Fujipoly®

Fujipoly New Product Technical Information

NEW PRODUCT : SARCON® GR-SL

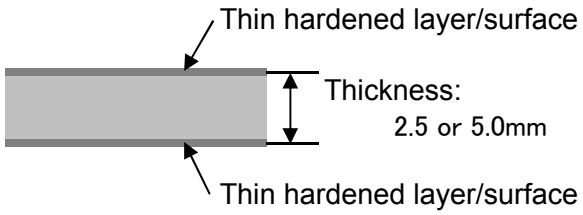
Lowest Modulus Themally Conductive and Non-Flammable Silicone Gel Sheets

1. Features:

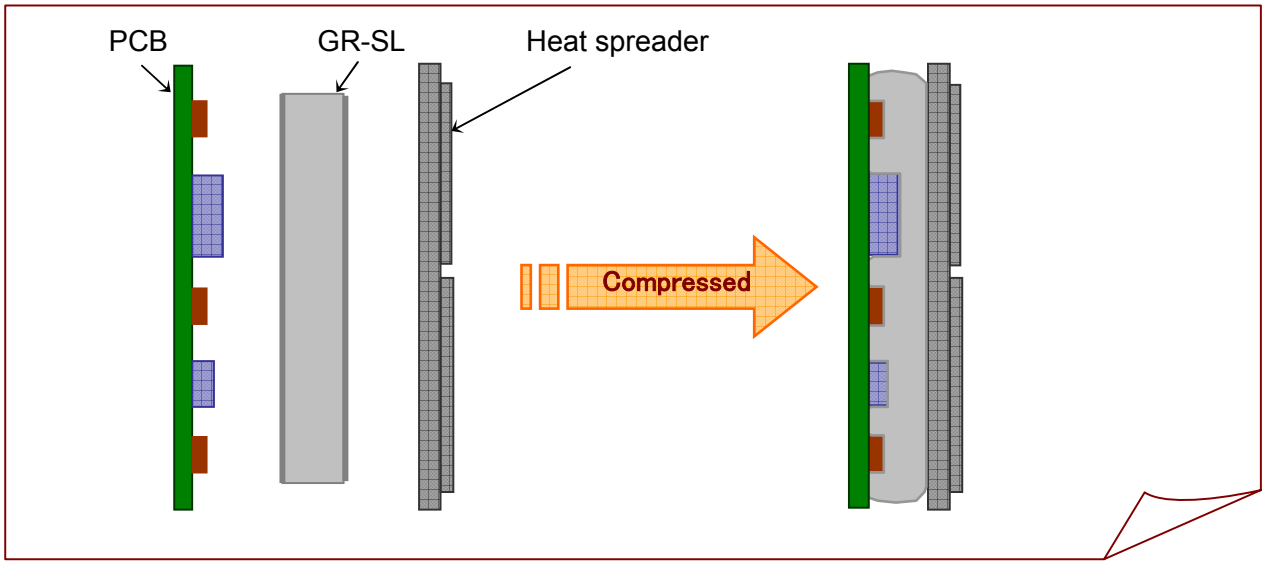
Sarcon® GR-SL is the lowest modulus type thermal gap filler material. It preserves thermal performance of the original Sarcon® GR-L material, **2.7 Watt/m-K** (No electricity conductive) in a versatile sheet form that easily fit and adhere to most of shapes and sizes of components, and makes reliable and complete physical contact. The surface consistency of the pads is excellent for filling air gaps and uneven surfaces.

1) Easy to fill air gaps and uneven surfaces.
2) Sarcon® GR-SL is as same as thermal conductivity of GR-L series and lower than hardness of Sarcon® GR-L series.
3) Low molecular silicone content is very low.

2. Variety of Sarcon® GR-SL Products:

Material name	Product name	Features
Sarcon® GR-SL	Sarcon® ###G-SL (Material : Sarcon® GR-SL)	Both sides low sticky type: Silicone (gel) compound with hardened both surface 

* ## refers to a thickness of sheet. (unit: 1/100mm)



3. Typical Product Properties: (Typical Value)

Item	250G-SL	500G-SL	Test Method
Thermal Resistance (100kPa) (℃·cm²/watt)	6.3	9.0	Fujipoly Test Method: TIM1300 Tester based on ASTM D5470.
Compression Modulus[1)]	170kPa(25%) 262kPa (50%)	128kPa(25%) 90kPa(50%)	ASTM D575
Operating Temperature	-40 ～ +150 ℃		–

Remark 1) Compression Velocity: 5.0mm/minute with 200kgf load cell
Compression Area: 25mm-square (25mm x 25mm)

