.6	25.8			
65	S-5370	H021016	H090088	H81	4487	32.0	1.6	25.9	S-5370	H020011	H109084	D81	4408	32.0	1.6	25.3			
66	S-5370	H021016	H090088	H81	4478	32.0	1.6	25.9	S-5370	HH111022	HH101093	F82	4739	33.0	1.6	26.5			
67	S-5370	H020011	H109084	H81	4346	32.0	1.6	26.3	S-5370	HH111022	HH101093	F82	4729	33.0	1.6	26.7			
68	S-5370	H021016	H090088	H81	4497	32.0	1.6	26.6	S-5370	HH111022	HH101093	F82	4693	33.0	1.6	26.7			
69	S-5370	H021016	H090088	H81	4535	32.0	1.6	25.8	S-5370	HH111022	HH101093	F82	4686	33.0	1.6	26.9			
70	S-5370	H020011	H109084	H81	4362	32.0	1.6												

Listing of 115 Data Set with Complete Material Information

Number 1										Number 2									
#	Material	Resin Lot #	Catalyst #	Month/Year	Serial No.	Resin Weight	Weight	Weight (g)	Final Part	Material	Resin Lot #	Catalyst #	Month/Year	Serial No.	Resin Weight	Weight	Weight (g)	Final Part	
81	S-5370	HH082029	HH082099	H83	5300	33.0	1.6	27.1	S-5370	HH082029	HH082099	G83	5317	33.0	1.6	26.8			
82	S-5370	HH043032	HH102101	I83	5363	33.0	1.6	27.3	S-5370	HH082029	HH082099	G83	5297	33.0	1.6	27.6			
83	S-5370	HH082029	HH082099	H83	5276	33.0	1.6	27.2	S-5370	HH082029	HH082099	H83	5381	33.0	1.6	27.4			
84	S-5370	HH043032	HH102101	I83	5367	33.0	1.6	27.1	S-5370	HH082029	HH082099	G83	5293	33.0	1.6	27.3			
85	S-5370	HH043032	HH102101	I83	5317	33.0	1.6	26.8	S-5370	HH082029	HH082099	H83	5377	33.0	1.6	26.8			
86	S-5370	HH082029	HH082099	H83	5269	33.0	1.6	27.0	S-5370	HH082029	HH082099	H83	5372	33.0	1.6	26.9			
87	S-5370	HH043032	HH102101	I83	5428	33.0	1.6	27.1	S-5370	HH082029	HH082099	H83	5401	33.0	1.6	27.3			
88	S-5370	HH082029	HH082099	H83	5267	33.0	1.6	27.2	S-5370	HH082029	HH082099	H83	5358	33.0	1.6	26.7			
89	S-5370	HH043032	HH102101	I83	5316	33.0	1.6	27.2	S-5370	HH043032	HH102101	I83	5432	33.0	1.6	26.2			
90	S-5370	HH043032	HH102101	I83	5345	33.0	1.6	26.7	S-5370	HH082029	HH082099	H83	5387	33.0	1.6	27.1			
91	S-5370	HH043032	HH102101	A84	5590	33.0	1.6	26.8	S-5370	HH043032	HH102101	L83	5494	33.0	1.6	27.2			
92	S-5370	HH043032	HH102101	A84	5435	33.0	1.6	27.3	S-5370	HH043032	HH102101	L83	5523	33.0	1.6	27.2			
93	S-5370	HH013030	HH052097	F84	5665	33.0	1.6	27.4	S-5370	HH043032	HH102101	A84	5670	33.0	1.6	26.8			
94	S-5370	HH013030	HH052097	F84	5680	33.0	1.6	27.2	S-5370	HH043032	HH102101	L83	5558	33.0	1.6	27.2			
95	S-5370	HH013030	HH052097	F84	5628	33.0	1.6	27.0	S-5370	HH043032	HH102101	A84	5718	33.0	1.6	26.4			
96	S-5370	HH013030	HH052097	F84	5750	33.0	1.6	27.2	S-5370	HH072028	HH052097	J84	5929	33.0	1.6	26.8			
97	S-5370	HH064040	HH064105	D85	6161	33.0	1.6	27.0	S-5370	HH072028	HH052097	J84	5899	33.0	1.6	26.9			
