



GETELEC

We protect your electronics



OUR SOLUTIONS FOR MEDICAL INDUSTRIES

www.getelec.com

INTRODUCTION

Combining more than 50 years of experience in EMC shielding, heat dissipation and technical sealing solutions, GETELEC teams design and deliver innovative solutions for medical devices.

Advances in medicine have resulted in a significant increase in the amount and complexity of equipment for patientcare applications.

Today, the miniaturization and portable nature of these more and more sophisticated equipment requires EMC shielding and heat dissipation products.

GETELEC provides medical players, its capitalized know-how and customer support for both electronic sub-assemblies and complete medical devices.



MEDICAL IMAGING

Our family of microwave shielding gasket provides EMC protection for transmission and reception.

Our products prevent electromagnetic interference between the various devices (scanner, monitor, instruments).



MONITORING

Modern medical devices are subject to multiple constraints: reliability, patient safety, performance or even compactness.

These constraints are as many design challenges that GETELEC is raising through its range dedicated to the medical sector.

GETELEC's technical teams support the design offices from the initial design choices to the final realization

CONSUMABLES

Thanks to our integrated chemistry laboratory, GETELEC engineers formulate many silicones and LSRs adapted to medical specificities.

Our fleet of latest generation machine allows us to make all kinds of extruded parts, molded, cut or overmolded.

Our extrusion lines produce silicone tubes of very different sizes, shapes and material grades.



RANGE OF PRODUCTS

EMI CONDUCTIVE SILICONE GASKETS

GETELEC develops its own conductive mixtures meeting the requirements of standards MIL G 83528, MIL STD 285, GAM EG-13. Our EMC experts are at your disposal to assist you in the definition of your projects. All of these seals are available as molded, cut flat, extruded and overmolded parts.

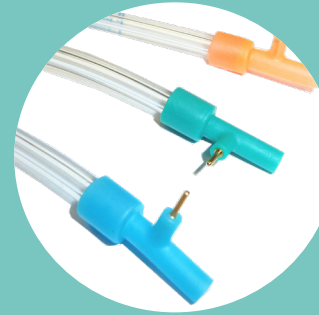
Volume Resistivity of 0.0016 $\Omega \cdot \text{cm}$ to 2.7 $\Omega \cdot \text{cm}$

Shielding effectiveness between 80dB to 140dB (20MHz - 10GHz)



OVERMOLDED PRODUCTS

The overmoulding guarantees a direct seal without external additions, joints or glues, adopting the geometry and the overmolded material. In this way, your catheters will benefit from a high precision over-molding and advanced technological solutions, to make them more watertight, more flexible and more resistant.

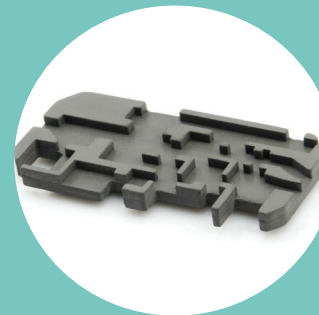


MICROWAVE ABSORBERS

Microwave absorbers consists of flexible silicone materials filled of magnetic particles. These materials ensure an excellent attenuation performance over given frequency bands, which can reach an attenuation greater than 20 dB of the incident wave.

Our laboratory has developed several formulations composed of epoxy type rigid microwave absorbers, silicone-based flexible microwave absorbers and foams of different thicknesses.

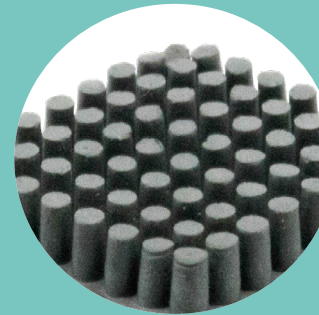
Range of natural frequencies of absorptions between 1 GHz and 40 GHz.



