



GETELEC

We protect your electronics



OUR SOLUTIONS FOR MEDICAL INDUSTRY

www.getelec.com

INTRODUCTION

Advances in medicine have led to a significant increase in the quantity and complexity of equipment for patient care applications.

Today, the miniaturisation and portable nature of this equipment, with its increasingly sophisticated functionality, requires EMC shielding and heat dissipation products.

GETELEC provides the medical industry with its capitalised know-how and customer support, both in terms of electronic sub-assemblies and complete medical devices.



IMAGING

Our family of microwave shielding seals can provide EMC protection for both transmitting and reception.

Our products and solutions prevent electromagnetic interference between the various devices (scanner, monitoring, instruments).



MONITORING

Modern medical devices are subject to multiple constraints: reliability, patient safety, performance and compactness. These constraints are all design challenges that GETELEC meets through its range dedicated to the medical sector.

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

CONSUMABLES

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

Our latest equipment parc enables us to produce all kinds of extruded, moulded, cut or overmoulded parts.

Our extrusion lines produce silicone tubes in a wide range of sizes, shapes and material grades.



RANGE OF PRODUCTS

EMC CONDUCTIVE SILICONE GASKETS

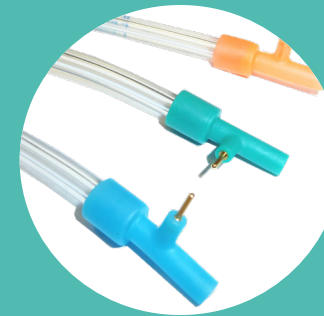
GETELEC develops its own conductive mixes that meet the requirements of standards MIL G 83528, MIL STD 285, GAM EG-13. All of these seals are available as moulded seals, cut flat seals, extruded profiles or custom overmoulded seals.

Volume resistivity from 0.0016 $\Omega \cdot \text{cm}$ to 2.7 $\Omega \cdot \text{cm}$
Shielding efficiency from 80dB to 140dB (Frequencies 20MHz - 10GHz)



OVERMOLDED PRODUCTS

Overmoulding ensures direct sealing, without the need for additional external seals or adhesives, by adopting the geometry of the overmoulded part. Your catheters in particular, thanks to advanced technological solutions, will benefit from a high-precision overmoulding that will make them more watertight, more flexible and more resistant.

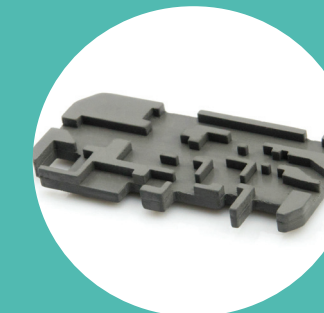


MICROWAVE ABSORBERS

Microwave absorbers consist of flexible silicone materials filled with 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 rigid Epoxy-type microwave absorbers, flexible microwave absorbers made with silicone or foams of different thicknesses.

Absorption natural frequency range from 1 GHz to 40 GHz.



THERMALLY CONDUCTIVE PADS

Positioned between the power component and the cooler, the thermal gap filler pad is designed to optimise heat dissipation and thus reduce the thermal resistance of your equipment. Our complete range consists of flexible thermal gap pad, conductive electrical insulators and electrically and thermally conductive silicone.

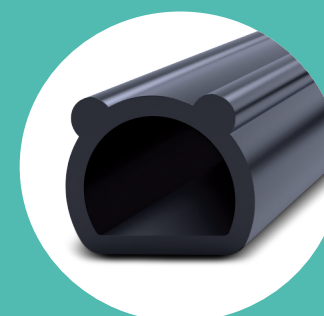
The thermal conductivity of our products is between 1 and 8.5 W/m.K.



ENVIRONMENTAL SEALING GASKETS

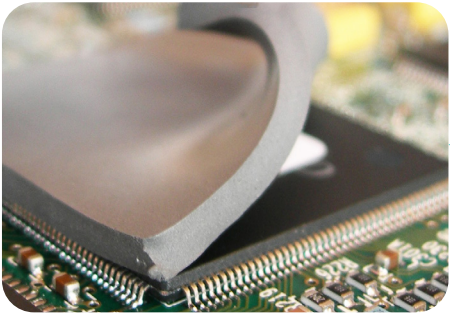
GETELEC formulates its own silicone mixes. This mastery allows us to define the ideal material according to your equipment and your specifications, in order to offer you a tailor-made insulating solution adapted to your needs.

The use of specific silicone grades allows us to offer a complete range of silicone and fluorosilicone products available in hardness ratings **between 20 and 90 Shore A**.