98	S-5370	HH072028	HH052097	J84	5800	33.0	1.6	26.4	S-5370	HH072028	HH052097	J84	5871	33.0	1.6	27.0			
99	S-5370	HH023031	HH102101	L84	5921	33.0	1.6	27.1	S-5370	HH072028	HH052097	J84	5878	33.0	1.6	27.0			
100	S-5370	HH072028	HH052097	K84	5886	33.0	1.6	27.0	S-5370	HH072028	HH052097	H84	5840	33.0	1.6	27.1			
101	S-5370	HH023031	HH102101	L84	5914	33.0	1.6	26.9	S-5370	HH023031	HH102101	K84	5975	33.0	1.6	27.0			
102	S-5370	HH023031	HH102101	L84	5975	33.0	1.6	27.2	S-5370	HH023031	HH102101	K84	5994	33.0	1.6	27.2			
103	S-5370	HH023031	HH102101	L84	5981	33.0	1.6	27.3	S-5370	HH064040	HH064105	C85	6034	33.0	1.6	27.1			
104	S-5370	HH023031	HH102101	L84	6026	33.0	1.6	27.0	S-5370	HH023031	HH102101	K84	5996	33.0	1.6	27.2			
105	S-5370	HH064040	HH064105	C85	6081	33.0	1.6	26.9	S-5370	HH064040	HH064105	C85	6129	33.0	1.6	26.7			
106	S-5370	HH064040	HH064105	C85	6106	33.0	1.6	26.7	S-5370	HH064040	HH064105	C85	6079	33.0	1.6	26.8			
107	S-5370	HH064040	HH064105	D85	6177	33.0	1.6	26.7	S-5370	HH064040	HH064105	C85	6207	33.0	1.6	26.8			
108	S-5370	HH064040	HH064105	C85	6115	33.0	1.6	26.9	S-5370	HH064040	HH064105	C85	6089	33.0	1.6	26.4			
109	S-5370	HH064040	HH064105	C85	6095	33.0	1.6	26.7	S-5370	HH064040	HH064105	C85	6104	33.0	1.6	27.0			
110	S-5370	HH094042	HH104106	K85	6470	33.0	1.6	26.7	S-5370	HH064040	HH064105	K85	6487	33.0	1.6	26.9			
111	S-5370	HH094042	HH104106	K85	6421	33.0	1.6	26.3	S-5370	HH064040	HH064105	K85	6471	33.0	1.6	27.3			
112	S-5370	HH094042	HH104106	K85	6527	33.0	1.6	27.0	S-5370	HH094042	HH094106	K85	6491	33.0	1.6	27.2			
113	S-5370	HH094042	HH104106	B86	6615	33.0	1.6	26.2	S-5370	HH094042	HH094106	A86	6629	33.0	1.6	26.7			
114	S-5370	HH025045	HH035109	C86	6671	32.0	1.6	25.9	S-5370	HH025045	HH035109	C86	6672	33.0	1.6	26.6			
115	S-5370	HH094042	HH094106	B86	6594	33.0	1.6	27.0	S-5370	HH025045	HH035109	C86	6693	33.0	1.6	26.9			

Appendix D

**Individual Part Information for the
Cinderella Mold Evaluation**

KCP and LANL Cinderella Mold Evaluation 12/16/04

	5/21/04 to 12/09/04	37.0-44.5	1.9 to 2.8	5-7%	29.91-35.80	7 Lots	Shrinkage			
S/N #	Date Molded	Resin Pour Weight (g)	Catalyst Weight (g)	Catalyst % Target	Part Weight (g)	Material Lot LK3626	98.0%	98.5%	99.0%	100.0%
156	5/21/04	43.5	2.6	6.0	34.52	0225041				
159	5/21/04	44.5	2.7	6.0	35.61	0225041				
310	9/8/04	42.0	2.5	6.0	34.67	0716041				
312	9/9/04	42.0	2.5	6.0	34.34	0716041				
313	9/9/04	42.0	2.5	6.0	34.05	0716041				
315	9/27/04	42.0	2.5	6.0	34.86	0903041				
316	9/27/04	42.0	2.5	6.0	34.79	0903041				
317	9/27/04	42.0	2.5	6.0	34.93	0903041				
318	9/27/04	42.0	2.5	6.0	34.77	0903041				
319	9/29/04	42.0	2.5	6.0	34.95	0090341				

