

Reliability Test Plan

Chomerics SOFT-SHIELD® 3500 3153

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Chomerics Approved Signatory:

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1.0 Introduction

1.1 Purpose

The purpose of the document is to explain the mechanical and environmental tests and the corresponding measurements that were performed on samples of Chomerics Soft Shield 3500 (part number 77-13-3153-00590).

1.2 Sample Set-Up Summary

The samples were tested in fixtures consisting of two aluminum panels screwed together with non-conductive screws and 0.062" washers used as compression stops. The electrical resistivity and compression set were measured for each sample. The measurements were taken initially and each week after 120 hour aging. The heat aged processes were steady temperature at 60°C; steady heat and humidity at 40°C and 90%RH; and temperature cycling. Measurements were taken on a set of five samples for each set of conditions.

Chomerics standard gaskets were tested with standard non-conductive psa.

2.0 Steady Temperature Test

2.1 Purpose

The purpose of the steady temperature test is to ensure the reliability of the samples after exposure to 60°C air temperatures.

2.2 Procedure

The samples were placed within a chamber at a temperature of 60°C. The fixtures were removed from the chamber after 120 hours and allowed to dwell at room temperature. The electrical resistivity measurements were carried out after 24 hours. The panels were then separated and the profile height was measured after a minimum of 0.5 hours. The top panels were then cleaned and put back together and placed back within the chamber for further aging.

3.0 Steady Temperature and Humidity Test

3.1 Purpose

The purpose of the steady temperature and humidity test is to ensure the reliability of the samples after exposure to a damp heat environment.

3.2 Procedure

The samples were placed within an environmental chamber at a temperature of 40 °C and 90% relative humidity. The fixtures were removed from the chamber after 120 hours and allowed to dwell at room temperature. The electrical resistivity measurements were carried out after 24 hours. The panels were then separated and the profile height was measured after a minimum of 0.5 hours. The top panels were then cleaned and put back together and placed back within the chamber for further aging.

4.0 Temperature Cycling

4.1 Purpose and Reference

The purpose of this test is to determine the reliability of the sample for use and storage under conditions of cycling temperature changes between -20°C and 60°C.

4.2 Procedure

The samples were placed within an environmental chamber and cycled between -20°C and 60°C with 3 hour dwell times and 1 hour ramp times for 3 cycles per day. The fixtures were removed from the chamber after 120 hours and allowed to dwell at room temperature. The electrical resistivity measurements were carried out after 24 hours. The panels were then separated and the profile height was measured after a minimum of 0.5 hours. The top panels were then cleaned and put back together and placed back within the chamber for further aging.

5.0 Test Procedure

5.1 Sample Preparation

The release liner on the 6" long gasket was removed and the sample was adhered to an aluminum panel. A second panel was placed on top of the sample and tightened all the way to the stops (~50% compressed). See Figure 1. All panels were first wiped with IPA. Fixtures were always placed in the chambers on a Wednesday, removed on the following Monday, and tested on Tuesday to ensure that the samples were aged for 120 hours and all testing could be performed on weekdays.

Figure 1.
Fixture with gasket

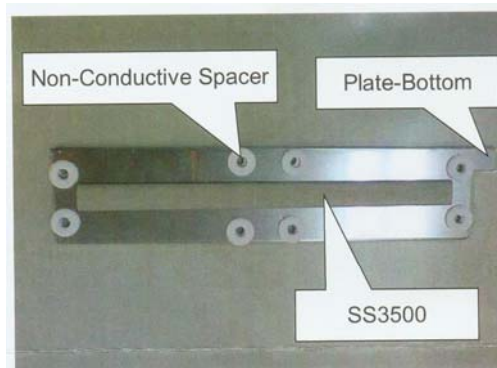
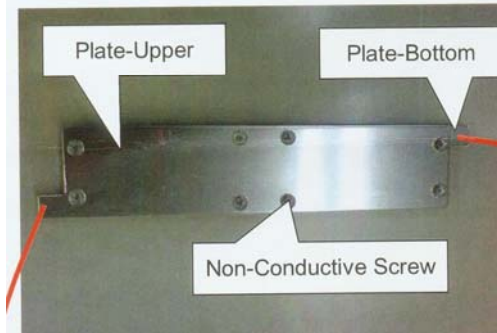


Figure 2.
Red tabs at ends for electrical leads



5.2 Electrical Resistivity

The samples were tested at room temperature with electrical clips on the end of each panel. See Figure 2. A reading was taken after 30 seconds.

5.3 Compression Set

Samples were tested at room temperature on a Texture Analyzer (from Texture Technologies) using a 25 gram trigger force and a 1" x 1" probe. The height measurement was taken at the center of the profile each time (by centering the probe over the holes in the panel.) See Figure 3 for set-up.

