

## Fujipoly Data Sheet

# SARCON® HR / GHR series

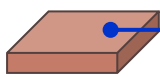
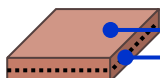
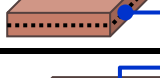
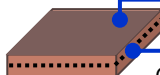

### High Performance Rubber Type

### FEATURES

**Thin Film with High Thermal Conductivity , Electric Isolation and Non-Flammable.**

- SARCON HR is available in press moldings, die-cut Gaskets, extrusion shapes and more with desired designs.
- UL 94 V-0 and UL 746 150°C certified.

### CONSTRUCTIONS

Series	Characteristics	Constructions
<b>SARCON® HR</b>	Fine heat conductive particles are mixed with insulative silicone rubber to produce this excellent insulative, high heat conductive silicone material : 1.7W/mK (by Hot Wire)	 Plain Type
<b>SARCON® GHR</b>	Thermalley conductive sheet shaped material with reinforcement which coated SARCON HR to Glass Fabric for excellent mechanical and physical characteristics.	 Plain Type  Glass Fabric
<b>SARCON® GHR-AD</b>	SARCON GHR is available with a PSA (Pressure Sensitive Adhesive) mounting option, simply remove the protective liner and press into position to attach.	 PSA  Glass Fabric

### THERMAL RESISTANCE

#### HR

Clamping Torque	30H (0.3mmT)	45H (0.45mmT)	85H (0.85mmT)
0.29Nm / 0.22lbf-ft	2.8 (0.44)	3.5 (0.54)	4.9 (0.76)
0.49Nm / 0.36lbf-ft	2.7 (0.42)	3.4 (0.52)	4.8 (0.74)
0.69Nm / 0.51lbf-ft	2.5 (0.39)	3.3 (0.51)	4.7 (0.73)

#### GHR

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

Clamping Torque	15GHR (0.15mmT)	20GHR (0.2mmT)	30GHR (0.3mmT)
0.29Nm / 0.22lbf-ft	3.7 (0.58)	3.9 (0.61)	4.3 (0.67)
0.49Nm / 0.36lbf-ft	3.6 (0.55)	3.7 (0.57)	3.9 (0.61)
0.69Nm / 0.51lbf-ft	3.4 (0.53)	3.5 (0.54)	3.8 (0.59)

#### 1. Test Method by FTM P-3010

Fujipoly test method FTM P-3010 which gives ASTM D5470 equivalent value. Punched-out specimen in TO-3 package is located between a transistor and heat sink, and secured them by using a screwdriver. 20watt power is applied to the transistor. After three minutes, the thermal resistance is calculated based on the following formula.

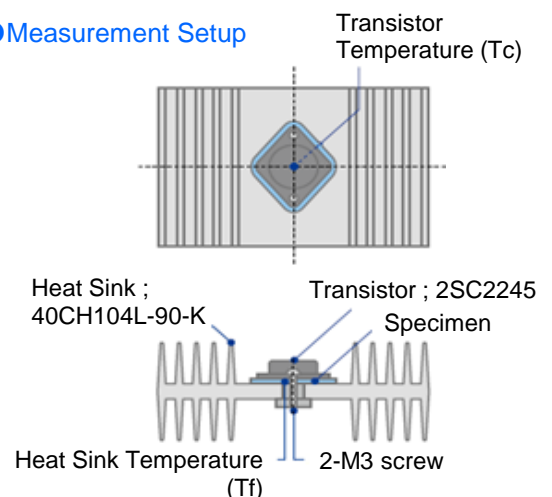
#### 2. Principle

A thermal impedance is given by the equation below.

$$R_t = (T_c - T_f) / P_0$$

$R_t$  : Thermal resistance (K/W)  
 $T_c$  : Transistor temperature (K)  
 $T_f$  : Heat sink temperature (K)  
 $P_0$  : Heat Flow (W)