JLZ [Date]

KCP and LANL Cinderella Mold Evaluation 12/16/04

	5/21/04 to 12/09/04	37.0-44.5	1.9 to 2.8	5-7%	29.91-35.80	7 Lots	Shrinkage			
S/N #	Date Molded	Resin Pour Weight (g)	Catalyst Weight (g)	Catalyst % Target	Part Weight (g)	Material Lot LK3626	98.0%	98.5%	99.0%	100.0%
320	9/29/04	42.0	2.5	6.0	34.88	0903041				
321	9/29/04	42.0	2.5	6.0	35.08	0903041				
322	9/29/04	42.0	2.5	6.0	34.71	0903041				
323	9/30/04	42.5	2.1	5.0	34.82	0903041				
325	9/30/04	42.5	2.1	5.0	34.79	0903041				
326	9/30/04	42.5	2.1	5.0	34.05	0903041				
329	10/1/04	42.5	2.1	5.0	35.14	0903041				
330	10/1/04	42.5	2.1	5.0	34.57	0903041				
331	10/1/04	42.5	2.1	5.0	34.50	0903041				
334	10/13/04	42.5	2.1	5.0	34.31	0903041				

JLZ [Date]

KCP and LANL Cinderella Mold Evaluation 12/16/04

	5/21/04 to 12/09/04	37.0-44.5	1.9 to 2.8	5-7%	29.91-35.80	7 Lots	Shrinkage			
S/N #	Date Molded	Resin Pour Weight (g)	Catalyst Weight (g)	Catalyst % Target	Part Weight (g)	Material Lot LK3626	98.0%	98.5%	99.0%	100.0%
335	10/13/04	42.5	2.1	5.0	34.48	0903041				
336	10/13/04	42.5	2.1	5.0	34.89	0903041				
337	10/13/04	42.5	2.1	5.0	35.20	0903041				
338	10/20/04	37.0	2.2	6.0	30.00	0928041				
339	10/20/04	37.0	2.2	6.0	30.56	0928041				
340	10/20/04	37.0	2.2	6.0	30.02	0928041				
341	10/21/04	37.0	2.2	6.0	29.91	0928041				
342	10/21/04	37.5	2.3	6.0	30.50	0928041				
344	10/21/04	37.5	2.3	6.0	30.33	0928041				
345	10/21/04	37.5	2.3	6.0	30.25	0928041				

JLZ [Date]

KCP and LANL Cinderella Mold Evaluation 12/16/04

	5/21/04 to 12/09/04	37.0-44.5	1.9 to 2.8	5-7%	29.91-35.80	7 Lots	Shrinkage			
S/N #	Date Molded	Resin Pour Weight (g)	Catalyst Weight (g)	Catalyst % Target	Part Weight (g)	Material Lot LK3626	98.0%	98.5%	99.0%	100.0%
346	10/22/04	38.0	2.3	6.0	30.67	0928041				
347	10/22/04	38.0	2.3	6.0	30.49	0928041				
348	10/22/04	38.0	2.3	6.0	30.78	0928041				
349	10/22/04	38.0	2.4	6.0	30.85	0928041				
350	10/25/04	38.5	2.3	6.0	31.15	0928041				
351	10/25/04	38.5	2.3	6.0	31.59	0928041				
352	10/25/04	38.5	2.3	6.0	31.31	0928041				
353	10/25/04	38.5	2.3	6.0	31.24	0928041				
354	10/26/04	39.0	2.3	6.0	31.90	0928041				
355	10/26/04	39.0	2.3	6.0	31.84	0928041				

JLZ [Date]

