

Soft Shield[®] 3500

Reliability Test Report

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Chomerics Approved Signatory:

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1.0 Introduction

The purpose of this document is to summarize and explain the mechanical and environmental tests and the corresponding measurements that were performed on samples of Chomerics Soft Shield 3500 fabric wrapped foam gaskets.

2.0 Peel Adhesion

2.1 Test Procedure

The purpose of the peel adhesion test is to measure the force required to peel the gasket from a panel. Gaskets were applied to the stainless steel panel with a standard 4.5 lb roller. They were allowed to dwell at room temperature for 72 hours. The samples were tested at a 90 degree angle at 12"/min on a Texture Analyzer TA.HDplus. All results were normalized to account for the different PSA tape widths.

2.2 Results

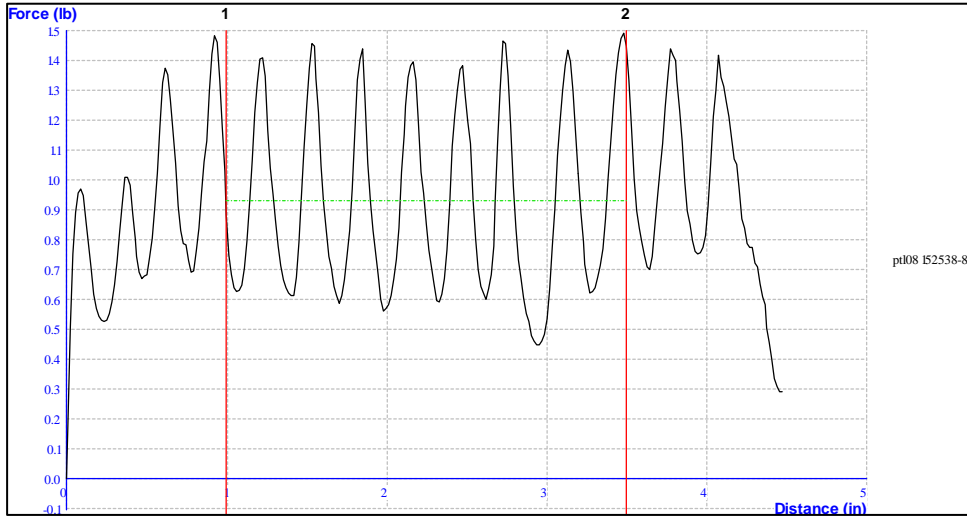
Peel adhesion results are expressed in units of force per width of PSA tape.

90° Peel from Stainless Steel	Peel Strength	
	g/mm	lb/inch
SS3500 3211 (0.039" thick x 0.118" wide)	68.5	3.8
SS3500 3224 (0.039" thick x 0.236" wide)	63.3	3.5
SS3500 3101 (0.079" thick x 0.118" wide)	100.8	5.6
SS3500 3109 (0.079" thick x 0.236" wide)	58.5	3.3
SS3500 3107 (0.157" thick x 0.157" wide)	54.5	3.0
SS3500 3113 (0.197" thick x 0.197" wide)	72.7	4.1

(all Adhesive Failure from panel)

Note: Peel testing on a gasket, as opposed to just the PSA tape itself is difficult. The result is not a smooth peel, as the gasket is too big compared to the thickness of the PSA. See actual result for 3113 gasket below in Figure 1. Dotted green line represents the average force used for calculating peel adhesion value.