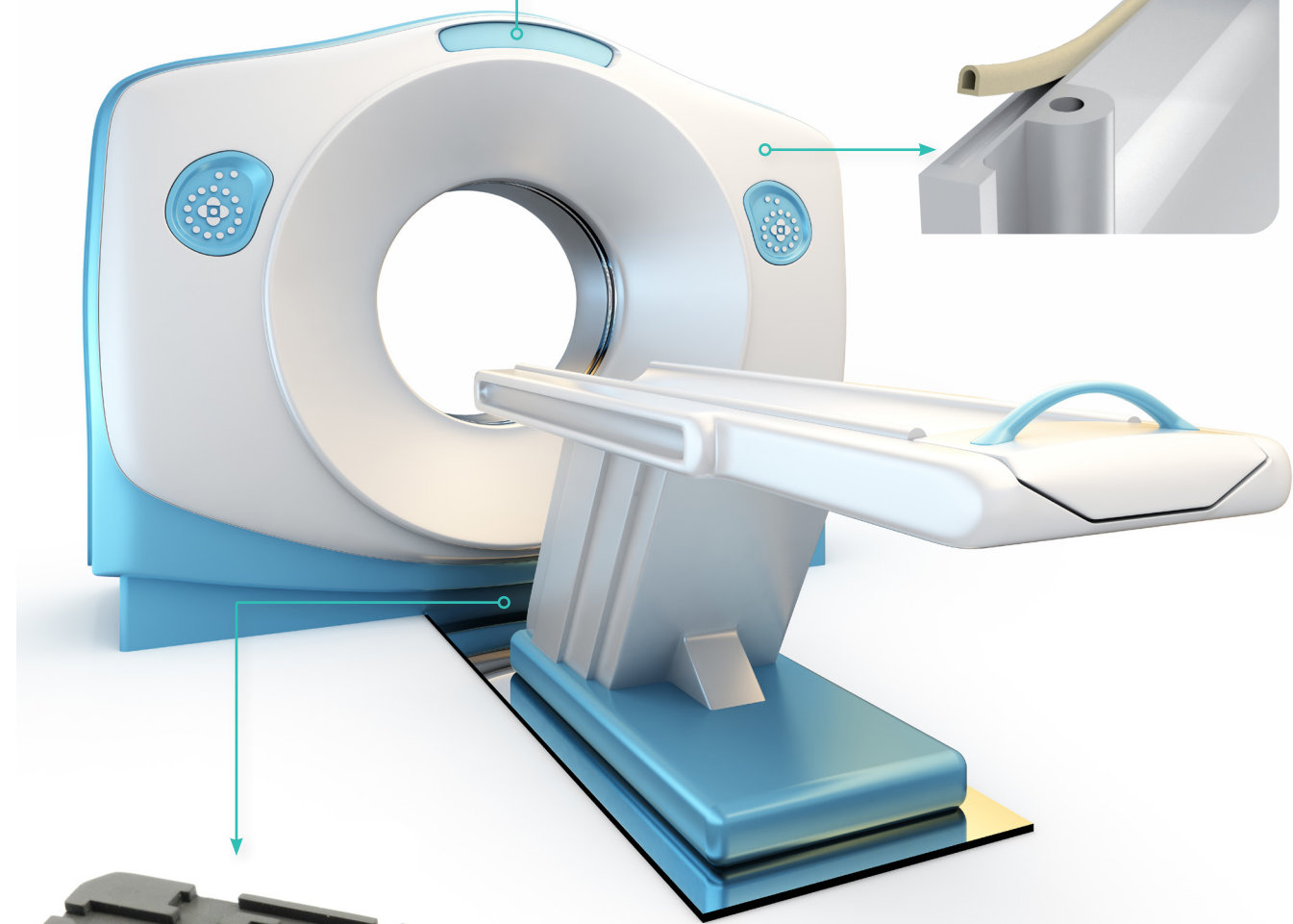
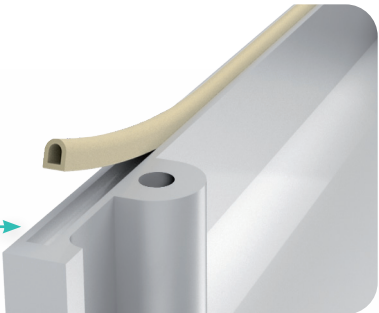