KCP and LANL Cinderella Mold Evaluation 12/16/04

	5/21/04 to 12/09/04	37.0-44.5	1.9 to 2.8	5-7%	29.91-35.80	7 Lots	Shrinkage			
S/N #	Date Molded	Resin Pour Weight (g)	Catalyst Weight (g)	Catalyst % Target	Part Weight (g)	Material Lot LK3626	98.0%	98.5%	99.0%	100.0%
357	10/26/04	39.0	2.3	6.0	31.88	0928041				
358	10/27/04	39.5	2.4	6.0	32.72	0928041				
359	10/27/04	39.5	2.4	6.0	32.62	0928041				
360	10/27/04	39.5	2.4	6.0	32.26	0928041				
361	10/27/04	39.5	2.4	6.0	32.55	0928041				
362	10/28/04	40.0	2.4	6.0	32.47	0928041				
363	10/28/04	40.0	2.4	6.0	32.75	0928041				
364	10/28/04	40.0	2.4	6.0	32.84	0928041				
365	10/28/04	40.0	2.4	6.0	32.85	0928041				
367	10/29/04	40.5	2.4	6.0	33.86	0928041				

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KCP and LANL Cinderella Mold Evaluation 12/16/04

	5/21/04 to 12/09/04	37.0-44.5	1.9 to 2.8	5-7%	29.91-35.80	7 Lots	Shrinkage			
S/N #	Date Molded	Resin Pour Weight (g)	Catalyst Weight (g)	Catalyst % Target	Part Weight (g)	Material Lot LK3626	98.0%	98.5%	99.0%	100.0%
369	10/29/04	40.5	2.4	6.0	33.41	0928041				
370	11/1/04	41.0	2.5	6.0	33.36	0928041				
371	11/1/04	41.0	2.5	6.0	33.36	0928041				
372	11/1/04	41.0	2.5	6.0	33.38	1022041				
373	11/1/04	41.0	2.5	6.0	33.21	1022041				
374	11/4/04	41.5	2.5	6.0	33.30	1022041				
375	11/4/04	41.5	2.6	6.0	34.16	1022041				
376	11/4/04	41.5	2.5	6.0	34.00	1022041				
377	11/4/04	41.5	2.5	6.0	34.65	1022041				
378	11/29/04	39.0	2.0	5.0	31.35	1029041				

JLZ [Date]

KCP and LANL Cinderella Mold Evaluation 12/16/04

	5/21/04 to 12/09/04	37.0-44.5	1.9 to 2.8	5-7%	29.91-35.80	7 Lots	Shrinkage			
S/N #	Date Molded	Resin Pour Weight (g)	Catalyst Weight (g)	Catalyst % Target	Part Weight (g)	Material Lot LK3626	98.0%	98.5%	99.0%	100.0%
379	11/29/04	39.0	1.9	5.0	31.59	1029041				
381	11/29/04	39.0	1.9	5.0	32.70	1029041 Aged for 16 hr				
382	11/30/04	39.5	2.4	5.0	31.92	1029041				
383	11/30/04	39.5	2.0	5.0	31.73	1029041				
384	11/30/04	39.5	2.0	5.0	31.73	1029041				
385	11/30/04	39.5	2.0	5.0	31.76	1029041 Aged for 16 hr				
386	12/1/04	40.0	2.0	5.0	32.54	1029041				
387	12/1/04	40.0	2.2	5.0	32.92	1029041				
388	12/1/04	40.0	2.0	5.0	32.73	1029041				
389	12/1/04	40.0	2.0	5.0	32.84	1029041				

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KCP and LANL Cinderella Mold Evaluation 12/16/04

S/N #	Date Molded	Resin Pour Weight (g)	Catalyst Weight (g)	Catalyst % Target	Part Weight (g)	Material Lot LK3626	Shrinkage			
							98.0%	98.5%	99.0%	100.0%
390	12/1/04	40.0	2.0	5.0	32.80	1029041 Aged for 16 hr				
391	12/3/04	39.5	2.4	6.0	31.66	1029041				
392	12/3/04	39.5	2.4	6.0	31.80	1029041				
393	12/3/04	39.5	2.4	6.0	33.30	1029041 No Comp.				
394	12/3/04	39.5	2.8	7.0	32.16	1029041				
395	12/3/04	39.5	2.8	7.0	32.40	1029041				
396	12/9/04	36.0	2.2	6.0	35.70	1108041				
397	12/9/04	36.0	2.2	6.0	35.80	1108041 uncompressed				
398	12/9/04	36.0	2.2	6.0	35.80	HH125097				
399	12/9/04	36.0	2.2	6.0	35.70	HH125097 uncompressed				

