

## Fujipoly Data Sheet

# SARCON<sup>®</sup> NR-c series

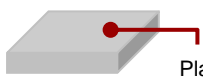
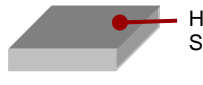
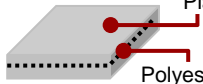
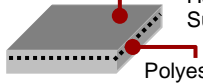
### Non-Silicone Gap Filler Type

### FEATURES

#### Highly Thermally Conductive and Non-Flammable Non-Silicone Gel materials.

SARCON<sup>®</sup> NR-c is a highly conformable, thermally conductive, non-flammable acrylate resin (non-silicone) sheet with thermally conductive fillers. Available in sheets and die-cut forms for formal interface uses wherever gap filler pads are traditionally used.

### CONSTRUCTIONS

Series	Characteristics	Constructions
<b>SARCON<sup>®</sup> NR-c</b>	Non-Silicone compound / Acrylate Resin with double sticky surfaces and Thermal Conductivity of NR-c material is 1.5W/m-K by using Hot Wire (1.3W/m-K by using Hot Disk)	 Plain Type
<b>SARCON<sup>®</sup> NR-Hc</b>	Non-Silicone compound as above NR-c plus additional hardening of the top surface to facilitate handling and installation during complex assemblies	 Hardened Surface
<b>SARCON<sup>®</sup> NR-Tc</b>	Non-Silicone compound with Polyester mesh reinforcement stiffener to prevent stretching	 Plain Type Polyester Mesh
<b>SARCON<sup>®</sup> NR-HTc</b>	Non-Silicone compound as above NR-Tc plus additional hardening of the top surface to facilitate handling and installation during complex assemblies	 Hardened Surface Polyester Mesh

### THERMAL RESISTANCE

#### NR-c

Unit : K-cm<sup>2</sup>/W (K-in<sup>2</sup>/W)

Compression Force	1.0mmT	1.5mmT	2.0mmT	3.0mmT
100kPa(14.5psi)	6.6 (1.02)	9.0 (1.39)	11.3 (1.75)	16.2 (2.52)
300kPa(43.5psi)	5.1 (0.78)	7.5 (1.16)	8.5 (1.32)	12.5 (1.93)
500kPa(72.5psi)	4.0 (0.61)	6.6 (1.02)	7.0 (1.08)	10.2 (1.58)

#### NR-Hc

Compression Force	1.0mmT	1.5mmT	2.0mmT	3.0mmT
100kPa(14.5psi)	6.6 (1.03)	10.2 (1.58)	13.6 (2.10)	18.6 (2.88)
300kPa(43.5psi)	5.5 (0.86)	8.9 (1.37)	11.0 (1.71)	14.4 (2.24)
500kPa(72.5psi)	5.0 (0.77)	8.0 (1.24)	9.6 (1.48)	12.1 (1.87)

#### NR-Tc

Compression Force	0.5mmT	1.0mmT	2.0mmT
100kPa(14.5psi)	4.0 (0.62)	7.6 (1.17)	13.4 (2.08)
300kPa(43.5psi)	3.8 (0.59)	7.1 (1.09)	12.3 (1.90)
500kPa(72.5psi)	3.7 (0.57)	6.8 (1.06)	11.2 (1.74)

#### NR-HTc

Compression Force	0.5mmT	1.0mmT	2.0mmT
100kPa(14.5psi)	4.4 (0.68)	7.5 (1.16)	14.0 (2.17)
300kPa(43.5psi)	4.3 (0.66)	7.1 (1.09)	12.4 (1.92)
500kPa(72.5psi)	4.2 (0.64)	6.7 (1.04)	11.4 (1.77)

Test method: Fujipoly Test method, FTM-P3050 by TIM Tester 1300 which is ASTM D5470 equivalent

- Specimen Area; DIA.33.0mm (1.30in)