#### ● Measurement Setup



**TYPICAL PROPERTIES**

Properties	unit	HR			GHR			Test method		
		30H	45H	85H	15GHR	20GHR	30GHR			
Physical Properties	Color	-	Brown			Brown			Visual	
	Thickness	mm	0.3 +0.1/-0	0.45 ±0.05	0.85 ±0.05	0.15 +0.02/-0.04	0.2 +0.02/-0.04	0.3 +0.10/-0	ISO 463:2006	
	Specific Gravity	-	2.4			2.4			ASTM D792	
	Hardness Highest Value	IRHD	85	85	85	92	92	95	ISO 7619	
	Tensile Strength	MPa	4.8	5.0	5.0	52.3*	39.2*	22.4*	ASTM D412	
		psi	696	725	725	7583*	5684*	3248*		
	Elongation	%	60	60	60	2 or less*	2 or less*	2 or less*	ASTM D412	
Tear Strength	N/mm	2 (Die-B)	3 (Die-B)	6 (Die-B)	-	-	-	ASTM D624		
Electrical Properties	Volume Resistivity	Ohm-m	1x10 <sup>13</sup>	1x10 <sup>13</sup>	1x10 <sup>13</sup>	1x10 <sup>13</sup>	1x10 <sup>13</sup>	1x10 <sup>13</sup>	ASTM D257	
	Breakdown Voltage	kV(AC)	9	10	14	3	6	9	ASTM D149	
	Dielectric Strength	kV(AC)	6	7	10	2	4	8	ASTM D149	
	Dielectric Constant	-	50Hz	4.9	4.6	5.4	3.0	3.3	3.9	ASTM D150
			1kHz	4.9	4.5	5.7	3.0	3.3	3.9	
			1MHz	4.8	4.5	5.4	3.0	3.3	3.9	
Dissipation Factor	-	50Hz	0.008	0.007	0.004	0.015	0.009	0.006	ASTM D150	
		1kHz	0.004	0.004	0.002	0.005	0.003	0.003		
		1MHz	0.003	0.003	0.002	0.003	0.004	0.004		
Thermal Properties	Thermal Conductivity	W/m-K	1.7			1.4			ASTM D2326 (Hot Wire)	
	Recommended Operating Temp.	°C	-40 to +150			-40 to +150			-	
		°F	-40 to +302			-40 to +302				
	Relative Thermal Index	°C	150			150			UL 746	
Flame Retardant	UL94	V-0			V-0			UL 94		

\* Tensile Strength/Elongation on GHR according to ASTM D1458, Fully Cured Silicone Rubber - Coated Glass Fabric Cloth.

**DURABILITY - HR****Heat Aging Test : 150°C (300°F)**

Properties	unit	30H			45H			85H		
		Before	500hrs	1,000hrs	Before	500hrs	1,000hrs	Before	500hrs	1,000hrs
Hardness	IRHD	93	92	94	93	95	95	93	94	94
Tensile Strength	Mpa	5.6	5.3	3.9	6.8	6.3	6.1	6.2	5.8	5.5
Elongation	%	60	30	25	50	30	30	50	30	30
Volume Resistivity	Ohm-m	$9.0 \times 10^{13}$	$4.6 \times 10^{13}$	$1.0 \times 10^{13}$	$9.0 \times 10^{13}$	$6.6 \times 10^{13}$	$4.7 \times 10^{13}$	$1.0 \times 10^{13}$	$7.0 \times 10^{13}$	$7.0 \times 10^{13}$
Breakdown Voltage	kV	9.0	7.8	7.0	10.0	8.3	8.1	14.0	11.7	11.5
Dielectric Constant	50Hz	4.9	4.6	4.6	4.6	4.5	4.6	5.4	5.5	5.5
	1kHz	4.9	4.6	4.5	4.5	4.5	4.6	5.4	5.5	5.5
	1MHz	4.8	4.6	4.6	4.5	4.5	4.6	5.4	5.5	5.5
Dissipation Factor	50Hz	0.008	0.003	0.004	0.007	0.004	0.004	0.004	0.003	0.003
	1kHz	0.004	0.002	0.002	0.004	0.003	0.003	0.002	0.002	0.002
	1MHz	0.003	0.003	0.003	0.003	0.004	0.004	0.002	0.003	0.003