THERMAL INTERFACE MATERIALS

Positioned between the power component and the cooler, thermal pads are designed to optimize the heat dissipation and thus reduce the thermal resistance of your equipment. Our complete range consists of high flexible thermally conductive gap fillers, thermally conductive electrical insulators, both electrical and thermal conductive silicones.

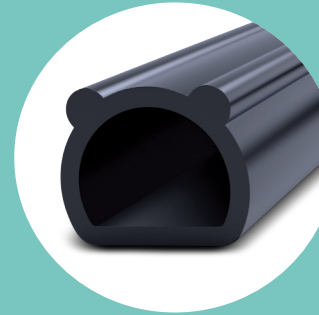
Thermal conductivity of our products is between 1 and 8.5 W/m.K



ENVIRONMENTAL SEALING GASKETS

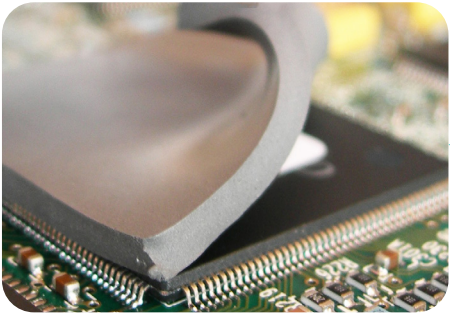
GETELEC formulates its own silicone mixtures and masters the transformation, allowing it to offer a tailor-made solution to its customers.

Our specific silicone grades allow us to offer you a complete range of aircraft grade seals available at **hardnesses between 20 Shore A and 90 Shore A.**

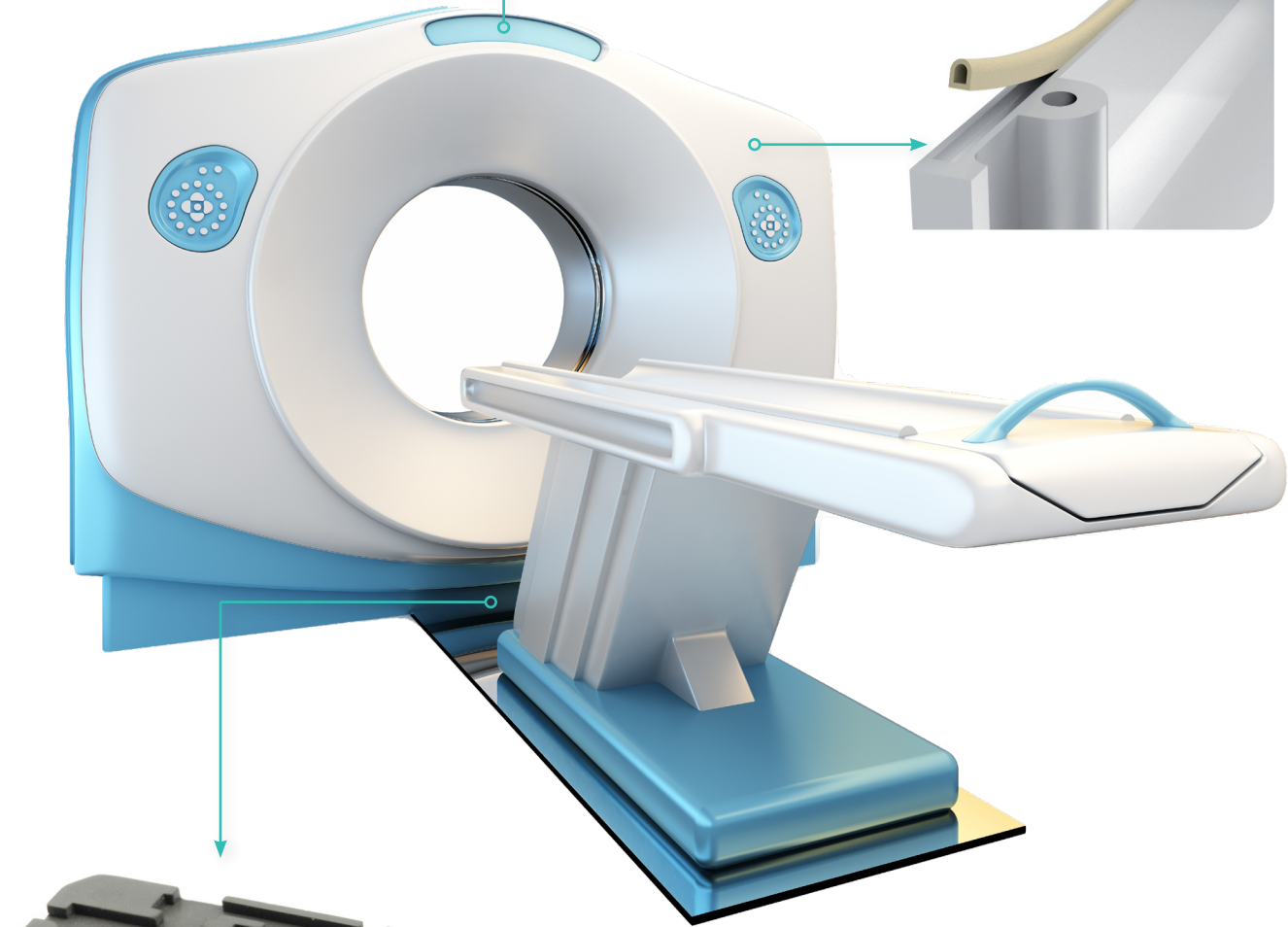
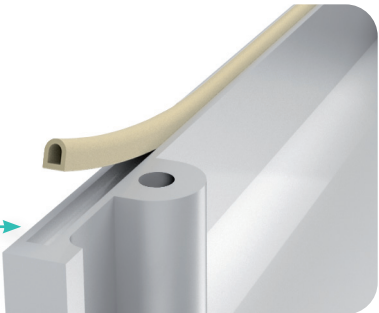