Figure 1. SS3500 3113 90° Peel



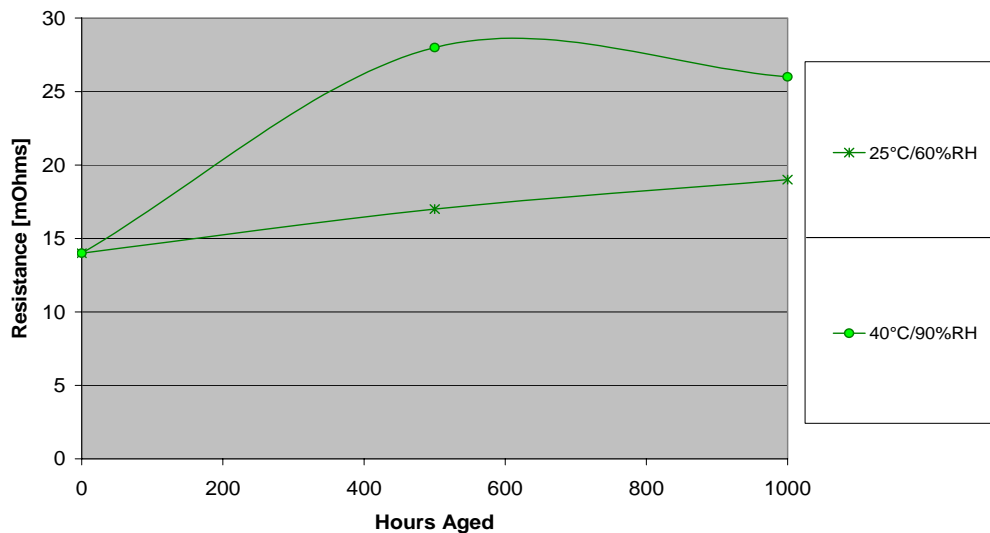
3.0 Long Term Resistance

3.1 Test Procedure

Several long term electrical resistance tests were performed at different times, not simultaneously. The 1" long sample was sandwiched between two aluminum pucks. Plastic shims were used to keep a set compression gap of 50%. The initial resistance was measured and the fixtures were placed in the oven or chamber. After aging, the fixtures were removed and allowed to cool for a minimum time of 0.5 hours. Resistance through the fixtures were recorded.