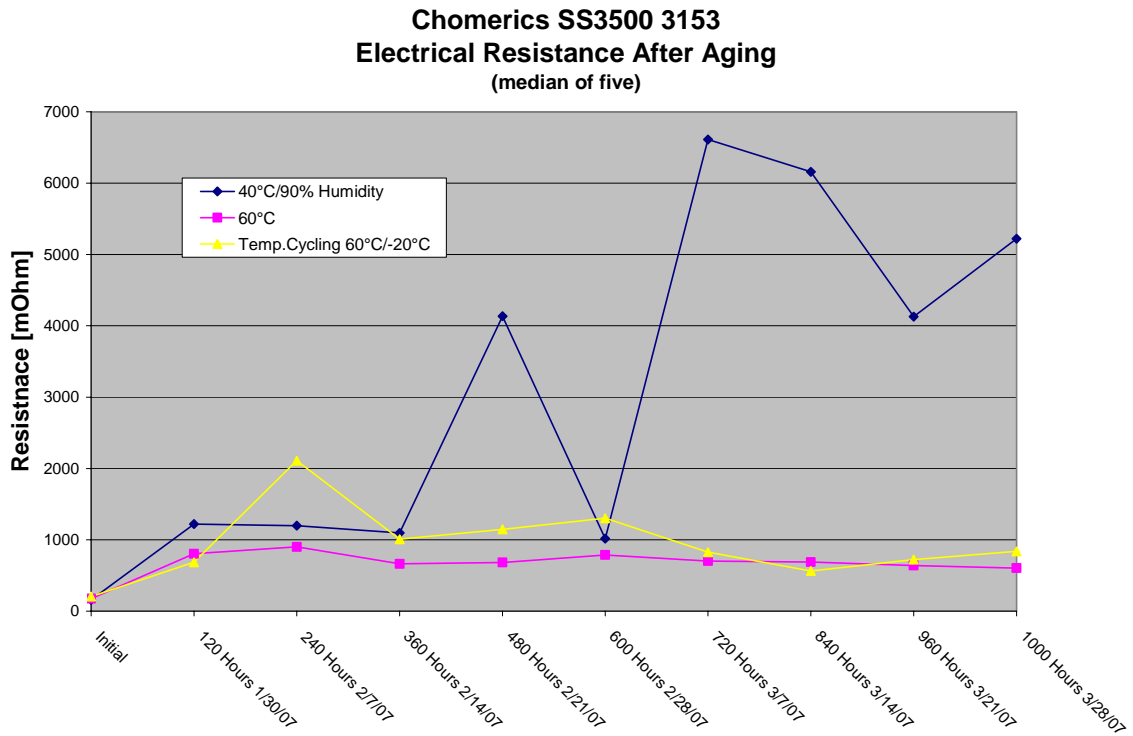
Figure 3.
Compression Set Measurement