APPLICATIONS FOR THE MEDICAL INDUSTRY

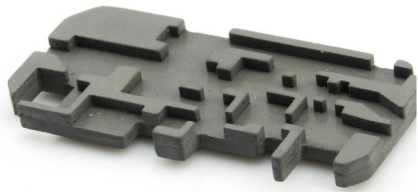
Thermal pad for heat dissipation



Extruded EMI shielding gasket



Microwave absorbers



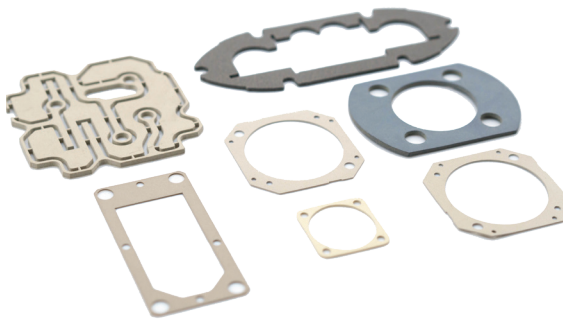
Silicone tube extrusion



CONDUCTIVE SILICONE GASKETS

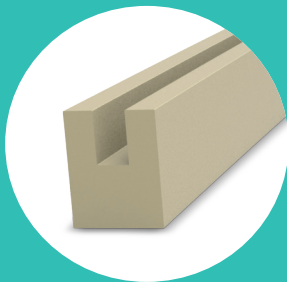
Our conductive materials are developed in every respect by our chemical engineers. From the selection of raw materials to the final transformation, they make specific formulations for each application and master all the processes of development.

This mastery allows us to define the material according to your equipment, in order to offer you a bespoke solution adapted to your needs.