JLZ [Date]

Appendix E

Statistical Analysis of the Cinderella Mold Evaluation

An analysis of the “KCP LANL Cinderella Mold Evaluation 12/16/04” dataset was performed to determine the appropriate material shrinkage for proper tooling manufacture. The information was entered into JMP (SAS Corporation, Version 5.1.1) and utilized the Distribution and Capability Analysis features of the software. Each shrinkage factor was analyzed, and the results are shown in Table 1. A concise interpretation of the results is as follows:

- A shrinkage factor of 100% generates “loose” parts 98.6% of the time.
- A shrinkage factor of 99% generates “loose” parts 90.8% of the time, “tight” parts 1.3% of the time, and on spec parts 7.9% of the time.
- A shrinkage factor of 98.5% generates “loose” parts 26% of the time, “tight” parts 1.3% of the time, and on spec parts 72.7% of the time.
- A shrinkage factor of 98% generates “loose” parts 1.3% of the time, “tight” parts 10.4% of the time, and on spec parts 88.3% of the time.

This analysis uses a target value of 0, an upper spec limit of 0.5, and a lower spec limit of -0.5.

Table 1: Results of Capability Analysis for Cinderella Test

	Shrinkage			
	98	98.5	99	100
Above Spec Limit of 0.5	10.4	1.3	1.3	0
At Spec (0+0.5)	88.3	72.7	7.9	1.4
Below Spec Limit of -0.5	1.3	26	90.8	98.6

Appendix F

KCP Power Point Slides Concluding the Cinderella Mold Evaluation

KCP/LANL Cinderella Mold Evaluation 12/16/04

- LANL indicated to KCP that the stress cushions provided to them were not fitting the next assembly.
- The part contour can only be determined by fitting it to a known shrinkage.
- Acrylic was the material of choice for the cavity to allow viewing the stress cushion “fit”.
- The next assembly contour was the basis for the acrylic cavities. Four cavities were machined to 2%, 1.5%, 1% and 0% reduction from the design requirement.

4/13/05

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KCP/LANL Cinderella Mold Evaluation 12/16/04

- 77 Stress Cushions Evaluated
 - Molded date range 5/21/04 – 12/9/04
- Resin Weight Ranged from 37.0 – 44.5 g
- Catalyst Ranged from 5 – 7 %
- 7 Lots LK3626 Evaluated
- Final Part Weight Ranged from 29.9 – 35.8 g

Statistically 3.5% Shrinkage was Optimum as Determined by LANL. This is based on 2% from the perform mold and 1.5% from the Cinderella mold.