4. Typical Material Properties: (Typical Value)

Item	Unit	Sarcon® GR-SL	Test method	Specimen[2)]
Color	-	Gray	Visual	-
Specific Gravity	-	3.0	JIS K 6220 / ASTM D 792	A
Hardness	ASKER-C (Shore-00)	18 (45)	JIS K 7312 (ASTM D 2240)	B
Tensile Strength	MPa	0.06	JIS K 6251(#2 Die)/ASTM D412	A
Elongation	%	45	JIS K 6251(#2 Die)/ASTM D412	A
Tear Strength	N/mm	0.3	JIS K 6252(Angle Die)/ASTM D624	A
Volume Resistivity	MΩ·m	$2x10^7$	JIS K 6249/ASTM D257	C
Breakdown Voltage	kV/mm	15	JIS K 6249/ASTM D149	C
Thermal Conductivit	Watt/m·K	2.7	Hot Disk method tester (TPA-	B
Flame Retardancy	-	V-0	UL94 standard	D

Remark 2) Specimen A 2.0mm thickness (200G-SL)
Specimen B 60mm width x 120mm length x 12mm thickness
Specimen C 120mm width x 120mm length x 1mm thickness (for measurement use only)
Specimen D 13mm width x 125mm length

5. Low Molecular Siloxane Content:

D_n	Sarcon® GR-SL
D_4-D_{10}	≦0.0016
D_{11}-D_{20}	≦0.0039
Total less D_{20}	≦0.0055

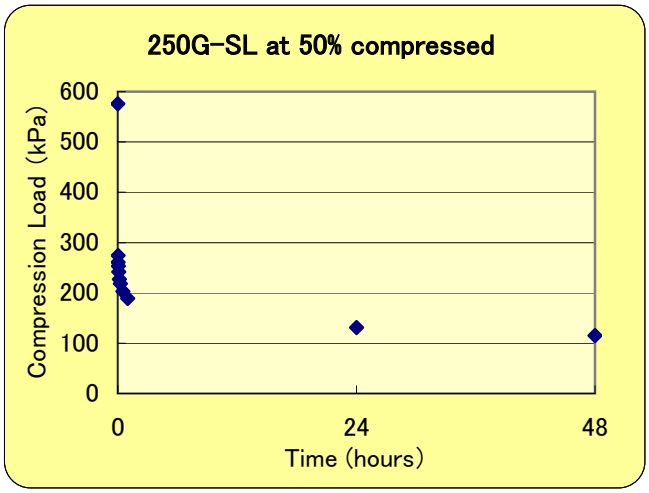
Gas Chromatography method：Extraction solvent: carbon tetrachloride

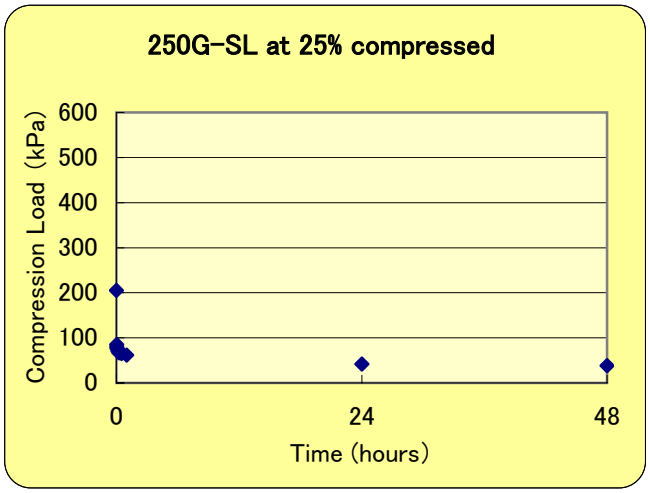
6. Compression vs. Compression Load: (Typical Value)

Compression Rate		250G-SL	500G-SL
Load (N)	10%	28	18
	20%	83	46
	30%	174	86
	40%	276	135
	50%	387	172
	Sustain 50%	196	72

*Test method: Specimen 25mm x 25mm
Measured the force at 50% compression with the 25x25mm specimen set between two aluminum plates (27mmW x 27mmL x 4.0mmT)
Compression Speed： 5.0mm/minute with 1960N(200kgf) load Cell
Measurement： Compression Load tester (Aikoh Engineering MODEL-310N)
Sustain 50%： Sustain 50% at 1 minute later