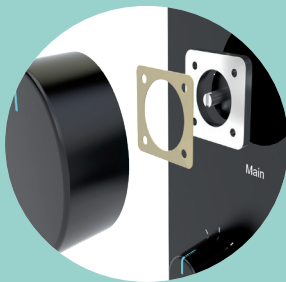


Properties	Standards	GT 1000	GT 2020	GT 5000	GT 5200
Type MIL G 83528		K	-	B	
Elastomer		Silicone	Silicone	Silicone	EPDM
Conductive filler		Silver-plated copper	Pure silver	Silver-plated aluminum	Silver-plated aluminum
Volume resistivity $\Omega \cdot \text{cm}$	MIL G 83528	< 0.005	< 0.006	< 0.0054	< 0.015
Hardness Shore A	ASTM D 2240	82	75	65	70
Density g/cm^3	ASTM D 792 Method A	3.40	3.90	1.90	2
Break resistance (Mpa)	ASTM D 412 Method A C	2.80	4.61	1.89	1.70
Elongation at break (%)	ASTM D 412 Method A C	250	355	286	470
Tear strength (N/mm)	ASTM D 624 Method C	13.44	13.73	8.43	12.00
Residual deformation after 70 hours at 100°C (%)	ASTM D 395 Method B	17.50	33.12	17.30	40
Working temperature (°C)		-55 °C to +125°C	- 55°C to +160°C	-55 °C to +160°C	-45 °C to+160 °C
Shielding performance					
20 MHz		130 dB	110 dB	128 dB	128 dB
100 MHz		140 dB	110 dB	137 dB	137 dB
500 MHz		120 dB	110 dB	133 dB	133 dB
2 GHz		120 dB	110 dB	122 dB	122 dB
10 GHz		120 dB	110 dB	104 dB	104 dB
Color		Grey	Beige	Grey	Grey

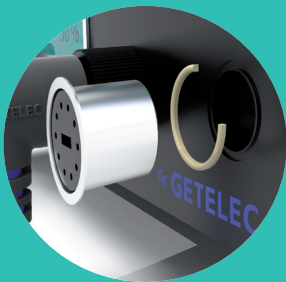
AVAILABLE FORMATS :



Extruded



Cut

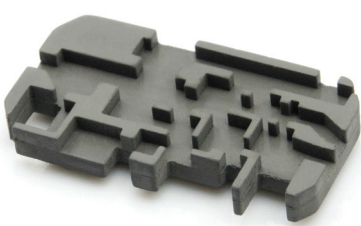


Molded

MICROWAVE ABSORBERS

Flexible silicone microwave absorbers

GT602 range have narrowband performance but also high-power density performance (> 1W / cm2) for positioning on antennas or high-power equipment. Thanks to its low de-gassing properties, our GT602 range is suitable for space applications. These absorbers are frequently used with adhesives for simplified implementation. Homogeneity is ensured by a complex mixture developed internally by GETELEC.



Our entire product range is available in sheet form or custom cut pieces.

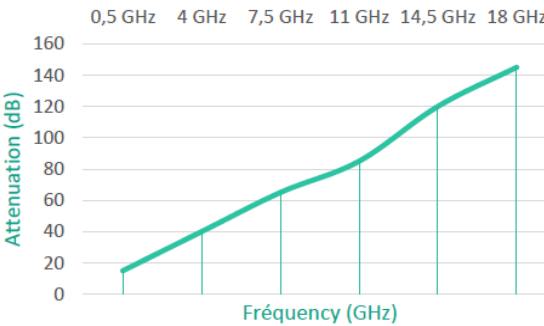
Attenuation guide

Attenuation	Percentage absorbed	
- 5 dB	68.38 %	
-10 dB	90.00 %	
-15 dB	96.84 %	
-20 dB	99.00 %	
-40 dB	99.99 %	
Getelec material reference	Thickness (mm)	Resonance frequency
GT 602 R90	4.5	1 GHz
GT 602 R90	3.2	2 GHz
GT 602 R90	2.4	3 GHz
GT 602 R90	2.2	4 GHz
GT 602 R88	2	5 GHz
GT 602 R85	2	6 GHz
GT 602 R85	1.8	7 GHz
GT 602 R85	1.6	8 GHz
GT 602 R85	1.5	9 GHz
GT 602 R85	1.3	10 GHz
GT 602 R74	1.7	11 GHz
GT 602 R71	1.6	12 GHz
GT 602 R71	1.5	13 GHz
GT 602 R71	1.45	14 GHz
GT 602 R71	1.4	15 GHz
GT 602 R71	1.3	16 GHz
GT 602 R65	1.2	17 GHz
GT 602 R65	1.15	18 GHz
GT 602 R64	1.1	24 GHz
GT 602 R63	0.95	28 GHz
GT 602 R62	1.1	35 GHz

Sheets or finished parts are available, on request, in version with or without adhesive.