**Heat Aging Test : 200°C (390°F)**

Properties	unit	30H			45H			85H		
		Before	500hrs	1,000hrs	Before	500hrs	1,000hrs	Before	500hrs	1,000hrs
Hardness	IRHD	93	98	98	93	99	99	93	94	95
Tensile Strength	Mpa	5.6	5.3	5.6	6.8	6.5	6.8	6.2	4.6	6.2
Elongation	%	60	40	25	50	35	25	50	25	25
Volume Resistivity	Ohm-m	$9.0 \times 10^{13}$	$4.4 \times 10^{13}$	$9.4 \times 10^{13}$	$9.0 \times 10^{13}$	$6.5 \times 10^{13}$	$5.6 \times 10^{13}$	$1.0 \times 10^{13}$	$6.5 \times 10^{13}$	$7.6 \times 10^{13}$
Breakdown Voltage	kV	9.0	7.6	7.0	10.0	7.6	6.0	14.0	12.1	12.4
Dielectric Constant	50Hz	4.9	4.7	4.6	4.6	4.4	4.3	5.4	5.5	5.5
	1kHz	4.9	4.7	4.6	4.5	4.4	4.3	5.4	5.5	5.4
	1MHz	4.8	4.7	4.6	4.5	4.4	4.3	5.4	5.5	5.4
Dissipation Factor	50Hz	0.008	0.005	0.005	0.007	0.004	0.004	0.004	0.002	0.002
	1kHz	0.004	0.003	0.003	0.004	0.003	0.003	0.002	0.002	0.002
	1MHz	0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.003	0.002

**Water Resistance Test : 60°C (140°F)**

Properties	unit	30H			45H			85H		
		Before	250hrs	500hrs	Before	250hrs	500hrs	Before	250hrs	500hrs
Hardness	IRHD	90	86	86	93	90	89	93	86	86
Volume Resistivity	Ohm-m	$2.8 \times 10^{13}$	$3.6 \times 10^{11}$	$2.4 \times 10^{11}$	$1.8 \times 10^{13}$	$6.6 \times 10^{11}$	$2.4 \times 10^{11}$	$1.0 \times 10^{13}$	$5.3 \times 10^{11}$	$2.6 \times 10^{11}$
Breakdown Voltage	kV	9.0	3.5	4.0	10.5	6.0	5.0	14.0	7.0	6.0
Dielectric Constant	50Hz	4.9	5.3	5.6	4.6	5.3	5.5	5.4	6.1	6.4
	1kHz	4.9	5.2	5.4	4.5	5.1	5.3	5.4	5.9	6.2
	1MHz	4.8	5.1	5.2	4.5	5.1	5.1	5.4	5.8	6.0
Dissipation Factor	50Hz	0.008	0.021	0.029	0.007	0.016	0.024	0.004	0.019	0.023
	1kHz	0.004	0.013	0.017	0.004	0.009	0.014	0.002	0.010	0.013
	1MHz	0.003	0.006	0.008	0.003	0.006	0.007	0.002	0.006	0.007

**Chemical Resistance Test : (Chemical : HCFC AK-225 (Substitutive Freon) )**

Properties	unit	30H		45H		85H	
		Before	24hrs	Before	24hrs	Before	500hrs
Volume Resistivity	Ohm-m	$2.8 \times 10^{12}$	$3.0 \times 10^{11}$	$1.8 \times 10^{13}$	$2.3 \times 10^{13}$	$1.0 \times 10^{13}$	$6.0 \times 10^{13}$
Breakdown Voltage	kV	9	8	10	10	14	13
Thermal Resistance	K-in <sup>2</sup> /W	0.42	0.41	0.52	0.53	0.76	0.74

**DURABILITY - GHR****Heat Aging Test : 150°C (300°F)**

Properties	unit	15GHR			20GHR			30GHR		
		Before	500hrs	1,000hrs	Before	500hrs	1,000hrs	Before	500hrs	1,000hrs
Hardness	IRHD	92	93	92	92	92	93	95	94	96
Tensile Strength	Mpa	52.3	60.1	51.0	41.7	43.1	47.0	24.1	24.6	26.6
Elongation	%	2 or less	2 or less	2 or less	2 or less	2 or less	2 or less	2 or less	2 or less	2 or less
Volume Resistivity	Ohm-m	$1.1 \times 10^{13}$	$6.5 \times 10^{13}$	$1.8 \times 10^{14}$	$1.3 \times 10^{13}$	$1.3 \times 10^{14}$	$7.3 \times 10^{13}$	$3.3 \times 10^{13}$	$9.1 \times 10^{13}$	$3.9 \times 10^{13}$
Breakdown Voltage	kV	3.0	3.0	3.0	5.5	5.3	5.0	7.0	7.3	7.0
Dielectric Constant	50Hz	3.0	2.6	2.5	3.3	2.7	2.9	3.9	3.4	3.1
	1kHz	3.0	2.6	2.5	3.3	2.6	2.9	3.9	3.4	3.1
	1MHz	3.0	2.6	2.5	3.3	2.6	2.9	3.9	3.4	3.1
Dissipation Factor	50Hz	0.015	0.005	0.004	0.009	0.003	0.004	0.006	0.003	0.004
	1kHz	0.005	0.002	0.002	0.003	0.002	0.002	0.003	0.002	0.002
	1MHz	0.003	0.003	0.003	0.004	0.004	0.003	0.004	0.004	0.004

