



**EMC & Product Safety
Testing • Consulting**

**EMC Shielding Effectiveness Test Report
Gasket Materials
TO MIL-DTL 83528E**

<i>Report No.</i> 20680	<i>Issue Date</i> February 24, 2015
<i>Revision</i> 1.0	<i>Page</i> 1 of 15

EMC SHIELDING EFFECTIVENESS TEST REPORT

Test Specification : MIL-DTL 83528E
Manufacturer : Specialty Silicone Products, Inc
Test Samples :
1. SSP502-50-F Nickel Graphite Filled
Fluorosilicone



**EMC Shielding Effectiveness Test Report
Gasket Materials
TO MIL-DTL 83528E**

Report No.

20680

Issue Date

February 24, 2015

Revision

1.0

Page

2 of 15

**TEST REPORT NO. 20680
from
D.L.S. Electronic Systems, Inc.
Test for Specialty Silicone Products, Inc**


WRITTEN BY Jereme Irwin	REVIEWED BY Jack Prawica	REVIEWED BY Brian Mattson

TEST PERSONNEL	TITLE
Jereme Irwin	EMC Test Engineer

TEST DATE(S)	January 19-20, 2015
---------------------	----------------------------

TEST FACILITY ADDRESS CITY, STATE, ZIP CODE PHONE FAX	D.L.S. Electronic Systems, 1250 Peterson Drive Wheeling, IL. 60090 (847) 537-6400 (847) 537-6488
--	--

This report may be reproduced in full, partial reproduction may only be made with the written consent of the laboratory. The results in this report apply only to the equipment tested.

 <p style="text-align: center;">EMC Shielding Effectiveness Test Report Gasket Materials TO MIL-DTL 83528E</p>	<i>Report No.</i> 20680	<i>Issue Date</i> February 24, 2015
	<i>Revision</i> 1.0	<i>Page</i> 3 of 15

ADMINISTRATIVE SUMMARY

REASON FOR TEST:

To test the shielding effectiveness of one material as specified in MIL-DTL 83528E.

TEST SPECIFICATION:

MIL-DTL 83528E
GASKETING MATERIAL, CONDUCTIVE, SHIELDING GASKET, ELECTRONIC, ELASTOMER, EMI/RFI
GENERAL SPECIFICATION

DATE(S) OF TEST:

January 19-20, 2015

TEST SAMPLES:

A total of three sample was presented for testing. Refer to Section 2 of this report for a description of each test sample along with the manufacturer's designation.

MANUFACTURER: Specialty Silicone Products, Inc
Corporate Technology Park
3 McCrea Hill Road
Ballston Spa, NY 12020

MANUFACTURERS REPRESENTATIVE:

Dominic J Testo

DISPOSITION OF TEST SAMPLE:

Samples will be returned to SSP, Inc.

TEST LOCATION:

D.L.S. Electronic Systems,
1250 Peterson Drive
Wheeling, IL. 60090

TEST PERSONNEL:

Jereme Irwin EMC Test Engineer

SUMMARY OF TEST RESULTS:

The shielding effectiveness of the test sample can be found in data sheets located in Appendix C of this report.



**EMC Shielding Effectiveness Test Report
Gasket Materials
TO MIL-DTL 83528E**

<i>Report No.</i> 20680	<i>Issue Date</i> February 24, 2015
<i>Revision</i> 1.0	<i>Page</i> 4 of 15

TABLE OF CONTENTS

ADMINISTRATIVE SUMMARY 3

REASON FOR TEST: 3

TEST SPECIFICATION: 3

DATE(S) OF TEST: 3

TEST SAMPLES: 3

MANUFACTURER: 3

MANUFACTURERS REPRESENTATIVE: 3

DISPOSITION OF TEST SAMPLE: 3

TEST LOCATION: 3

TEST PERSONNEL: 3

SUMMARY OF TEST RESULTS: 3

INTRODUCTION 5

SECTIONS 5

SECTION 1 - CLIENT INFORMATION 5

SECTION 2 - PURPOSE OF TEST 6

SECTION 3 - TEST SAMPLE DESCRIPTION 6

SECTION 4 - TEST SITE; FACILITIES, CONDITIONS AND TOLERANCES 7

SECTION 5 - TEST EQUIPMENT 7

SECTION 6 - SUMMARY OF TEST RESULTS 8

SECTION 7 - SHIELDING EFFECTIVENESS MEASUREMENTS 9

APPENDIX A - TEST EQUIPMENT 10

A.1 Specific Equipment Used 10

APPENDIX B - DESCRIPTION OF TEST METHODS 11

B.1 SHIELDING EFFECTIVENESS MEASUREMENTS 11

APPENDIX C - SUPPLEMENTAL DATA 12



**EMC Shielding Effectiveness Test Report
Gasket Materials
TO MIL-DTL 83528E**

<i>Report No.</i> 20680	<i>Issue Date</i> February 24, 2015
<i>Revision</i> 1.0	<i>Page</i> 5 of 15