Rigid microwave absorber | Epoxy

Properties	Standards	GT 502
Material		Epoxy
Hardness shore D	ASTM D 2240	95
Density g/cm3	ASTM D 792 Method A	4.57
Tensile strength Mpa	NF EN ISO 527-1	56
Elongation at break %	NF EN ISO 527-1	2.4
Working temperature °C		-180 °C to + 200°C



ENVIRONMENTAL SEALING SILICONE

Using specific silicone grades, forming the basis of our formulations, has allowed us to develop two main product families: Fluorinated silicones and non-fluorinated silicones, within our complete range of environmental sealing silicones.

The family of fluorinated silicones : FVMQ type (ASTM D1418), these elastomers offer excellent resistance to solvents, fuels, organic oils and silicone oils, while maintaining their mechanical properties over a wide range of temperatures (-60°C to + 230°C).

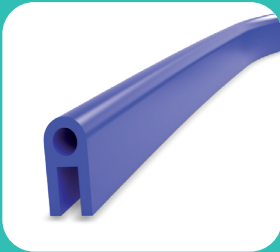
The family of non-fluorinated silicones : Of the VMQ type (ASTM D 1418), these elastomers allow the production of molded parts, extruded joints, flat seals cut or adhesively vulcanized. They retain their mechanical properties over a wide range of temperatures (-73°C to + 232°C).



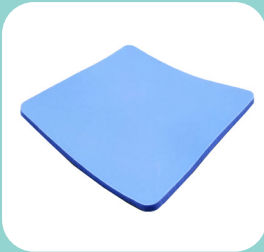
Properties	Standards	GT 20	GT 40	GT 47	GT 50	GT 57	GT 60	GT 67	GT 70	GT 77
Elastomer		Silicone	Silicone	Fluoro-silicone	Silicone	Fluoro-silicone	Silicone	Fluoro-silicone	Silicone	Fluoro-silicone
Hardness shore A ±5	ASTM D 2240	25	40	40	50	50	60	60	70	70
Specific mass at 25°C (g/cm3)	ASTM D 792	1.10	1.10	1.43	1.19	1.44	1.27	1.46	1.35	1.48
Tensile strength PSI MPa	ASTM D 412	870 6	1 000 6.80	1 250 8.60	980 6.75	1 200 8.45	950 6.55	1 200 8.30	1 000 6.89	1 250 8.60
Elongation (%)	ASTM D 412	950	500	400	380	350	300	300	180	300
Residual deformation after 70 hours at 177 °C	ASTM D 395 Method B	20	30	20	32	25	33	25	34	25
Color		Red*	Orange *	Blue *	Red *	Blue *	Blue*	Blue*	Red*	Blue*

* Customized color on request

AVAILABLE FORMATS :



Extruded



Cut



Molded

THERMAL INTERFACE MATERIALS

The GTG range includes highly conductive thermal mattresses ideal for applications requiring high thermal conductivity. Its specific formulations developed by our laboratory, as well as its loads, give these silicone elastomers an exceptional thermal conductivity.

Thanks to their great flexibility, flexibility and ease of installation, they follow the surface irregularities between the power component and the cooler as soon as they are assembled, which helps to dissipate heat and protect your equipment.