**Heat Aging Test : 200°C (390°F)**

Properties	unit	15GHR			20GHR			30GHR		
		Before	500hrs	1,000hrs	Before	500hrs	1,000hrs	Before	500hrs	1,000hrs
Hardness	IRHD	92	93	94	92	92	92	95	95	96
Tensile Strength	Mpa	52.3	45.7	38.5	41.7	38.7	41.7	24.1	23.0	20.2
Elongation	%	2 or less	2 or less	2 or less	2 or less	2 or less	2 or less	2 or less	2 or less	2 or less
Volume Resistivity	Ohm-m	$1.1 \times 10^{13}$	$1.8 \times 10^{14}$	$1.8 \times 10^{14}$	$1.3 \times 10^{13}$	$1.1 \times 10^{14}$	$1.8 \times 10^{14}$	$3.3 \times 10^{13}$	$1.0 \times 10^{14}$	$1.0 \times 10^{14}$
Breakdown Voltage	kV	3.0	3.0	2.5	5.5	4.7	4.0	7.0	6.1	5.7
Dielectric Constant	50Hz	3.0	2.1	2.4	3.3	2.6	2.9	3.9	3.2	3.5
	1kHz	3.0	2.1	2.4	3.3	2.7	2.9	3.9	3.2	3.5
	1MHz	3.0	2.2	2.4	3.3	2.6	2.9	3.9	3.2	3.5
Dissipation Factor	50Hz	0.015	0.001	0.002	0.009	0.001	0.002	0.006	0.002	0.002
	1kHz	0.005	0.001	0.001	0.003	0.001	0.001	0.003	0.001	0.001
	1MHz	0.003	0.002	0.003	0.004	0.002	0.003	0.004	0.003	0.003

**Water Resistance Test : 60°C (140°F)**

Properties	unit	15GHR			20GHR			30GHR		
		Before	250hrs	500hrs	Before	250hrs	500hrs	Before	250hrs	500hrs
Hardness	IRHD	92	92	92	92	92	92	95	95	95
Volume Resistivity	Ohm-m	$1.1 \times 10^{13}$	$7.5 \times 10^{11}$	$3.2 \times 10^{10}$	$1.3 \times 10^{13}$	$3.3 \times 10^9$	$2.0 \times 10^8$	$3.3 \times 10^{13}$	$2.4 \times 10^{11}$	$3.9 \times 10^9$
Breakdown Voltage	kV	3.0	2.5	2.5	5.5	4.0	4.0	7.0	7.0	7.0
Dielectric Constant	50Hz	3.0	-	3.5	3.3	-	4.4	3.9	-	5.0
	1kHz	3.0	-	3.3	3.3	-	4.1	3.9	-	4.7
	1MHz	3.0	-	3.3	3.3	-	4.0	3.9	-	4.5
Dissipation Factor	50Hz	0.015	-	0.045	0.009	-	0.061	0.006	-	0.069
	1kHz	0.005	-	0.010	0.003	-	0.026	0.003	-	0.020
	1MHz	0.003	-	0.007	0.004	-	0.014	0.004	-	0.008

**Chemical Resistance Test : (Chemical : HCFC AK-225 (Substitutive Freon) )**

Properties	unit	15GHR		20GHR		30GHR	
		Before	24hrs	Before	24hrs	Before	500hrs
Volume Resistivity	Ohm-m	$1.6 \times 10^{13}$	$2.5 \times 10^{12}$	$3.2 \times 10^{13}$	$1.2 \times 10^{13}$	$2.5 \times 10^{13}$	$1.1 \times 10^{13}$
Breakdown Voltage	kV	3	2	6	4.5	9	8.3
Thermal Resistance	K-in <sup>2</sup> /W	0.55	0.56	0.57	0.61	0.61	0.62

## **HANDLING NOTES**

- 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**

- 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.
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