**TYPICAL PROPERTIES**

Properties		unit	NR-c		Test method	Specimen	
Physical Properties	Color	-	Light Gray		Visual	-	
	Specific Gravity	-	2.1		ASTM D 792	A	
	Hardness Highest Value	Shore OO (ASKER C)	53 (27)		ASTM D2240 (ISO 7619)	B	
	Tensile Strength	MPa (psi)	0.2 (29.0)		ASTM D 412	A	
	Elongation	%	150		ASTM D 412	A	
	Tear Strength	N/mm (ppi)	1.5 (8.6)		ASTM D 624	A	
Electrical Properties	Volume Resistivity	Ohm-m	1.0x10 <sup>9</sup>		ASTM D 257	C	
	Breakdown Voltage	kV/mm (volts/mil)	11 (279)		ASTM D 149	C	
	Dielectric Constant	-	50Hz	9.12		ASTM D 150	A
			1kHz	8.55			
			1MHz	5.83			
	Dissipation Factor	-	50Hz	0.152		ASTM D 150	A
1kHz			0.135				
1MHz			0.034				
Thermal Properties	Thermal Conductivity	W/m-K	1.5 by Hot Wire		ASTM D 2326	-	
			1.3 by Hot Disk		ISO/CD 22007-2		
	Useful Temperature	°C (°F)	-40 to +105 (-40 to +221)		-	-	
	Flame Retardant	UL94	V-0		UL 94	-	

- Specimen A: 2mmT • Specimen B: 20mmW x 60mmL x 10mmT • Specimen C: 120mmW x 120mmL x 1mmT
- Test methods of Thermal Conductivity are based on Fujipoly Test Method, FTM P-1612 by Hot Disk and FTM P-1620 by Hot Wire.

**COMPRESSION FORCE****NR-c**Unit : N/6.4cm<sup>2</sup> (psi)

Compression Ratio	1.0mmT	1.5mmT	2.0mmT	2.5mmT	3.0mmT
10%	297 (67.3)	165 (37.3)	116 (26.3)	98 (22.2)	71 (16.1)
20%	548 (124.2)	355 (80.4)	271 (61.4)	201 (45.5)	168 (38.1)
30%	794 (179.9)	568 (128.7)	432 (97.9)	325 (73.6)	276 (62.5)
40%	1077 (244.0)	801 (181.5)	613 (138.9)	494 (111.9)	413 (93.6)
50%	1316 (298.2)	1014 (229.7)	826 (187.1)	687 (155.6)	568 (128.7)
Sustain 50%	445 (100.8)	379 (85.9)	310 (70.2)	284 (64.3)	226 (51.2)

**NR-Hc**

Compression Ratio	1.0mmT	1.5mmT	2.0mmT	2.5mmT	3.0mmT
10%	304 (68.9)	215 (48.7)	135 (30.6)	122 (27.6)	89 (20.2)
20%	599 (135.7)	454 (102.9)	305 (69.1)	250 (56.6)	210 (47.6)
30%	883 (200.0)	684 (155.0)	503 (114.0)	406 (92.0)	345 (78.2)
40%	1176 (266.4)	929 (210.5)	705 (159.7)	618 (140.0)	516 (116.9)
50%	1492 (338.1)	1253 (283.9)	957 (216.8)	858 (194.4)	710 (160.9)
Sustain 50%	621 (140.7)	572 (129.6)	351 (79.5)	355 (80.4)	283 (64.1)

Test method: Measured by ASTM D575-91 for reference

- Specimen Area; DIA.28.6mm (1.13in) • Platen Area; DIA. 28.6mm (1.13in) • Sustain 50%: Sustain 50% at 1 minute later
- Compression Velocity; 5.0mm/minute

**NR-Tc**Unit : N/6.4cm<sup>2</sup> (psi)

Compression Ratio	0.5mmT	1.0mmT	2.0mmT
10%	582 (131.8)	334 (75.8)	136 (30.8)
20%	608 (137.8)	608 (137.8)	297 (67.2)
30%	936 (212.1)	936 (212.1)	496 (112.3)
40%	1267 (287.1)	1267 (287.1)	701 (158.9)
50%	1614 (365.6)	1614 (365.6)	914 (207.1)
Sustain 50%	540 (122.4)	540 (122.4)	342 (77.4)

**NR-HTc**

Compression Ratio	0.5mmT	1.0mmT	2.0mmT
10%	643 (145.7)	366 (82.9)	148 (33.6)
20%	1404 (318.1)	787 (178.3)	360 (81.5)
30%	2066 (468.1)	1220 (276.4)	604 (136.8)
40%	2859 (647.7)	1717 (289.0)	871 (197.4)
50%	3651 (827.2)	2234 (506.0)	1185 (268.5)
Sustain 50%	1725 (390.9)	725 (164.2)	405 (91.7)

Test method: Measured by ASTM D575-91 for reference

- Specimen Area; DIA.28.6mm (1.13in) • Platen Area; DIA. 28.6mm (1.13in) • Sustain 50%: Sustain 50% at 1 minute later
- Compression Velocity; 5.0mm/minute