APPLICATIONS FOR MEDICAL INDUSTRY

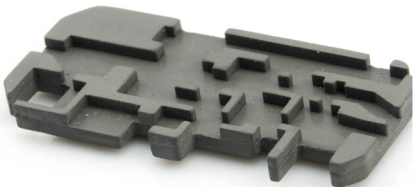
Thermal pad for heat dissipation



Extruded EMI shielding gasket



Microwave absorbers



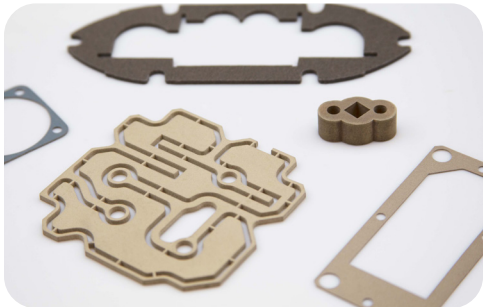
Silicone tube extrusion



EMC CONDUCTIVE SILICONE GASKETS

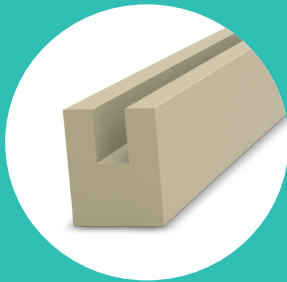
Our conductive elastomers are developed in every respect by our chemical engineers. From the selection of raw materials to the final transformation, they create specific formulations for each request and master all the development processes and procedures.

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

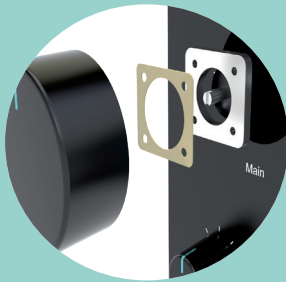


Properties	Standards	GT 1000	GT 2020	GT 5000	GT 5200
Type MIL G 83528		K	-	B	
Elastomer		Silicone	Silicone	Silicone	EPDM
Conductive filler		Silver-plated copper	Pure silver	Silver-plated aluminum	Silver-plated aluminum
Volume resistivity $\Omega \cdot \text{cm}$	MIL G 83528	< 0.005	< 0.006	< 0.0054	< 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
Residual deformation after compression70 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

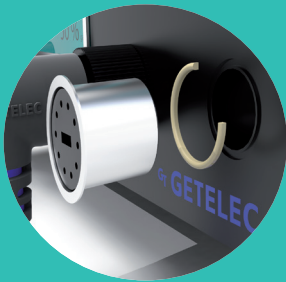
AVAILABLE FORMATS



Extruded



Cut



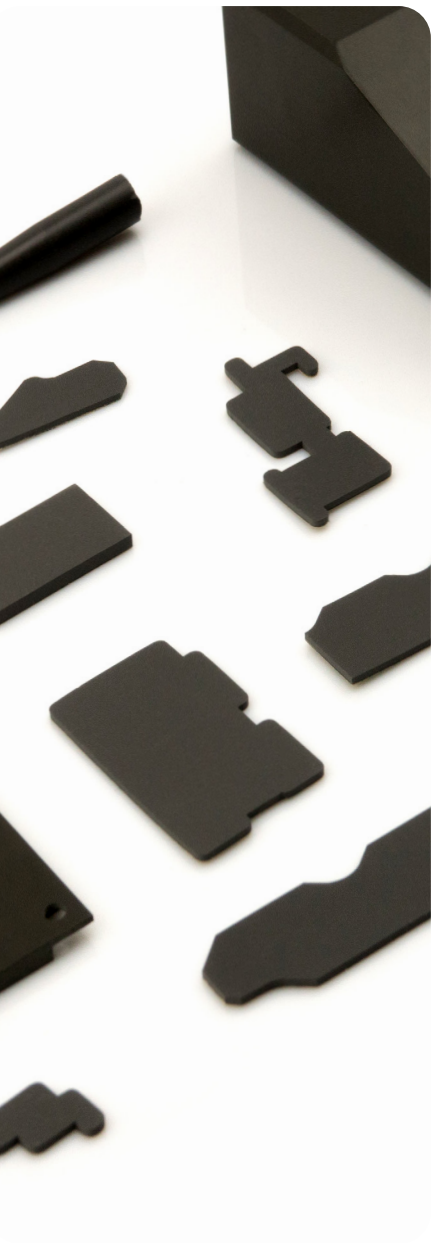
Molded

MICROWAVE ABSORBERS

Flexible silicone microwave absorbers :

Our GT602 range of microwave absorbers have narrow-band performance but also high power-density performance (>1 W/cm2) allowing them to be positioned on high-power antennas or equipment.The homogeneity of the mixture is ensured by a complex system developed by Getelec

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



Attenuation Guide

Attenuation	Percentage absorption
- 5 dB	68.38 %
-10 dB	90.00 %
-15 dB	96.84 %
-20 dB	99.00 %
-40 dB	99.99 %

Getelec reference material	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

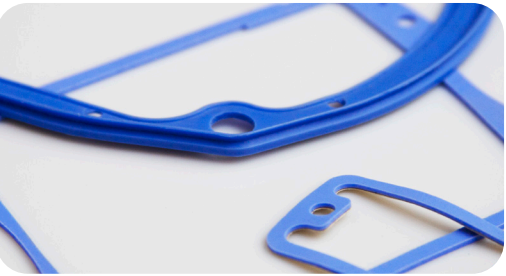
Sheets or finished parts are available with or without adhesive on request.