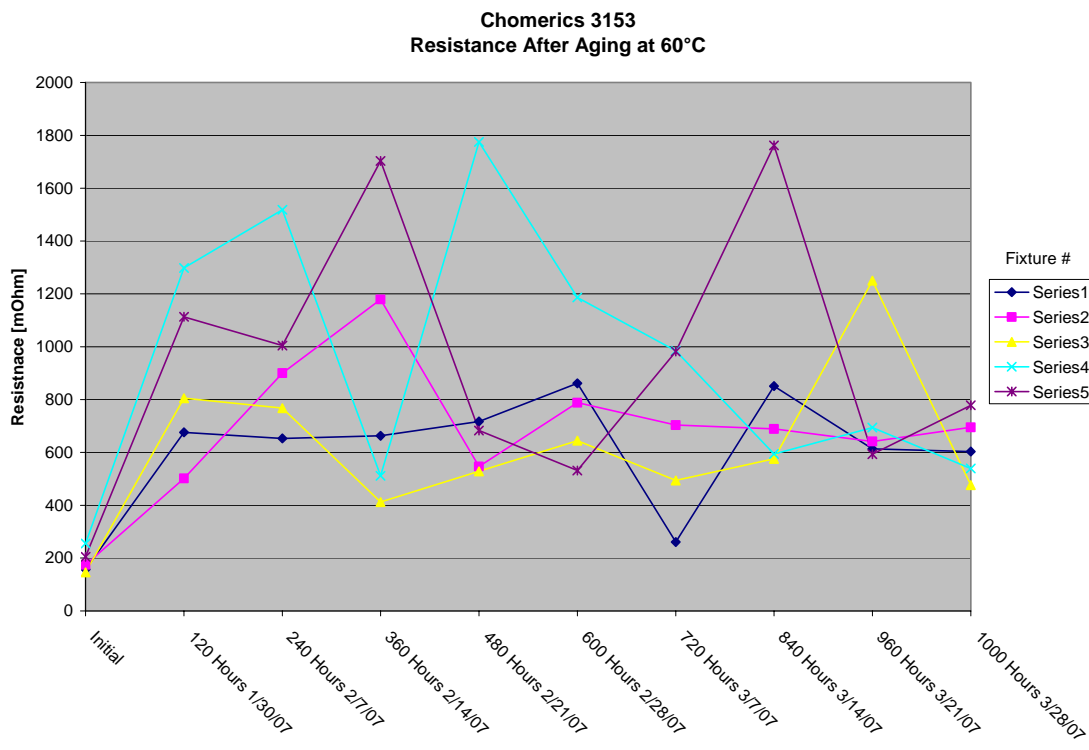
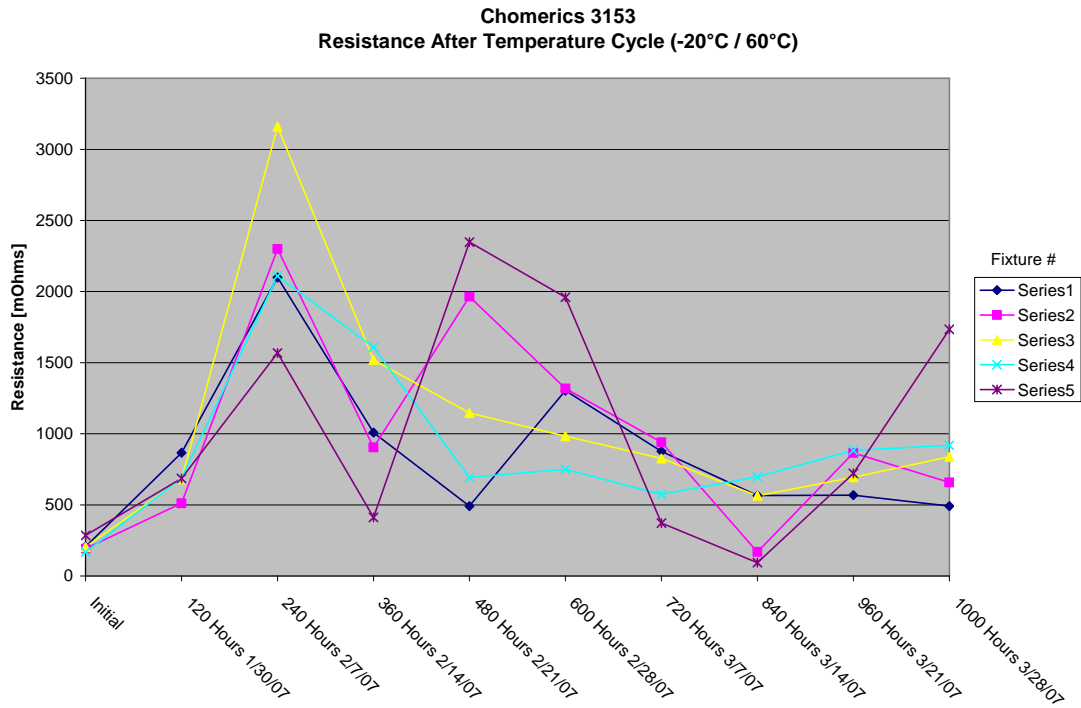
6.0 Results