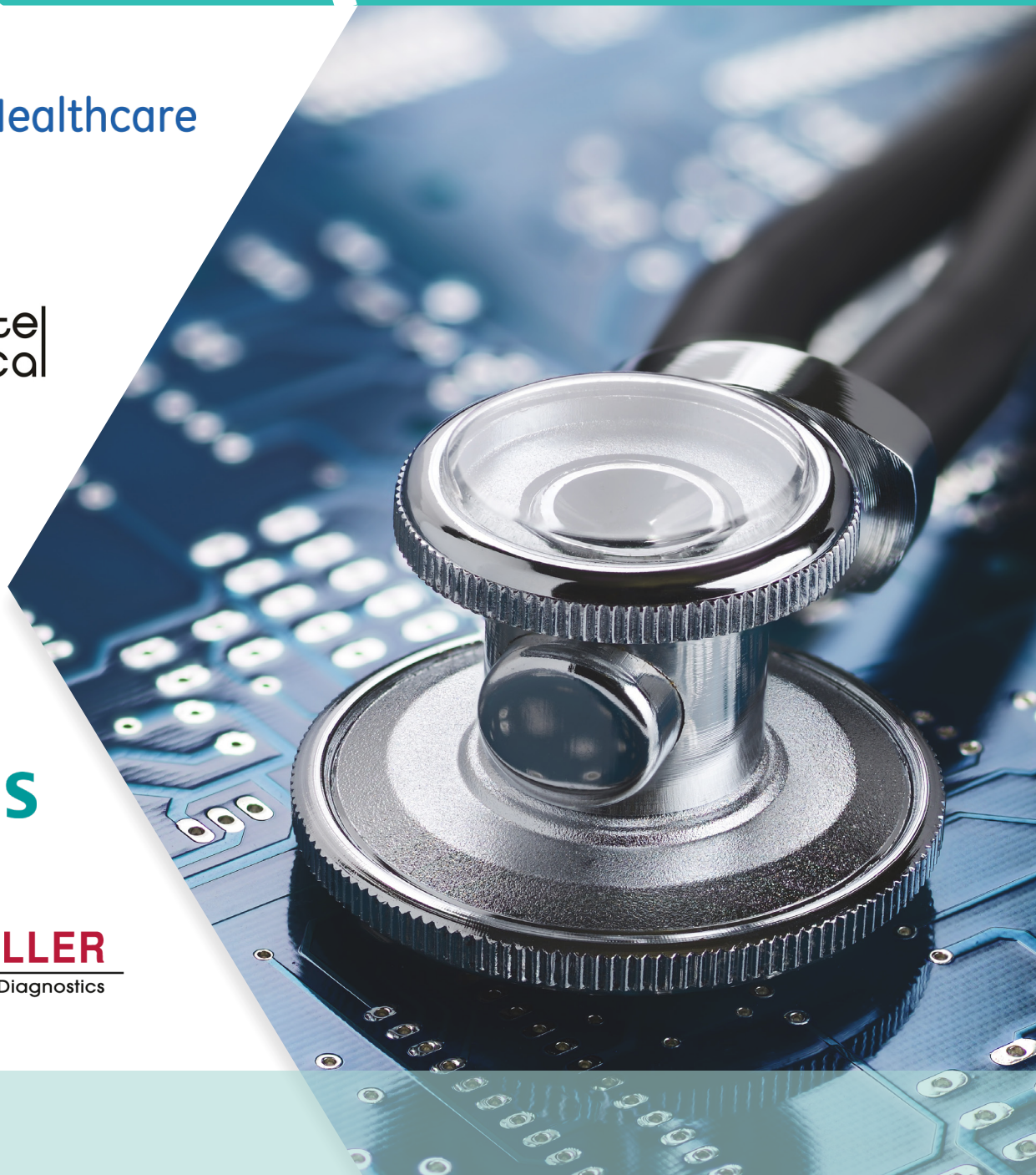
Thermal conductivity	Reference	Color	Hardness shore 00	Thickness mm	Flame retardant	RoHs	Working temperature (°C)	Densitéy g/cm3	Elongation %	Thermal conductivity W/m.k	Dielectric strength kV/mm	Breakdown voltage kV/mm	Volume resistivity Ohm.m	Dielectric constant @1Mhz	Dissipation factor @1MHz												
Standards			ASTM D2240	UL 94				ASTM D792	ASTM D412	ASTM D 7984 Modified transient plane source(MTPS)	ASTM D149	ASTM D149	ASTM D257	ASTM D150	ASTM D150												
1 W/m.K	GTG 1-40	Grey	40 ± 2	0.5 to 20 mm	V0	Yes	-60°C to +200°C	2.6	< 200	1 ± 0.1	11	17	10 ¹³	4	0.006												
	GTG 1.3-45*		45 ± 2							1.3 ± 0.1	5	18															
	GTG 1-60		60 ± 2						200	1 ± 0.1	11	17															
	GTG 1-75		75 ± 2							1 ± 0.1	11	17															
	GTG 1-85		85 ± 2																								
2 W/m.K	GTG 2-40	Blue	40 ± 2	0.5 to 20 mm	V0	Yes	-45 °C to +200°C	2.7	< 100	2.± 0.1	14	17	10 ¹²	4.2	0.005												
	GTG 2.5-50		50 ± 2					2.75		2.5 ± 0.1	18	16															
	GTG 2-60		60 ± 2					2.7	100	2 ± 0.1	14	17															
	GTG 2-75		75 ± 2																								
	GTG 2-85		85 ± 2																								
3 W/m.K	GTG 3-35	Light blue	35 ± 2	0.5 to 20 mm	V0	Yes	-40°C to + 200 °C	2.9	< 100	3 ± 0.1	11	15	10 ¹¹	5.5	0.005												
	GTG 3-40		40 ± 2					2.95		3.5 ± 0.1																	
	GTG 3.5-50		50 ± 2					100	3 ± 0.1																		
	GTG 3-60		60 ± 2													2.9											