3.2 Results

Soft Shield 3500 3161
Resistance at 50% Compression

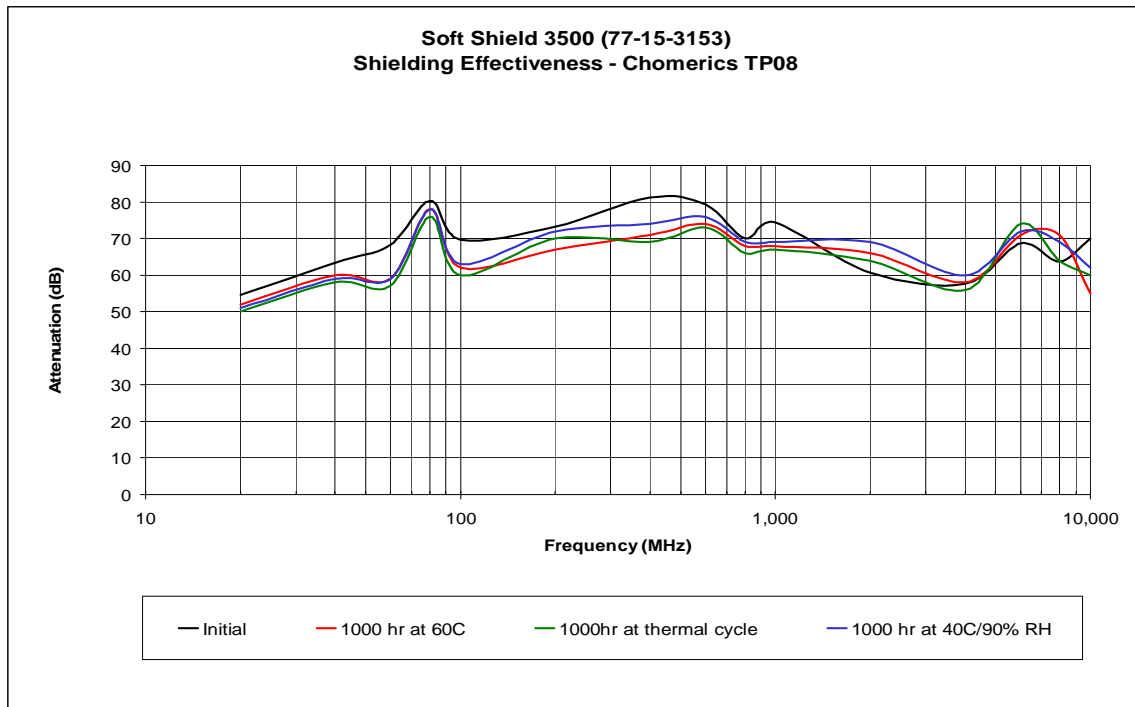


4.0 Shielding Effectiveness

4.1 Test Procedure

Soft Shield 3500 3153 samples were set up per Chomerics TP-08 Shielding Effectiveness Test. The fixtures were subjected to three different environmental conditions. One set was aged for 1000 hours at 60°C. The second set was aged for 1000 hours at 40°C/90% humidity. The final set was thermal cycled for 1000 hours, with 3 cycles per day. The thermal cycle was three hours at -20°C, ramp up to 60°C in one hour, hold for three hours, ramp back down to -20°C in one hour and repeat.

4.2 Results

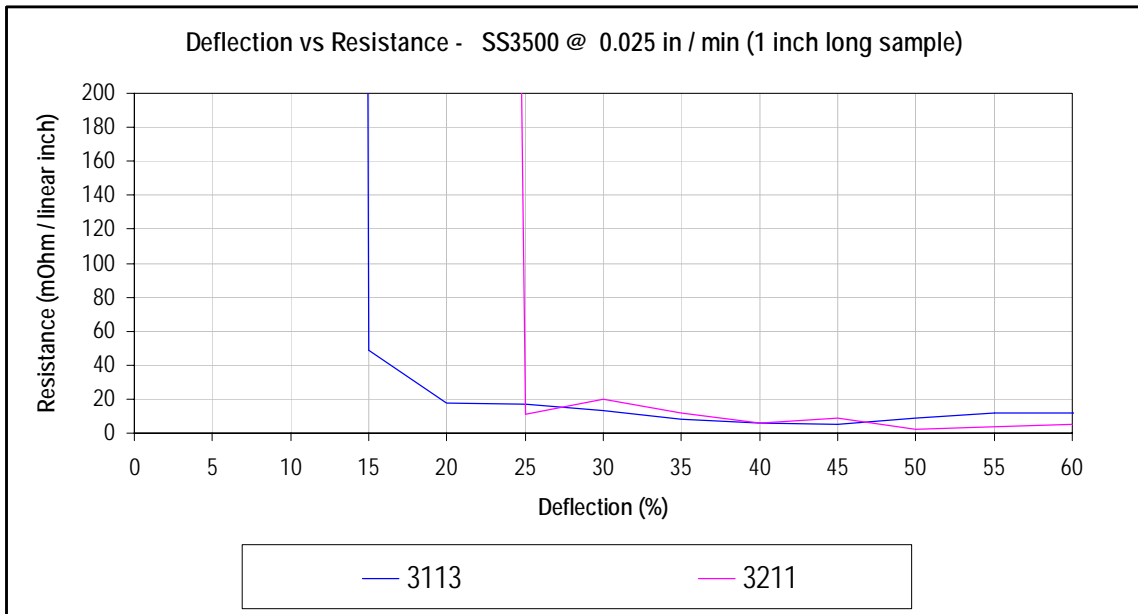
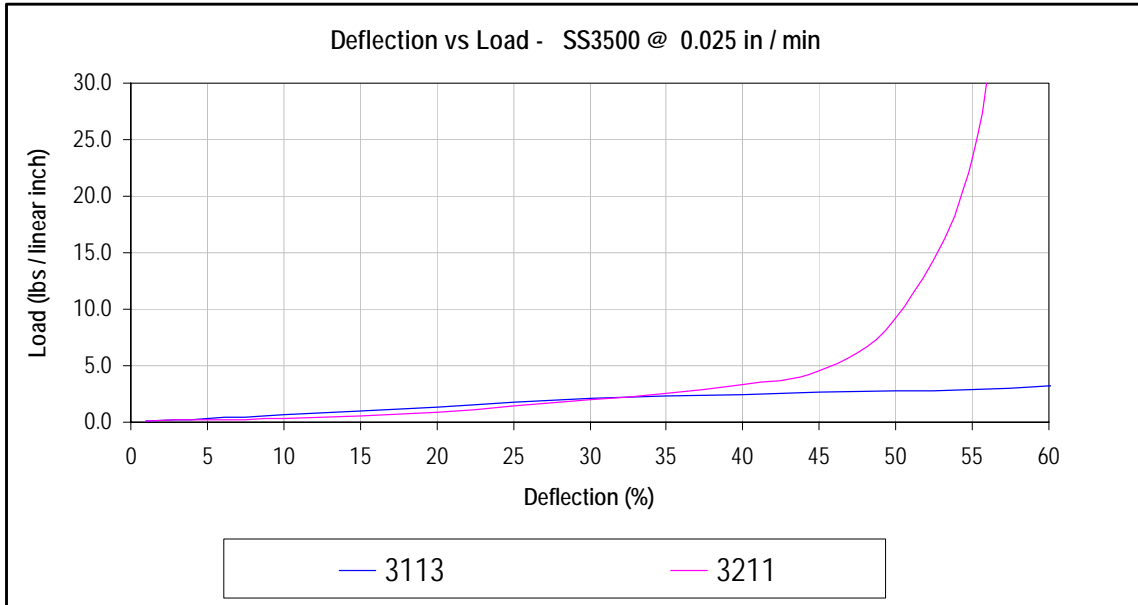