7. The relaxation of compression load data on Sarcon® GR-SL materials

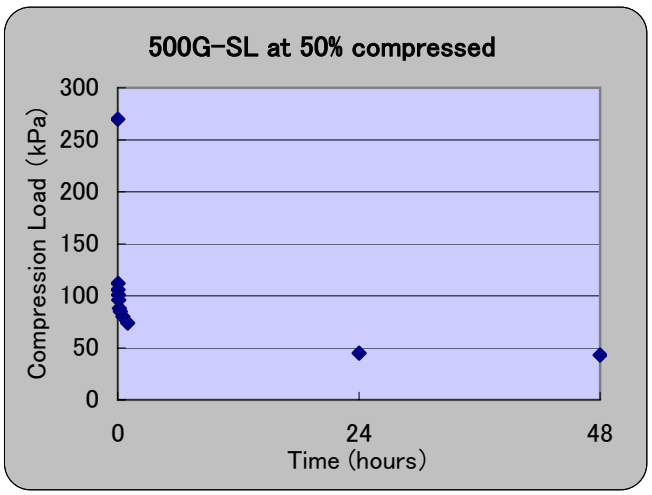


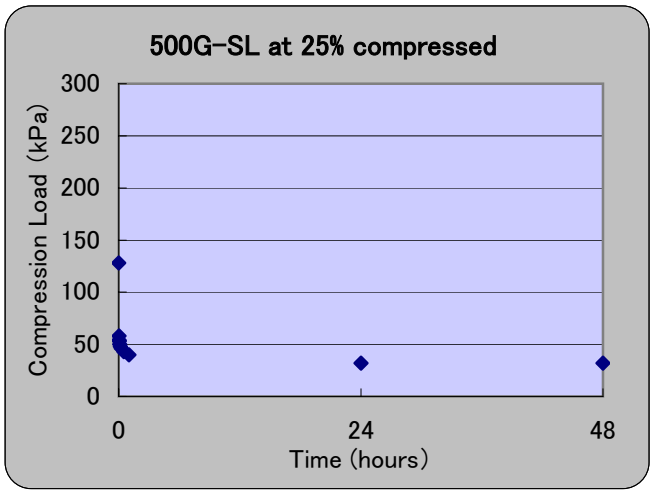


Sarcon® 250G-SL

Time		Peak(0)	1 min	2 min	3 min	5 min	10 min	15 min	30 min	60 min	24 h	48h
Comp. Rate	50%	576	274	261	253	242	227	218	203	189	131	115
	25%	205	85	80	77	75	70	67	65	62	42	38

Unit:kPa





Sarcon® 500G-SL

Time		Peak(0)	1 min	2 min	3 min	5 min	10 min	15 min	30 min	60 min	24 h	48h
Comp. Rate	50%	270	112	106	101	96	88	85	80	74	45	43
	25%	128	58	54	53	50	48	46	43	40	32	32

Unit:kPa

*Test method: Specimen 25mm x 25mm 2.5mmT,5.0mmT
Compression Speed: 5.0mm/minute with 1960N(200kgf) load Cell
Measurement: Compression Load tester (Aikoh Engineering MODEL-310N)
Compression Rate: 25%, 50%

8. Aging Test: (Typical Value)

8-1. Test Condition: +70℃ x 1000 hrs. --- Sarcon® GR-SL

Property			Unit	Initial	100hrs.	250hrs.	500hrs.	1000hrs.
Specific Gravity			-	3.0	3.0	3.0	3.0	3.0
Hardness			ASKER-C	18	26	28	24	30
Tensile Strength			MPa	0.06	0.06	0.11	0.11	0.12
Elongation			%	45	58	58	52	67
Tear Strength			N/mm	0.3	0.3	0.4	0.5	0.5
Volume Resistivity			MΩ·m	$2x10^{7}$	$6x10^{6}$	$2x10^{6}$	$8x10^{5}$	$2x10^{6}$
Breakdown Voltage			kV/mm	15	12	16	14	16
Thermal Conductivity			W/m·K	2.7	2.7	2.7	2.7	2.7
Compression Load	Compression Rate	10%	N	38	50	68	32	37
		20%		116	112	144	78	71
		30%		244	205	268	148	112
		40%		385	320	411	245	166
		50%		538	445	556	362	244
		Sustain 50%		288	270	338	203	113

Remark / The test methods are the same as the content 4 and 6.