	GTG 3-75		75 ± 2																								
	GTG 3-85		85 ± 2																								
4 W/m.K	GTG 4-40	Green	40 ± 2	0.5 to 20 mm	V0	Yes	-40°C to + 200 °C	3.09	< 100	4 ± 0.1	16	18	10 ¹¹	7	0.008												
	GTG 4-60		60 ± 2						100																		
	GTG 4-75		75 ± 2																								
	GTG 4-85		85 ± 2																								
5 W/m.K	GTG 5-40	Green	40 ± 2	0.5 to 20 mm	V0	Yes	-40°C to +200°C	3.12	< 50	5 ± 0.1	15	18	10 ¹¹	7.5	0.006												
	GTG 5-60		60 ± 2						50																		
	GTG 5-75		75 ± 2																								
	GTG 5-85		85 ± 2																								
6 W/m.K	GTG 6-40	Green	40 ± 2	0.8 to 20 mm	V0	Yes	-40°C to +200°C	3.23	< 50	6 ± 0.1	14	17	10 ¹¹	8.1	0.007												
	GTG 6-55		55 ± 2						50																		
	GTG 6-75		75 ± 2																								
	GTG 6-85		85 ± 2																								
7 W/m.K	GTG 7.5-35	Light Green	35 ± 2	0.8 to 20 mm	V0	Yes	-40°C to +200°C	3.22	< 40	7.5 ± 0.1	10	16	10 ¹¹	7.9	0.013												
	GTG 7.5-55		55 ± 2						40																		
	GTG 7.5-75		75 ± 2																								
	GTG 7.5-85		85 ± 2																								
8 W/m.K	GTG 8-65	Light grey	65 ± 2	1 to 20 mm	V0	Yes	-40°C to +200°C	3.3	< 30	8 ± 0.1	8	14	10 ¹¹	7	0.02												
	GTG 8.5-80		80 ± 5	1.5 to 10 mm	V0	Yes	-40°C to +150°C	3.02	> 20	8.6 ±0.1	11	17	1*10 ¹¹	8.1	0.014												

THEY TRUST US :



SIEMENS

SCHILLER
The Art of Diagnostics



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