**DURABILITY**

Test Property	Unit	80°C		125°C	
		Initial	After 1,000hrs	Initial	After 1,000hrs
Specific Gravity	-	2.1	2.1	2.1	2.2
Hardness	ASKER C	27	30	27	57
Breakdown Voltage	kV/mm	11	18	11	26
Thermal Resistance	°C-cm <sup>2</sup> /W	6.8	7.5	6.8	9.9

Test Property	Unit	85°C/85%RH		-40°C	
		Initial	After 1,000hrs	Initial	After 1,000hrs
Specific Gravity	-	2.1	2.1	2.1	2.1
Hardness	ASKER C	27	28	27	37
Breakdown Voltage	kV/mm	11	15	11	27
Thermal Resistance	°C-cm <sup>2</sup> /W	6.8	7.3	6.8	10.4

Test Property	Unit	-40°C(30min)↔+125°C(30min)	
		Initial	After 1,000hrs
Specific Gravity	-	2.1	2.1
Hardness	ASKER C	27	37
Breakdown Voltage	kV/mm	11	27
Thermal Resistance	°C-cm <sup>2</sup> /W	6.8	10.4

Test method of Thermal Resistance: Measured by GHP (Guarded Hot Plate) method according to ASTM D5470 modified.

- Specimen; NR-c • Specimen Area; 15mm square • Specimen is sandwiched between aluminum blocks.

reduced temperature

-40°C = -40°F

60°C = 140°F

70°C = 158°F

85°C = 185°F

150°C = 302°F

## **TYPES AND CONFIGURATION**

Series	Product Name	Thickness	Sheet Size
SARCON® NR-c	100N-c	1.0mm ± 0.01mm	300mm x 200mm (Recommended Usable Size: 290mmx190mm)
	150N-c	1.5mm ± 0.15mm	
	200N-c	2.0mm ± 0.20mm	
	250N-c	2.5mm ± 0.25mm	
	300N-c	3.0mm ± 0.30mm	
SARCON® NR-Hc	100N-Hc	1.0mm ± 0.01mm	300mm x 200mm (Recommended Usable Size: 290mmx190mm)
	150N-Hc	1.5mm ± 0.15mm	
	200N-Hc	2.0mm ± 0.20mm	
	250N-Hc	2.5mm ± 0.25mm	
	300N-Hc	3.0mm ± 0.30mm	
SARCON® NR-Tc	50N-Tc	0.5mm ± 0.15mm	300mm x 200mm (Recommended Usable Size: 290mmx190mm)
	100N-Tc	1.0mm ± 0.20mm	
	150N-Tc	1.5mm ± 0.20mm	
	200N-Tc	2.0mm ± 0.30mm	
	250N-Tc	2.5mm ± 0.30mm	
	300N-Tc	3.0mm ± 0.30mm	
SARCON® NR-HTc	50N-HTc	0.5mm ± 0.15mm	300mm x 200mm (Recommended Usable Size: 290mmx190mm)
	100N-HTc	1.0mm ± 0.20mm	
	150N-HTc	1.5mm ± 0.20mm	
	200N-HTc	2.0mm ± 0.30mm	
	250N-HTc	2.5mm ± 0.30mm	
	300N-HTc	3.0mm ± 0.30mm	

## **HANDLING NOTES**

- It is recommended to use the material in up to 30% of compression ratio. Using the material beyond the recommended compression rate may result in excessive silicone oil exudation.
- It is recommended to compress the material with the equal ratio on the whole surface. Partial excessive stress may also result in excessive silicone oil exudation.

## **WARRANTY STATEMENT**

- Fujipoly has been utilizing Hot Disk method and TIM Tester method since Fujipoly defined them as Fujipoly standard.
- Properties of the products may be revised due to some changes for improving performance.
- Properties values in this document are not specification or guaranteed.
- This product is made of silicone, and silicone oil may exude from the product.
- This product is made of silicone, and low molecular siloxane may vaporize depending on operating conditions.
- The product is designed, developed, and manufactured for general industrial use only. Never use for medical, surgical, and/or relating purposes. Never use for the purpose of implantation and/or other purposes by which a part of or whole product remains in human body.
- Before using, a safety must be evaluated and verified by the purchaser.
- Contents described in the document do not guarantee the performances and qualities required for the purchaser's specific purposes. The purchaser is responsible for pre-testing the product under the purchaser's specific conditions and for verifying the expected performances.
- Statements concerning possible or suggested uses made herein may not be relied upon, or be constructed, as a guaranty of no patent infringement.
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