INTRODUCTION

This report documents the results of a series of EMI/EMC measurements performed on the test samples described in Section 2 of this report. The purpose of this series of tests was to demonstrate compliance of the test sample(s) with the requirements of MIL-DTL-83528E Specification for comparison data of three test samples using a MIL-DTL-83528E test fixture.

SECTIONS

SECTION 1 - CLIENT INFORMATION

COMPANY NAME ADDRESS CITY, STATE ZIP	Specialty Silicone Products, Inc Corporate Technology Park 3 McCrea Hill Road Ballston Spa, NY 12020
CONTACT NAME TITLE PHONE E-MAIL	Dominic J Testo Account Representative (518) 363-5034 DTesto@sspinc.com
MANUFACTURER ADDRESS CITY, STATE ZIP	Specialty Silicone Products, Inc Corporate Technology Park 3 McCrea Hill Road Ballston Spa, NY 12020

 <p style="text-align: center;">EMC Shielding Effectiveness Test Report Gasket Materials TO MIL-DTL 83528E</p>	<i>Report No.</i> 20680	<i>Issue Date</i> February 24, 2015
	<i>Revision</i> 1.0	<i>Page</i> 7 of 15

SECTION 4 - TEST SITE; FACILITIES, CONDITIONS AND TOLERANCES

The EMI measurements were performed through a test fixture designed to the MIL-DTL-83528E test specification. A modified MIL-DTL-83528E test fixture was located between two adjacent shielded enclosures. The receive chamber and the control (transmit) chamber meets the applicable requirements of NSA65-6. AC power is supplied to each enclosure from a dedicated isolation transformer through low-pass line filters, which provide a minimum of 120 dB of attenuation from 10 kHz to 10 GHz.

SECTION 5 - TEST EQUIPMENT

A complete test system equipment list is provided in APPENDIX A of this report. The equipment absolute performance calibration, of the equipment requiring calibration, is performed on an as needed basis in accordance with MIL-STD-45662. However, calibration periods do not exceed one (1) year. The test equipment is capable of making measurements within tolerances of at least +/- 2 dB amplitude and +/-2% frequency deviation. Equipment certifications showing traceability to NIST (National Institute of Standards and Technology) are maintained on file at D.L.S. Electronic Systems in Wheeling, IL. All equipment is checked and verified for proper operation before and after each series of tests.



**EMC Shielding Effectiveness Test Report
Gasket Materials
TO MIL-DTL 83528E**


<i>Report No.</i> 20680	<i>Issue Date</i> February 24, 2015
<i>Revision</i> 1.0	<i>Page</i> 8 of 15

SECTION 6 - TEST RESULTS

The following table lists the requirements and results for each of the test samples.

NO.	Material		BEST ATTENUATION LEVEL (dB)
1.	SSP502-50-F Nickel Graphite Filled Silicone		130.8@100MHz

The Specialty Silicone Products, Inc. *Silicone gaskets* were tested to five specific frequencies; 100MHz, 500MHz, 2GHz, and 10GHz.

 <p>EMC Shielding Effectiveness Test Report Gasket Materials TO MIL-DTL 83528E</p>	<i>Report No.</i> 20680	<i>Issue Date</i> February 24, 2015
	<i>Revision</i> 1.0	<i>Page</i> 9 of 15

SECTION 7 - SHIELDING EFFECTIVENESS MEASUREMENTS

Detailed data sheets, which provide the entire shielding effectiveness results across the entire frequency range for each of the two samples, are provided in APPENDIX C of this report. The following information provides a description of the test data sheet information.

All amplitude measurement levels are recorded in dBuV.
Attenuation Levels are recorded in dB.