6.1 Electrical Resistivity

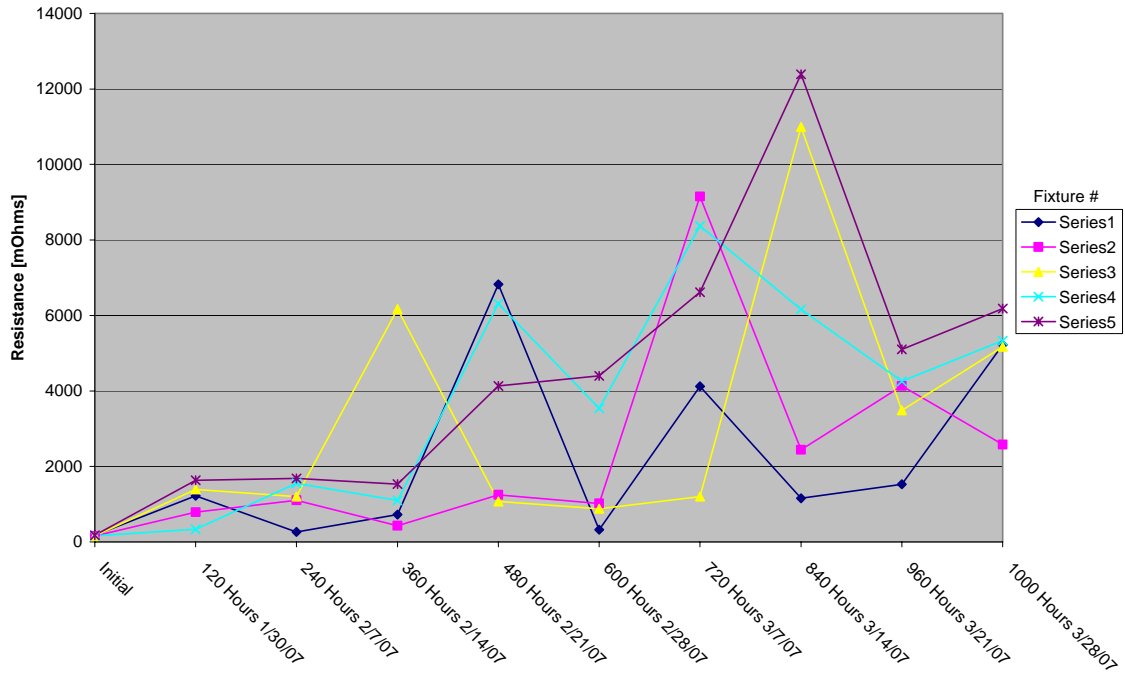
6.1.1 Median Data



6.1.2 All Data



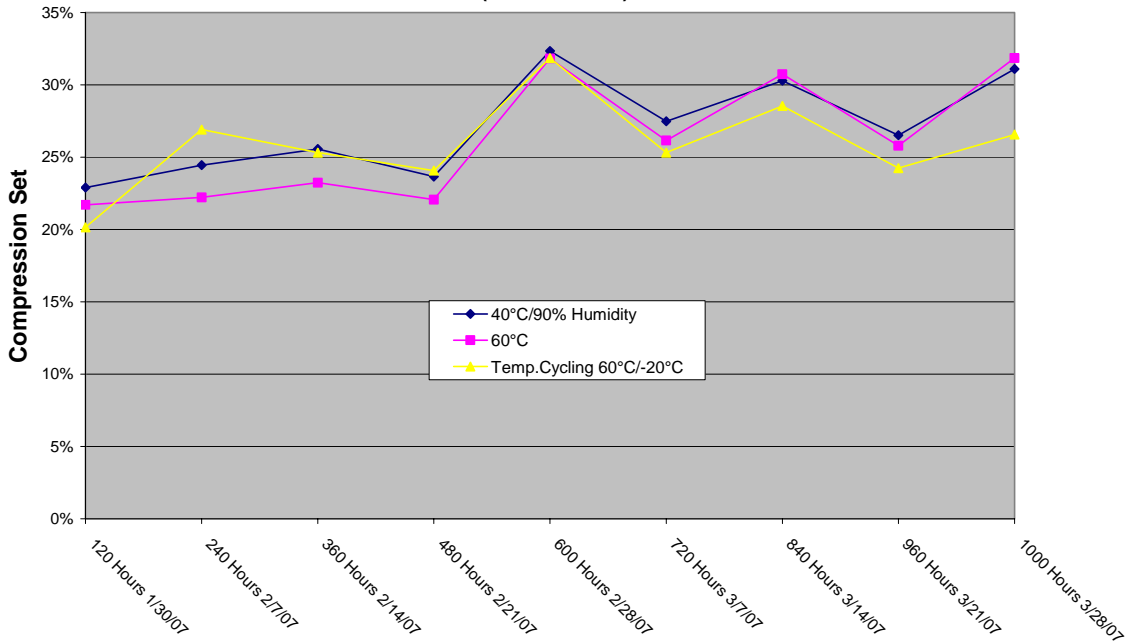
Chomerics 3153
Resistance After Aging at 40°C/90%