8-2. Test Condition: +150℃ x 1000 hrs. --- Sarcon® GR-SL

Property			Unit	Initial	100hrs.	250hrs.	500hrs.	1000hrs.
Specific Gravity			-	3.0	3.0	3.0	3.0	3.0
Hardness			ASKER-C	18	25	21	34	40
Tensile Strength			MPa	0.06	0.07	0.11	0.13	0.21
Elongation			%	54	57	63	58	N.D.
Tear Strength			N/mm	0.3	0.3	0.4	0.6	1.1
Volume Resistivity			MΩ·m	$2x10^{7}$	$2x10^{6}$	$2x10^{6}$	$2x10^{6}$	$1x10^{7}$
Breakdown Voltage			kV/mm	15	14	17	17	19
Thermal Conductivity			W/m·K	2.7	2.7	2.7	2.7	2.7
Compression Load	Compression Rate	10%	N	38	54	119	122	243
		20%		116	120	244	248	369
		30%		244	234	424	428	482
		40%		385	375	623	643	586
		50%		538	536	759	849	715
		Sustain 50%		288	344	402	462	373

8-3. Test Condition: +60℃/95%RH x 1000 hrs. --- Sarcon® GR-SL

Property			Unit	Initial	100hrs.	250hrs.	500hrs.	1000hrs.
Specific Gravity			-	3.0	3.0	3.0	3.0	3.0
Hardness			ASKER-C	18	22	22	23	31
Tensile Strength			MPa	0.06	0.06	0.11	0.12	0.12
Elongation			%	45	45	62	58	60
Tear Strength			N/mm	0.3	0.2	0.4	0.5	0.5
Volume Resistivity			MΩ·m	$2x10^{7}$	$4x10^{6}$	$8x10^{6}$	$5x10^{6}$	$2x10^{6}$
Breakdown Voltage			kV/mm	15	14	15	15	16
Thermal Conductivity			W/m·K	2.7	2.7	2.7	2.7	2.7
Compression Load	Compression Rate	10%	N	38	55	66	59	51
		20%		116	126	145	132	124
		30%		244	176	274	248	235
		40%		385	378	416	383	363
		50%		538	523	561	522	505
		Sustain 50%		288	320	325	293	297

8-4. Test Condition: -40℃/30min ⇔ +125℃/30min x 1000 hrs. --- Sarcon® GR-SL

Property			Unit	Initial	100hrs.	250hrs.	500hrs.	1000hrs.
Specific Gravity			-	3.0	2.9	3.0	3.0	3.0
Hardness			ASKER-C	18	32	25	31	33
Tensile Strength			MPa	0.06	0.07	0.13	0.19	0.15
Elongation			%	45	58	63	33	42
Tear Strength			N/mm	0.3	0.2	0.5	0.6	0.5
Volume Resistivity			MΩ·m	$2x10^{7}$	$4x10^{6}$	$4x10^{6}$	$4x10^{6}$	$4x10^{6}$
Breakdown Voltage			kV/mm	15	14	14	18	19
Thermal Conductivity			W/m·K	2.7	2.7	2.7	2.7	2.7
Compression Load	Compression Rate	10%	N	38	49	72	95	97
		20%		116	130	168	221	222
		30%		244	250	316	396	393
		40%		385	385	492	594	590
		50%		538	529	672	802	777
		Sustain 50%		288	319	383	456	408

Remark / The test methods are the same as the content 4 and 6.

Notes:

- Properties of the products may be revised due to some changes for improving performance.
- Properties values in this document are not specification or guaranteed.
- All Fujipoly test data in this document are based on Fujipoly test methods and are believe to be accurate and reliable. Nevertheless, any Fujipoly test data shows typical product properties and does not show the guaranteed product properties.
- Some silicone oil may exude from the product according to operating conditions.
- Some low molecular siloxane may vaporize from the product according to operating conditions.
- It is advisable to use the product under recommended operating condition. Some more silicone oil may exude from the product if it was used beyond the recommended condition.
- It is advisable to use the product under parallel and even compression. Some more silicone oil may exude from the product if it was used under excessive or partial stress.
- Products testing by the purchaser is recommended in order to meet expected results such as performance and application.
- The products in the document are low hardness ones. The products may deform to some extend when taking the sheets off the liner. Customer are adviced to test the handling performance before use.

Statement of Lieu of Warranty:

All technical information and data in this document is based on tests and is believed to be accurate and reliable. Nevertheless, since the products described herein are not provided to conform with mutually accepted specifications and the use thereof is unknown, the manufacturer and seller of the product do not guarantee results, freedom from patent infringement, or suitability of the product for any application thereof. The manufacturer and seller of the product described in this document will provide all possible technical assistance and will replace any products proven defective. No statement or recommendation made by the manufacturer or seller not contained herein shall have any force of effect unless in conformity with an agreement signed by an officer of the seller or manufacturer. Product testing by the purchaser is recommended in order to confirm expected results.