The data sheets contain the following categories:

- Frequency: Discreet frequency at which measurement was made. Recorded as MHz or GHz.
- Reference Level: Test level with shielding material not in place. This is an amplitude level recorded in dBuV.
- Attenuation: Added attenuation (20dB) to input of receiver when measuring the reference level so not to damage receiver; attenuation removed for testing of gasket. This value is added to the test level.
- Test Level: Measurement made with shielding material in the test fixture. This is an amplitude level recorded in dBuV.
- Shielding Effectiveness: Equal to [Reference Level minus the (Test Level minus the pre-amp)]. The result is in dB units.




**EMC Shielding Effectiveness Test Report
Gasket Materials
TO MIL-DTL 83528E**

<i>Report No.</i>	<i>Issue Date</i>
20680	February 24, 2015
<i>Revision</i>	<i>Page</i>
1.0	10 of 15

APPENDIX A - TEST EQUIPMENT

A.1 Specific Equipment Used

Description	Manufacturer	Cal Due	Frequency	Model	Use	Serial No.
Amplifier, RF, Power	Amplifier Research	N/A	10kHz-220MHz	2500LM11	TX	22714
Amplifier, RF, Power	Amplifier Research	N/A	200-1000MHz	1000W1000M7	TX	23121
Antenna, Bicon	ETS Lindgren	N/A	20-300MHz	3109	TX	9803-3163
Antenna, Bicon	ETS Lindgren	11/14/2015	20-300MHz	BIA-25	RX	2727
Antenna, Horn	ETS Lindgren	N/A	200-2000MHz	3106	TX	9406-2575
Antenna, Horn	ETS Lindgren	11/18/2015	200-2000MHz	3106	RX	2127
Antenna, Horn	ETS Lindgren	N/A	1-18GHz	3117	TX	135193
Antenna, Horn	ETS Lindgren	08/07/2015	1-18GHz	3117	RX	55158
Pre-Amp	Planar	07/16/2015	1-20GHz	PTB-35-120-5R0-1	RX	PL3159
Generator, Signal	Rohde & Schwarz	01/07/2016	9kHz-1GHz	SML 01	TX	100025
Generator, Microwave	Rohde & Schwarz	09/30/2015	1-20GHz	SMR 20	TX	100052
Spectrum Analyzer, RF	Agilent	06/26/2015	3Hz26.5GHz	E4446A	RX	MY46186619

 <p style="text-align: center;">EMC Shielding Effectiveness Test Report Gasket Materials TO MIL-DTL 83528E</p>	<i>Report No.</i> 20680	<i>Issue Date</i> February 24, 2015
	<i>Revision</i> 1.0	<i>Page</i> 11 of 15

APPENDIX B - DESCRIPTION OF TEST METHODS

B.1 SHIELDING EFFECTIVENESS MEASUREMENTS

The shielding effectiveness measurements were made in accordance with MIL-DTL-83528E using a spectrum analyzer and a signal generator in conjunction with the appropriate power amplifiers and antennas. The transmitting antenna was located inside of a shielded control chamber located adjacent to the Receiving chamber. Reference levels were measured through the 26 inch by 26 inch opening in the shielded enclosure without the test sample in place. The minimum reference level recorded was 110dB at 100 and 500MHz, 100dB at 2-10GHz. References were made with the antennas positioned in horizontal polarity separated by 2 meters 100-500MHz and 1 meter 2-10GHz.

The test sample was compressed 10% when under test.

The test levels were then recorded at each frequency and attenuation values were determined by calculating the difference between the reference level and the test level.

Dynamic Range is determined by placing a solid plate between the two chambers, measuring the amplitude of each frequency, then subtracting that from the reference level.