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Appendix G

GPC Data Set for the 4003028 Polydimethylsiloxanediol - LMWS

LMWS GPC Results

Lot	Location	Date	Mn	Mw	AVG Mn	AVG Mw		
23808	1	9/13/01	1469	1787			Red	NuSil
23808	1	9/13/01	1469	1789			Blue	UCT
23808	1	9/13/01	1468	1784				
23808	2	9/13/01	1465	1777				
23808	2	9/13/01	1467	1783				
23808	2	9/13/01	1466	1777	1467	1783		
23808	1	7/9/03	1525	1851				
23808	1	7/9/03	1526	1855				
23808	1	7/9/03	1525	1852				
23808	2	7/9/03	1525	1852				
23808	2	7/9/03	1520	1846				
23808	2	7/9/03	1523	1850	1524	1851		
25236	1	7/9/03	1511	1837				
25236	1	7/9/03	1511	1836				
25236	1	7/9/03	1513	1844				
25236	2	7/9/03	1515	1841				
25236	2	7/9/03	1515	1845				
25236	2	7/9/03	1513	1842	1513	1841		
29227	1	7/9/03	1531	1861				
29227	1	7/9/03	1533	1848				
29227	1	7/9/03	1531	1851				
29227	2	7/9/03	1534	1861				
29227	2	7/9/03	1531	1853				
29227	2	7/9/03	1534	1859	1532	1856		
33189	1	8/16/04	1596	1844				
33189	1	8/16/04	1597	1845				
33189	1	8/16/04	1597	1849				
33189	2	8/16/04	1595	1842				
33189	2	8/16/04	1594	1846	1596	1845		
33420	1	8/8/04	1614	1861				
33420	1	8/8/04	1615	1873				
33420	1	8/8/04	1601	1840				
33420	2	8/8/04	1610	1864				
33420	2	8/8/04	1609	1859				
33420	2	8/8/04	1602	1850	1609	1858		
29227	1	8/18/04	1536	1820				
29227	1	8/18/04	1537	1819				
29227	1	8/18/04	1635	1902				
29227	2	8/18/04	1537	1822				
29227	2	8/18/04	1535	1816				
29227	2	8/18/04	1631	1893	1569	1845		
20250010	1	7/9/03	1648	2873				
20250010	1	7/9/03	1652	2821				
20250010	1	7/9/03	1673	2929				
20250010	2	7/9/03	1653	2875				
20250010	2	7/9/03	1647	2853				
20250010	2	7/9/03	1648	2820	1654	2862		
195390	1	9/13/01	1666	2895				

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LMWS GPC Results

195390	1	9/13/01	1646	2853		
195390	1	9/13/01	1656	2866		
195390	2	9/13/01	1664	2851		
195390	2	9/13/01	1653	2852		
195390	2	9/13/01	1668	2886	1659	2867

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Appendix H

GPC Data Set for the 4003029 Polydimethylsiloxanediol - LHMWS

LHMWS GPC Results

Lot	Location	Date	Mn	Mw	AVG Mn	AVG Mw		
21502	1	7/9/03	11640	30689			Red	NuSil
21502	1	7/9/03	11301	30592			Blue	UCT
21502	1	7/9/03	11239	30593				
21502	2	7/9/03	11702	30771				
21502	2	7/9/03	11775	30827				
21502	2	7/9/03	11757	30784	11569	30709		
21502	1	9/13/01	11325	30830				
21502	1	9/13/01	10263	30420				
21502	1	9/13/01	9769	30366				
21502	2	9/13/01	11144	30663				
21502	2	9/13/01	11348	30813				
21502	2	9/13/01	11310	30828	10860	30653		
27200	1	7/9/03	11610	27323				
27200	1	7/9/03	11674	27405				
27200	1	7/9/03	11763	27491				
27200	2	7/9/03	11499	27325				
27200	2	7/9/03	11904	27544				
27200	2	7/9/03	11536	27394	11664	27414		
28998	1	6/18/04	11870	27583				
28998	1	6/18/04	11678	27566				
28998	1	6/18/04	11512	27531				
28998	2	6/18/04	11025	27332				
28998	2	6/18/04	10997	27392				
28998	2	6/18/04	10983	27312	11344	27453		
29145	1	7/9/03	11928	28206				
29145	1	7/9/03	11869	28193				
29145	1	7/9/03	11402	27982				
29145	2	7/9/03	12243	28480				
29145	2	7/9/03	12205	28712				
29145	2	7/9/03	12014	28431	11944	28334		
33188	1	6/18/04	11301	25508				
33188	1	6/18/04	11509	25438				
33188	1	6/18/04	11467	25445				
33188	2	6/18/04	11981	25795				
33188	2	6/18/04	11779	25855				
33188	2	6/18/04	11582	25636	11603	25613		
33188	1	8/18/04	11721	28472				
33188	1	8/18/04	11956	28578				
33188	1	8/18/04	12330	28690				
33188	2	8/18/04	10564	27772				
33188	2	8/18/04	11086	27852				
33188	2	8/18/04	10580	27832	11373	28199		
33419	1	8/16/04	12340	29341				
33419	1	8/16/04	12439	29325				
33419	1	8/16/04	12569	29415				
33419	2	8/16/04	12399	29237				
33419	2	8/16/04	12204	29064				
33419	2	8/16/04	12573	29341	12421	29287		