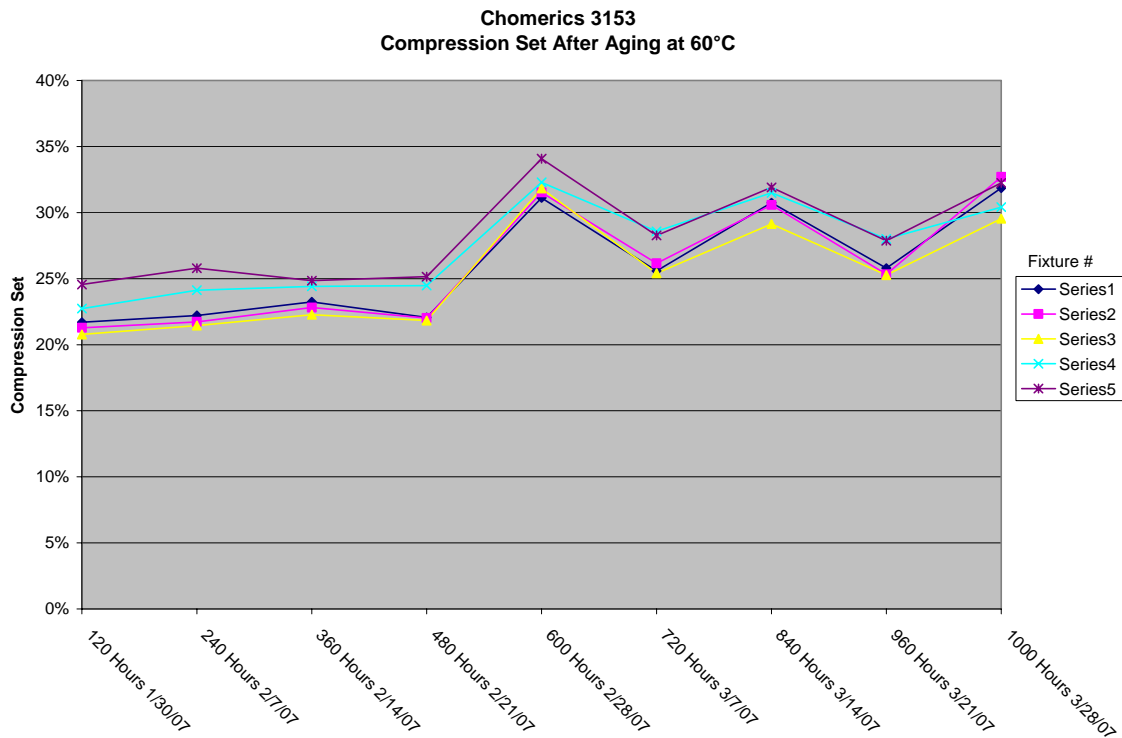
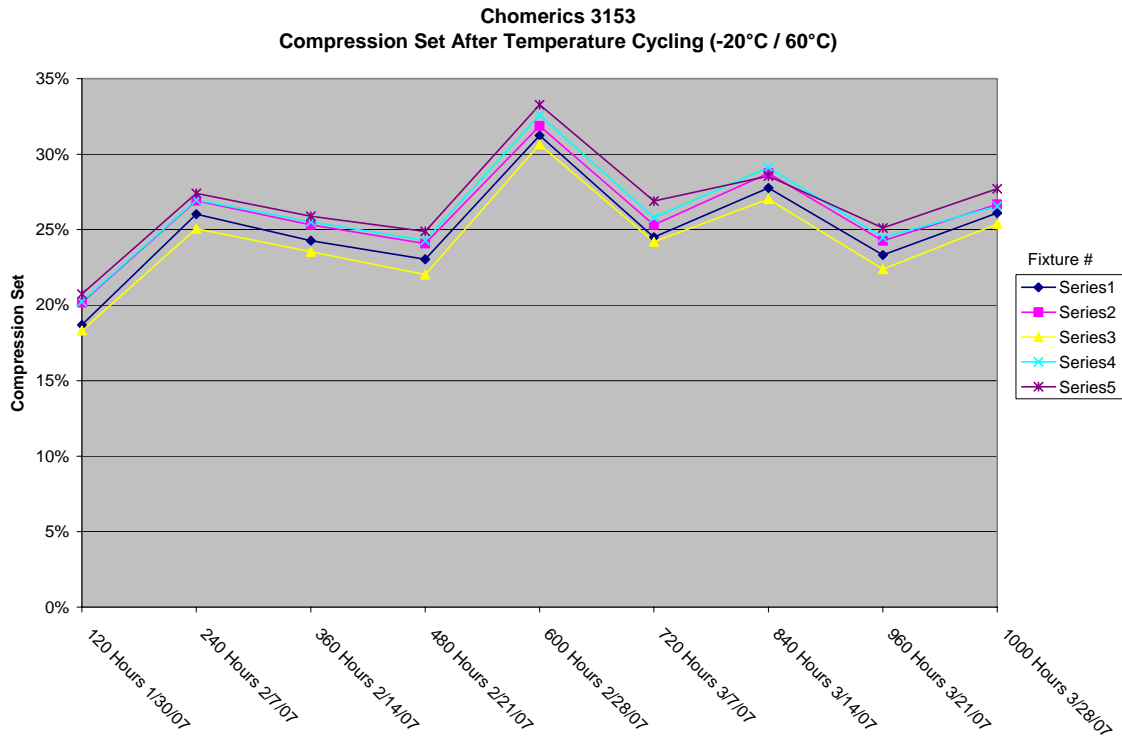
6.2 Compression Set