**EMC Shielding Effectiveness Test Report
Gasket Materials
TO MIL-DTL 83528E**

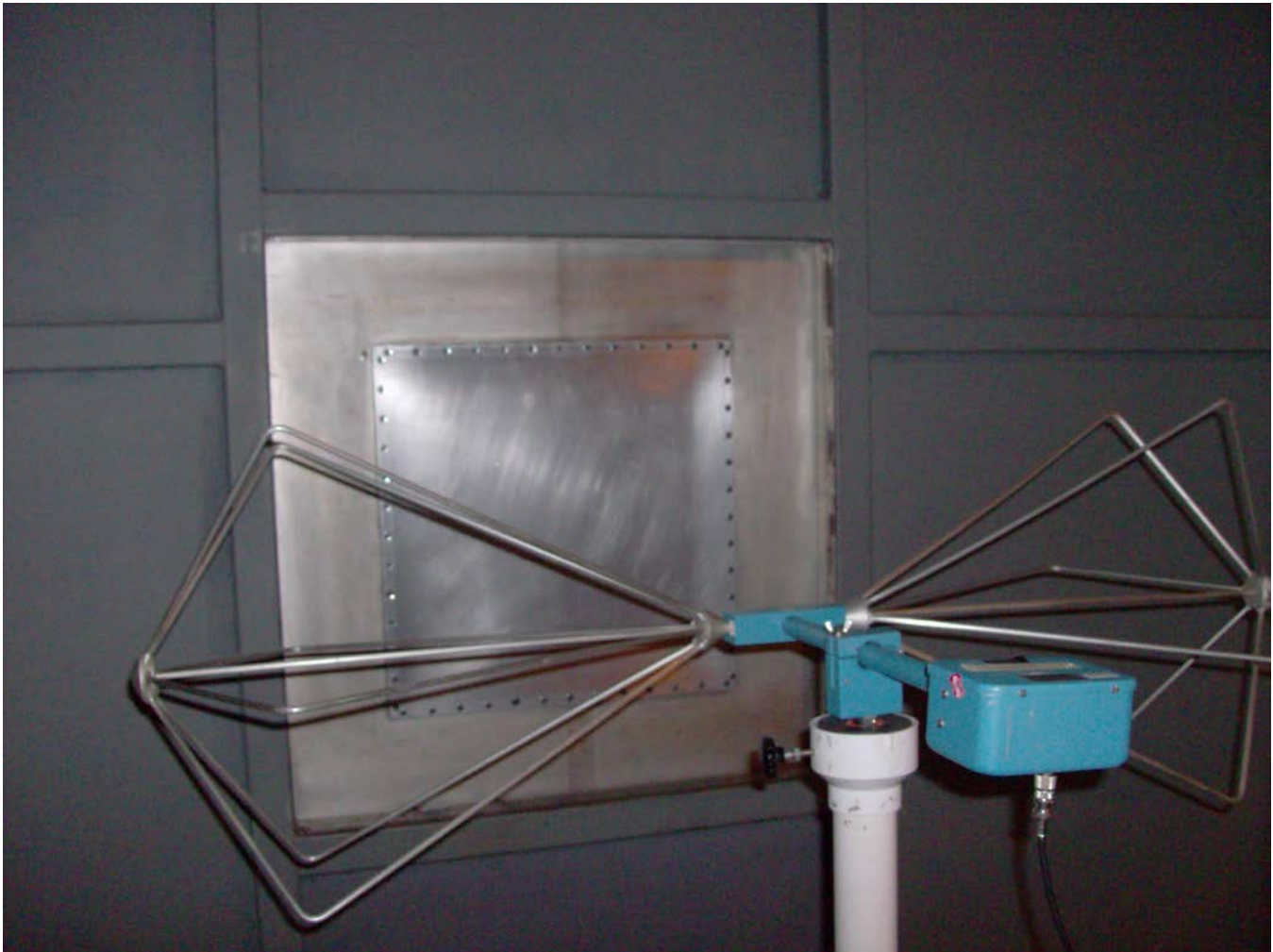
<i>Report No.</i> 20680	<i>Issue Date</i> February 24, 2015
<i>Revision</i> 1.0	<i>Page</i> 12 of 15

APPENDIX C - Supplemental Data

Frequency (MHz)	Reference Level	Dynamic Range	SSP502-50-F
100	110	-32.9	-20.8
500	110	-28.3	-3.1
2000	100	-18.2	-17.5
10000	100	-18.6	-17.9
Shielding Effectiveness (dB)		Dynamic Range	SSP502-50-F
100		142.9	130.8
500		138.3	113.1
2000		118.2	117.5
10000		118.6	117.9

Test Results

PHOTOS TAKEN DURING TESTING



100 MHz Test



**EMC Shielding Effectiveness Test Report
Gasket Materials
TO MIL-DTL 83528E**

<i>Report No.</i> 20680	<i>Issue Date</i> February 24, 2015
<i>Revision</i> 1.0	<i>Page</i> 14 of 15



500 MHz Test

**EMC Shielding Effectiveness Test Report
Gasket Materials
TO MIL-DTL 83528E**

<i>Report No.</i> 20680	<i>Issue Date</i> February 24, 2015
<i>Revision</i> 1.0	<i>Page</i> 15 of 15



2 & 10GHz Test