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LHMWS GPC Results

2005018	1	9/13/01	10067	32175		
2005018	1	9/13/01	9920	32102		
2005018	1	9/13/01	9927	32132		
2005018	2	9/13/01	8578	31140		
2005018	2	9/13/01	8628	31345		
2005018	2	9/13/01	8754	31267	9312	31694
2005018	1	7/9/03	10289	32164		
2005018	1	7/9/03	9876	31983		
2005018	1	7/9/03	10306	32051		
2005018	2	7/9/03	10280	32175		
2005018	2	7/9/03	10177	32161		
2005018	2	7/9/03	10461	32307	10232	32140
20250030	1	7/9/03	8656	31373		
20250030	1	7/9/03	9052	31674		
20250030	1	7/9/03	8848	31499		
20250030	2	7/9/03	8998	31733		
20250030	2	7/9/03	9053	31948		
20250030	2	7/9/03	9083	31653	8948	31647

Appendix I

GPC Data Set for the 4003030 Polydimethylsiloxanediol - HMWS

HMWS GPC Results

Lot	Location	Date	Mn	Mw	AVG Mn	AVG Mw
23810	1	9/13/01	17983	50844		
23810	1	9/13/01	18268	50960		
23810	1	9/13/01	17258	50890		
23810	2	9/13/01	18088	50961		
23810	2	9/13/01	18191	51202		
23810	2	9/13/01	17638	50955	17904	50969
23810	1	9/13/01	16952	49531		
23810	1	9/13/01	17186	49526		
23810	1	9/13/01	17297	49629		
23810	2	9/13/01	15375	49375		
23810	2	9/13/01	16701	49154		
23810	2	9/13/01	17536	49634	16841	49475
23810	1	7/9/03	16696	49018		
23810	1	7/9/03	17905	49335		
23810	1	7/9/03	16995	49322		
23810	2	7/9/03	16486	48982		
23810	2	7/9/03	16696	49066		
23810	2	7/9/03	16414	48970	16865	49116
25716	1	7/9/03	21061	55061		
25716	1	7/9/03	20522	55050		
25716	1	7/9/03	20040	54891		
25716	2	7/9/03	21352	55185		
25716	2	7/9/03	21590	55241		
25716	2	7/9/03	20612	55062	20863	55082
29328	1	7/9/03	15026	55443		
29328	1	7/9/03	15407	55632		
29328	1	7/9/03	15178	55838		
29328	2	7/9/03	15545	55824		
29328	2	7/9/03	15543	55738		
29328	2	7/9/03	15492	55793	15365	49948
33190	1	6/18/04	18586	54521		
33190	1	6/18/04	18547	54496		
33190	1	6/18/04	19386	54622		
33190	2	6/18/04	18191	54432		
33190	2	6/18/04	18086	54270		
33190	2	6/18/04	18821	54511	18603	54475
33421	1	8/8/04	17669	52753		
33421	1	8/8/04	17250	52449		
33421	1	8/8/04	17709	52656		
33421	2	8/8/04	19139	54094		
33421	2	8/8/04	18141	53990		
33421	2	8/8/04	17414	53916	17887	53310
33190	1	8/18/04	13150	55147		
33190	1	8/18/04	13890	55206		
33190	2	8/18/04	13479	55612		
33190	2	8/18/04	13570	55639		
33190	2	8/18/04	13718	55369	13561	55395

Red NuSil
Blue UCT

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HMWS GPC Results

20150108	1	9/13/01	21019	55251		
20150108	1	9/13/01	20654	55435		
20150108	2	9/13/01	20129	55267		
20150108	2	9/13/01	21010	55555		
20150108	2	9/13/01	20534	55337	20669	55369
20150108	1	9/13/01	18275	54720		
20150108	1	9/13/01	19387	54816		
20150108	1	9/13/01	18622	54820		
20150108	2	9/13/01	18539	54581		
20150108	2	9/13/01	18626	54578		
20150108	2	9/13/01	18094	54586	18591	54684
20150108	1	7/9/03	14801	52689		
20150108	1	7/9/03	15160	53035		
20150108	1	7/9/03	15010	52859		
20150108	2	7/9/03	15094	53015		
20150108	2	7/9/03	14097	52123		
20150108	2	7/9/03	16516	53141	15113	52810
20250235	1	7/9/03	18057	58202		
20250235	1	7/9/03	18157	58224		
20250235	1	7/9/03	17400	58092		
20250235	2	7/9/03	18820	58638		
20250235	2	7/9/03	19442	58742		
20250235	2	7/9/03	19249	58712	18521	58435