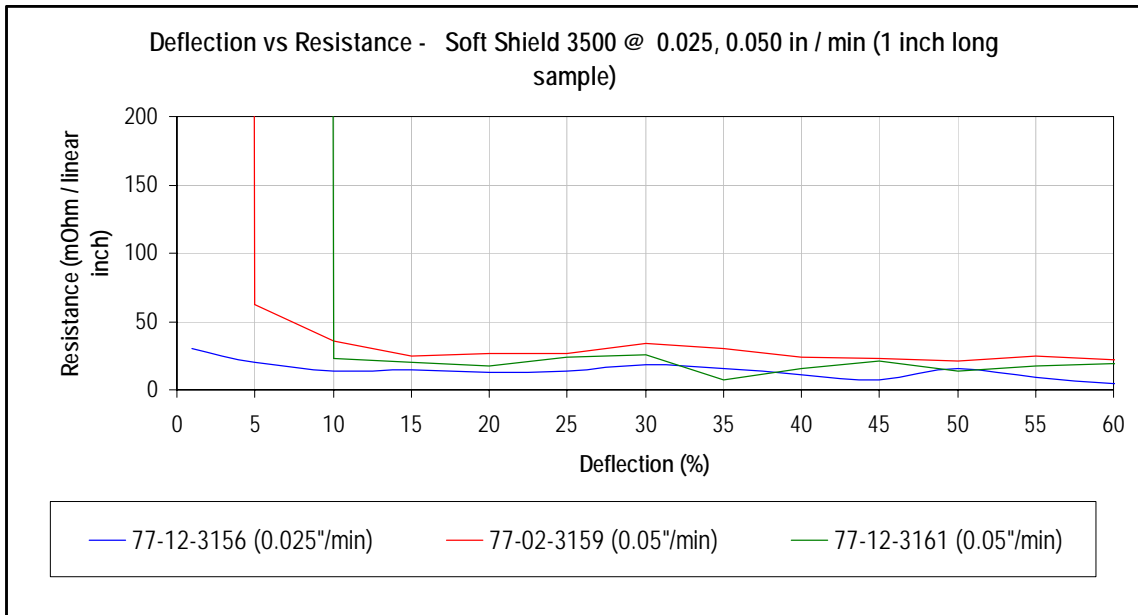
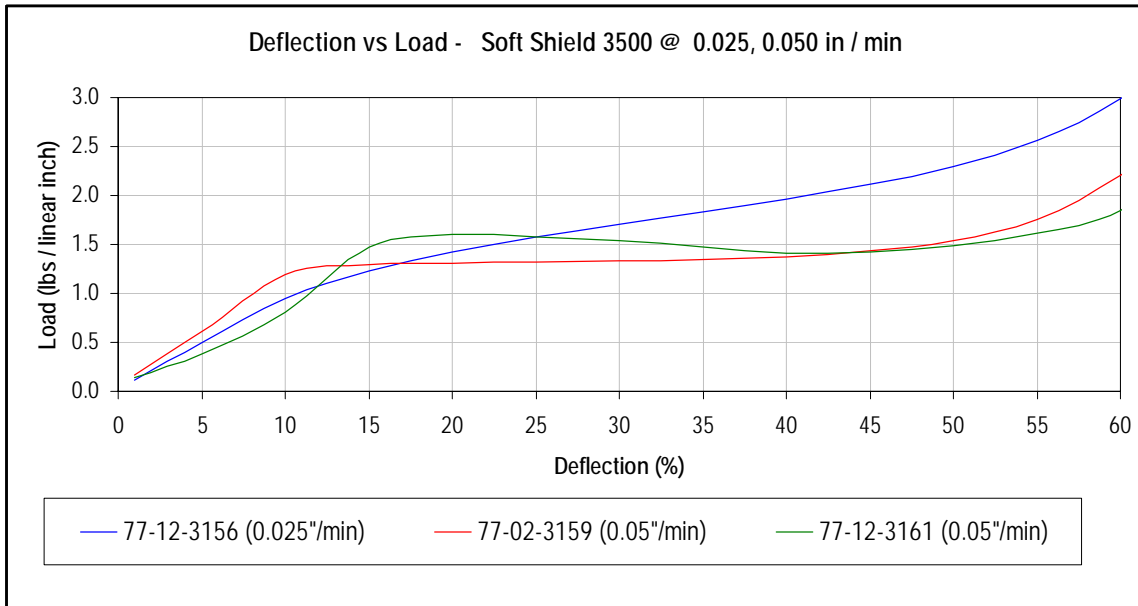
5.0 Compression Deflection