6.2.1 Median Data

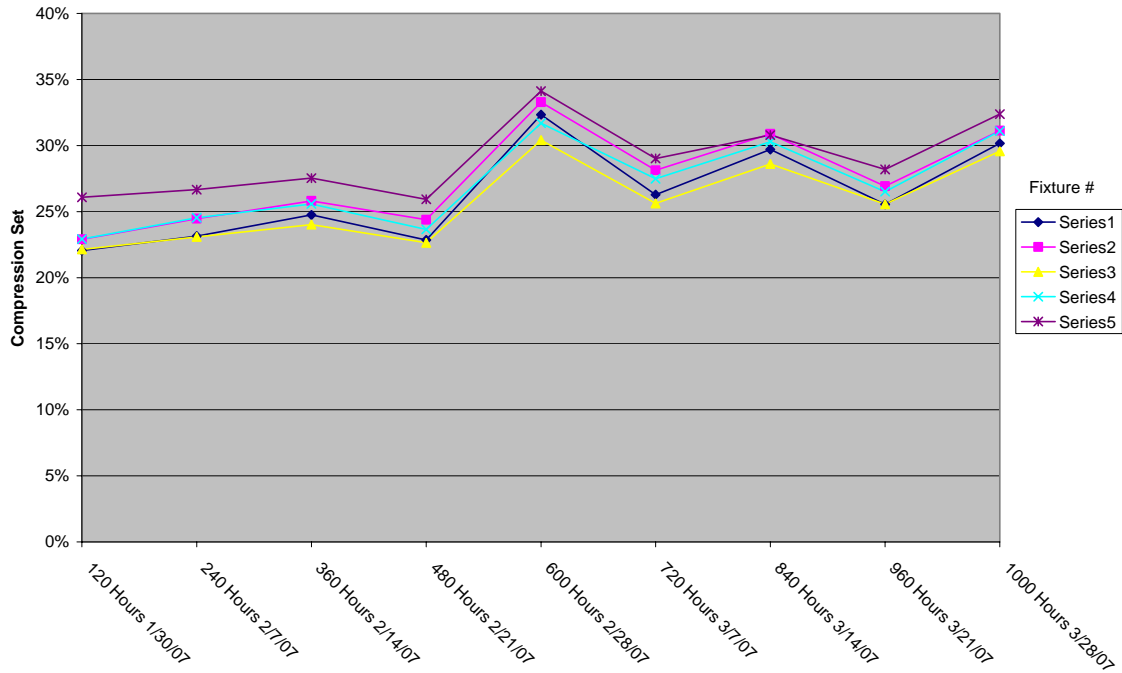
Chomerics SS3500 3153
Compression Set After Aging
(median of five)



6.2.2 All Data



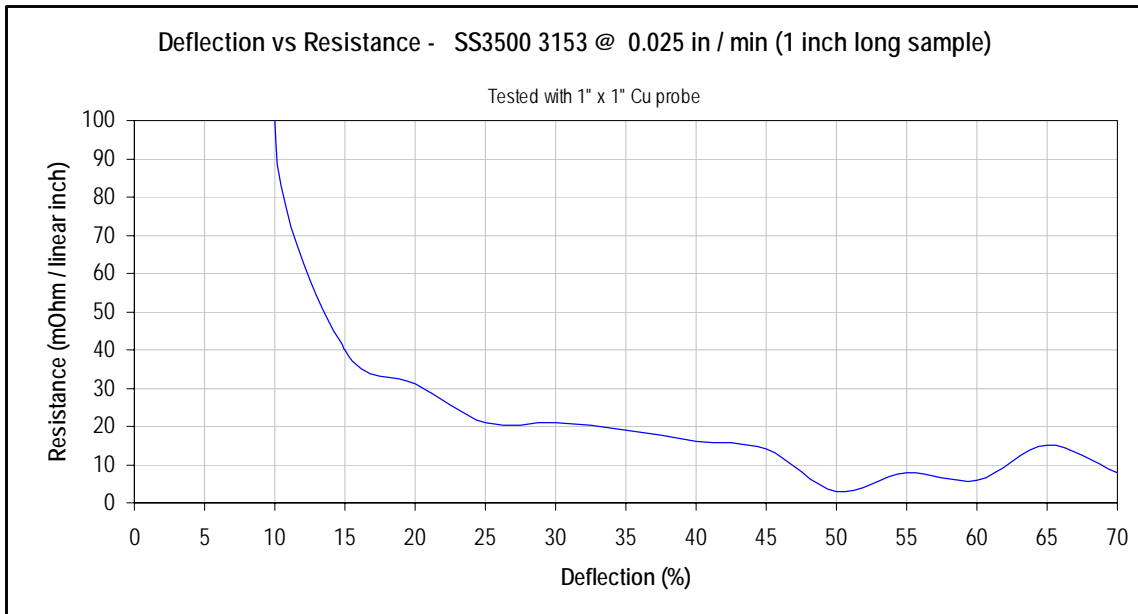
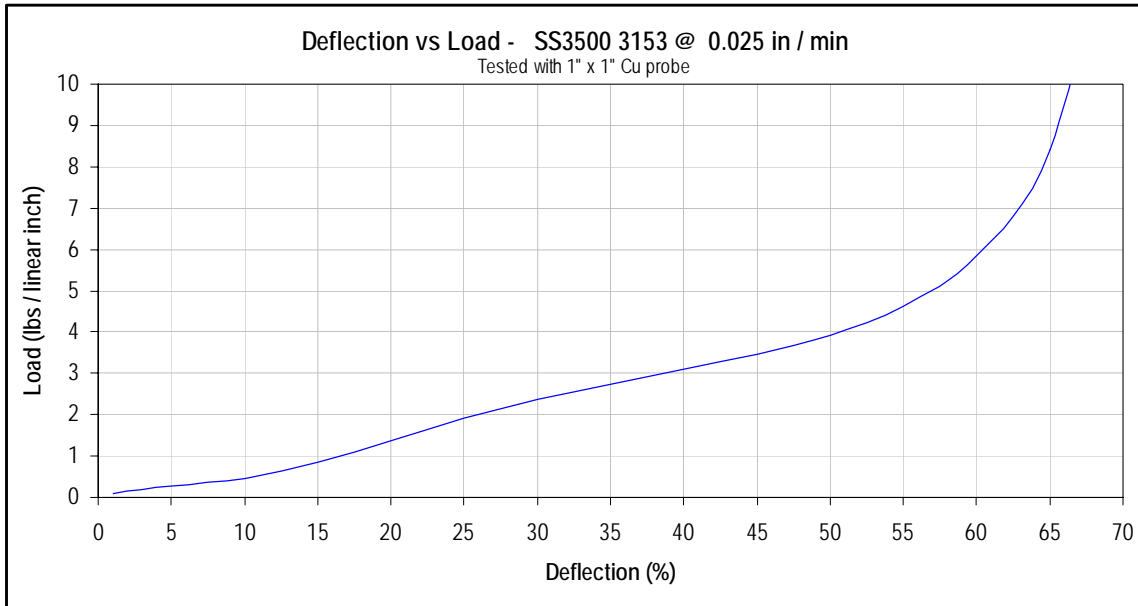
Chomerics 3153
Compression Set After Aging at 40°C/90%RH