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 ourcomplete range of environmental sealing silicones.

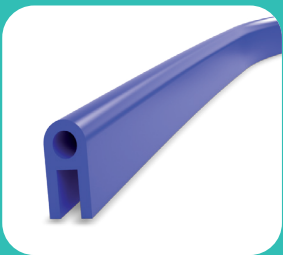
Fluorosilicone : FVMQ type (ASTM D1418), these elastomers offer excellent resistance to solvents, fuels, organic oils and silicone oils, while maintaining their mechanical properties over a wide range of temperatures (-60°C to + 230°C).

Silicone : 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).

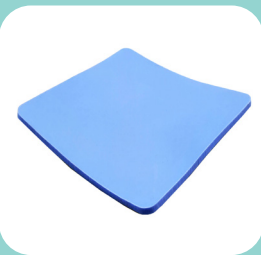


Properties	Standards	GT 20	GT 40	GT 47	GT 50	GT 57	GT 60	GT 67	GT 70	GT 77
Elastomer		Silicone	Silicone	Fluoro-silicone	Silicone	Fluoro-silicone	Silicone	Fluoro-silicone	Silicone	Fluoro-silicone
Hardness shore A ±5	ASTM D 2240	25	40	40	50	50	60	60	70	70
Specific mass at 25°C (g/cm3)	ASTM D 792	1.10	1.10	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 22 hours at 177°C (%)	ASTM D 395 Method B	20	30	20	32	25	33	25	34	25

AVAILABLE FORMATS :



Extruded



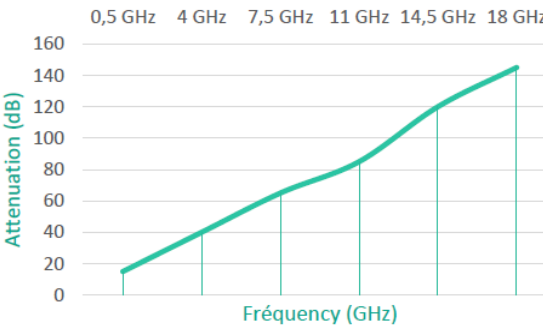
Cut



Molded

Rigid microwave absorbers | 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



THERMALLY CONDUCTIVE PADS

Our range of thermal pad includes highly conductive products ideal for applications requiring high thermal conductivity. The specific formulations developed by our laboratory give these silicone elastomers exceptional thermal conductivity.

Thanks to their great flexibility and ease of installation, they adapt to the surface irregularities between the power component and the cooler, thus promoting heat dissipation and protecting your equipment



Thermal conductivity	Hardness Shore 00	Thickness mm	Flame retardant	RoHs	Working temperature (°C)	Density g/cm3	Elongation %	Thermal conductivity W/m.k	Dielectric strength kV/mm	Breakdown voltage kV/mm	Volume Resistivity Ω.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	40 ± 5	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
	45 ± 5							1.3 ± 0.1	5	18			
	60 ± 5							1 ± 0.1	11	17			
	75 ± 5												
	85 ± 5												
2 W/m.K	40 ± 5	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
	50 ± 5					2.75		2.5 ± 0.1	18	16			
	60 ± 5					2.7		2 ± 0.1	14	17			
	75 ± 5												
	85 ± 5												
3 W/m.K	35 ± 5	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
	40 ± 5					2.95		3.5 ± 0.1					
	50 ± 5					2.9		100					
	60 ± 5												
	75 ± 5												
	85 ± 5												
4 W/m.K	40 ± 5	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
	60 ± 5						100						
	75 ± 5												
	85 ± 5												
5 W/m.K	40 ± 5	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
	60 ± 5						50						
	70 ± 5												
	85 ± 5												
6 W/m.K	40 ± 5	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
	55 ± 5						50						
	75 ± 5												
	85 ± 5												
7.5 W/m.K	35 (-5 +20)	0.8 to 20 mm	V0	Yes	-40°C to +200°C	3.23	< 40	7.5 ± 0.1	10	16	10 ¹¹	7.9	0.013
	60 (-5 +20)												
8 W/m.K	65 ± 5	1 to 20 mm	V0	Yes	-40°C to 200°C	3.3	< 30	8 ± 0.1	8	14	10 ¹¹	7	0.02
	80 ± 5	1.5 to 10 mm	V0	Yes	-40 °C à to +150°C	3.02	> 20	8.6 ± 0.1	11	17	10 ¹¹	8.1	0.014

THEY TRUSTED US :



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SCHILLER
The Art of Diagnostics



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