5.1 Test Procedure

Samples were tested in a laboratory environment on a Texture Analyzer TA.HDplus per Chomerics NBD-001, which is a modified version of ASTM C165. Three samples were tested for each profile. Samples were tested at 0.025 inches/min (0.01 mm/sec) for under 0.25" thick and 0.050 inches/min (0.02 mm/sec) for samples thicker than 0.25" up to 60% deflection or 50kg, the limit of the load cell. Load and resistance were recorded as the sample was compressed.

5.2 Results





6.0 Toluene Level

6.1 Test Procedure

The samples were tested separately by component. The product was broken down into individual components consisting of foam, fabric, and pressure-sensitive adhesive. Each of the Soft Shield 3500 components were cut into small pieces with a total weight of approximately 0.25 grams.

The test sample was placed in a 20 ml vial with 5 ml of water. It was held for one hour at 70°C. The gas generated within the vial was captured and analyzed for toluene content. This was measured using a GC-MS (gas chromatograph mass spectrometer) with a detection limit of 5 mg/liter.

6.2 Results

No toluene was detected in any of the SOFT-SHIELD 3500 components.

7.0 Horizontal Push Adhesion Test

7.1 Test Procedure

Profile 3161 samples were cut to small pieces and adhered to an aluminum panel. These samples were aged under four different conditions. The force to push the samples horizontally off the aluminum panel was measured.

7.2 Results

Adhesion Testing of SS3500 3161 Profile

<u>Aging Condition</u>	<u>Adhesion Resistance</u> <u>(newtons)</u>				<u>Average</u>
Cycling -20°C to +60°C 48 Hours	35.3	30.1	32	34.1	32.9
40°C/90%RH 48 Hours	38.6	36.4	32.4		35.8
Room Temperature 16 Hours*	14.9	23.8	22.6		20.4
Low Temp -40°C 16 Hours**	40.5	37.6	27.9		35.3

*Profile separated (fabric unwrapped) on all samples

**Profile separated (fabric unwrapped) on one sample (27.9)

1.0 cm wide probe

Performed at a speed of 1"/min

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