Appendix A: Typical Properties

Typical Properties	SOFT-SHIELD 3500	Test Method
Shielding Effectiveness, 50 MHz to 10 GHz	> 90(dB)	CHO-TM-TP08
35% Compression Deflection, lb/in (N/mm), [0.125 x 0.375 in. gasket]	< 1 (<0.175)	ASTM C165
Compression Set • Foam • Gasket assembly	<10% <25%	ASTM D3574
Operating Temperature Range	-40° to 70°C	-
Adhesive Peel Strength, 90°b/inch (N/mm) [Min. value]	4 (0.7)	ASTM D1000

Appendix B: Compression Deflection & Resistance Comparison



Appendix C: All Data Table View

Table 1

SS3500 for Panasonic - Compression Set and Electricals

Fixture #	Initial		120 Hours 1/30/07			240 Hours 2/7/07			360 Hours 2/14/07			480 Hours 2/21/07		
	Height (inches)	Resistance (mOhm)	Height (inches)	Compression Set	Resistance (mOhms)	Height (inches)	Compression Set	Resistance (mOhms)	Height (inches)	Compression Set	Resistance (mOhms)	Height (inches)	Compression Set	Resistance (mOhms)
1	0.13701	178.9	0.1068	22.0%	1219.7	0.1053	23.1%	264.5	0.1031	24.8%	720.0	0.1057	22.9%	6822.0
2	0.14165	155.1	0.1092	22.9%	785.3	0.1070	24.5%	1102.1	0.1051	25.8%	427.9	0.1071	24.4%	1246.0
3	0.13768	153.91	0.1072	22.1%	1393.4	0.1059	23.1%	1197.7	0.1046	24.0%	6171.0	0.1065	22.6%	1071.9
4	0.13571	158.45	0.1046	22.9%	332.1	0.1024	24.5%	1552.1	0.1010	25.6%	1096.5	0.1036	23.7%	6311.0
5	0.13799	174.18	0.102	26.1%	1633.2	0.1012	26.7%	1680.1	0.1000	27.5%	1533.0	0.1022	25.9%	4133.0
6	0.13602	156.92	0.1065	21.7%	676.2	0.1058	22.2%	653.0	0.1044	23.2%	662.7	0.1060	22.1%	717.1
7	0.13772	174.61	0.1084	21.3%	501.2	0.1078	21.7%	899.7	0.1063	22.8%	1178.6	0.1074	22.0%	546.5
8	0.13394	145.85	0.1061	20.8%	805.4	0.1052	21.5%	767.8	0.1041	22.3%	412.0	0.1047	21.8%	528.4
9	0.13693	255	0.1058	22.7%	1298.1	0.1039	24.1%	1518.3	0.1035	24.4%	511.5	0.1034	24.5%	1775.5
10	0.1376	205	0.1038	24.6%	1113.3	0.1021	25.8%	1004.3	0.1034	24.9%	1703.0	0.1030	25.1%	683.1
11	0.13787	206	0.1121	18.7%	866.3	0.1020	26.0%	2100.0	0.1044	24.3%	1009.1	0.1061	23.0%	491.2
12	0.13752	191.75	0.1098	20.2%	511.2	0.1005	26.9%	2300.0	0.1027	25.3%	904.0	0.1044	24.1%	1964.8
13	0.13772	203	0.1125	18.3%	680.5	0.1032	25.1%	3160.0	0.1053	23.5%	1519.5	0.1074	22.0%	1146.1
14	0.13827	167.95	0.1103	20.2%	687.6	0.1010	27.0%	2110.0	0.1030	25.5%	1608.9	0.1047	24.3%	692.7
15	0.13953	285	0.1106	20.7%	686.2	0.1013	27.4%	1568.0	0.1034	25.9%	411.6	0.1048	24.9%	2348.0