Appendix J

GPC Data Set for the 4003031 Polymethylhydrogensiloxane - PMHS

PMHS GPC Results

Lot	Location	Date	Mn	Mw	AVG Mn	AVG Mw		
33417	1	8/13/04	3831	7519			Red	NuSil
33417	1	8/13/04	3857	7519			Blue	UCT
33417	1	8/13/04	3922	7530			Black	Dow Corning
33417	2	8/13/04	3982	7660				
33417	2	8/13/04	3870	7577				
33417	2	8/13/04	3867	7608	3888	7569		
33181	1	6/18/04	4069	7592				
33181	1	6/18/04	4080	7683				
33181	1	6/18/04	4049	7617				
33181	2	6/18/04	4890	7630				
33181	2	6/18/04	4971	7620				
33181	2	6/18/04	4964	7539	4504	7614		
29079	1	7/9/03	4231	8221				
29079	1	7/9/03	4188	8234				
29079	1	7/9/03	4200	8238				
29079	2	7/9/03	4045	8151				
29079	2	7/9/03	4044	8175				
29079	2	7/9/03	4015	8159	4121	8196		
24209	1	7/9/03	3888	7779				
24209	1	7/9/03	3836	7747				
24209	1	7/9/03	3836	7838				
24209	2	7/9/03	3833	7727				
24209	2	7/9/03	3843	7813				
24209	2	7/9/03	3895	7782	3855	7781		
23784	1	7/9/03	3583	8579				
23784	1	7/9/03	3548	8566				
23784	1	7/9/03	3652	8603				
23784	2	7/9/03	3737	8739				
23784	2	7/9/03	3697	8751				
23784	2	7/9/03	3725	8647	3657	8648		
23784	1	9/13/01	3683	9153				
23784	1	9/13/01	3602	9351				
23784	1	9/13/01	3623	9586				
23784	2	9/13/01	3609	9371				
23784	2	9/13/01	3600	9366				
23784	2	9/13/01	3607	9410	3621	9373		
33181	1	8/18/04	3688	7404				
33181	1	8/18/04	3752	7416				
33181	1	8/18/04	3771	7493				
33181	2	8/18/04	3733	7443				
33181	2	8/18/04	3708	7364				
33181	2	8/18/04	3713	7453	3728	7429		
24209	1	9/13/01	3759	9325				
24209	1	9/13/01	3725	9348				
24209	1	9/13/01	3770	9421				
24209	2	9/13/01	3644	9200				
24209	2	9/13/01	3660	9289				
24209	2	9/13/01	3620	9305	3696	9315		

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PMHS GPC Results

2005260	1	9/13/01	4986	16220		
2005260	1	9/13/01	4989	16018		
2005260	1	9/13/01	5001	16396		
2005260	2	9/13/01	5128	16631		
2005260	2	9/13/01	5199	16240		
2005260	2	9/13/01	5118	16159	5070	16277
2005260	1	7/9/03	5130	15662		
2005260	1	7/9/03	4932	16201		
2005260	1	7/9/03	5290	15740		
2005260	2	7/9/03	4668	15410		
2005260	2	7/9/03	4761	15346		
2005260	2	7/9/03	5086	15470	4978	15638
783471	1	10/6/04	4519	10317		
783471	1	10/6/04	4526	10393		
783471	1	10/6/04	4412	10352		
783471	2	10/6/04	4422	10464		
783471	2	10/6/04	4603	10275		
783471	2	10/6/04	4507	10264	4498	10344
953815	1	10/6/04	3512	7322		
953815	1	10/6/04	3550	7321		
953815	1	10/6/04	3523	7291		
953815	2	10/6/04	3278	7064		
953815	2	10/6/04	3293	7100		
953815	2	10/6/04	3294	7113	3408	7202