Some fixtures were backwards
used different leads

*Fixtures were opened before
resistance tested
Closed then tested

40°C/90% Humidity

60°C

Temp.Cycling 60°C/-20°C

NOTES:

Samples aged 120 hrs from Wednesday to Monday

Samples tested on Tuesday for electricals first, then fixtures opened and wait 30 minutes minimum to test gasket height (on TA Tester)

Samples sit 24 hrs until Wednesday when the fixtures are cleaned and closed and put in the oven/chambers

Table 1 cont.

SS3500 for Panasonic - Compression Set and Electricals

Fixture #	600 Hours 2/28/07			720 Hours 3/7/07			840 Hours 3/14/07			960 Hours 3/21/07			1000 Hours 3/28/07		
	Height (inches)	Compression Set	Resistance (mOhms)	Height (inches)	Compression Set	Resistance (mOhms)	Height (inches)	Compression Set	Resistance (mOhms)	Height (inches)	Compression Set	Resistance (mOhms)	Height (inches)	Compression Set	Resistance (mOhms)
1	0.0927	32.3%	320.8	0.1010	26.3%	4120	0.0963	29.7%	1157	0.10201	25.5%	1528	0.09567	30.2%	5223
2	0.0945	33.3%	1015.4	0.1018	28.1%	9152	0.0979	30.9%	2441	0.1035	26.9%	4130	0.09756	31.1%	2578
3	0.0958	30.4%	876	0.1024	25.6%	1197	0.0983	28.6%	10995	0.10248	25.6%	3484	0.09697	29.6%	5168
4	0.0927	31.7%	3537	0.0984	27.5%	8368	0.0946	30.3%	6160	0.09972	26.5%	4255	0.0935	31.1%	5328
5	0.0909	34.1%	4401	0.0980	29.0%	6613	0.0955	30.8%	12390	0.09909	28.2%	5102	0.09331	32.4%	6179
6	0.0937	31.1%	861.5	0.1012	25.6%	261	0.0942	30.7%	851	0.10094	25.8%	614	0.09268	31.9%	603
7	0.0943	31.5%	788.4	0.1017	26.2%	703	0.0956	30.6%	689	0.10283	25.3%	641	0.09268	32.7%	695
8	0.0913	31.8%	644.3	0.0999	25.4%	494	0.0949	29.1%	576	0.10008	25.3%	1250	0.09437	29.5%	476
9	0.0927	32.3%	1186.3	0.0978	28.6%	985	0.0938	31.5%	594	0.09858	28.0%	694	0.09528	30.4%	539
10	0.0907	34.1%	531.3	0.0987	28.3%	982	0.0937	31.9%	1762	0.09925	27.9%	594	0.09323	32.2%	778
11	0.0948	31.2%	1303.5	0.1041	24.5%	877	0.0996	27.8%	566	0.10571	23.3%	569	0.10189	26.1%	491
12	0.0937	31.9%	1317.5	0.1027	25.3%	940	0.098	28.7%	169	0.10417	24.3%	865	0.10083	26.7%	658
13	0.0955	30.7%	983.3	0.1044	24.2%	826	0.1005	27.0%	564	0.10689	22.4%	695	0.10276	25.4%	838
14	0.0932	32.6%	750.5	0.1026	25.8%	574	0.098	29.1%	698	0.10441	24.5%	884	0.10154	26.6%	919
15	0.0931	33.3%	1960.6	0.1020	26.9%	372	0.0997	28.5%	94	0.10449	25.1%	722	0.10087	27.7%	1735

40°C/90% Humidity

60°C

Temp.Cycling 60°C/-20°C

NOTES:

Samples aged 120 hrs from Wednesday to Monday

Samples tested on Tuesday for electricals first, then fixtures opened and wait 30 minutes minimum to test gasket height (on TA Tester)

Samples sit 24 hrs until Wednesday when the fixtures are cleaned and closed and put in the oven/chambers