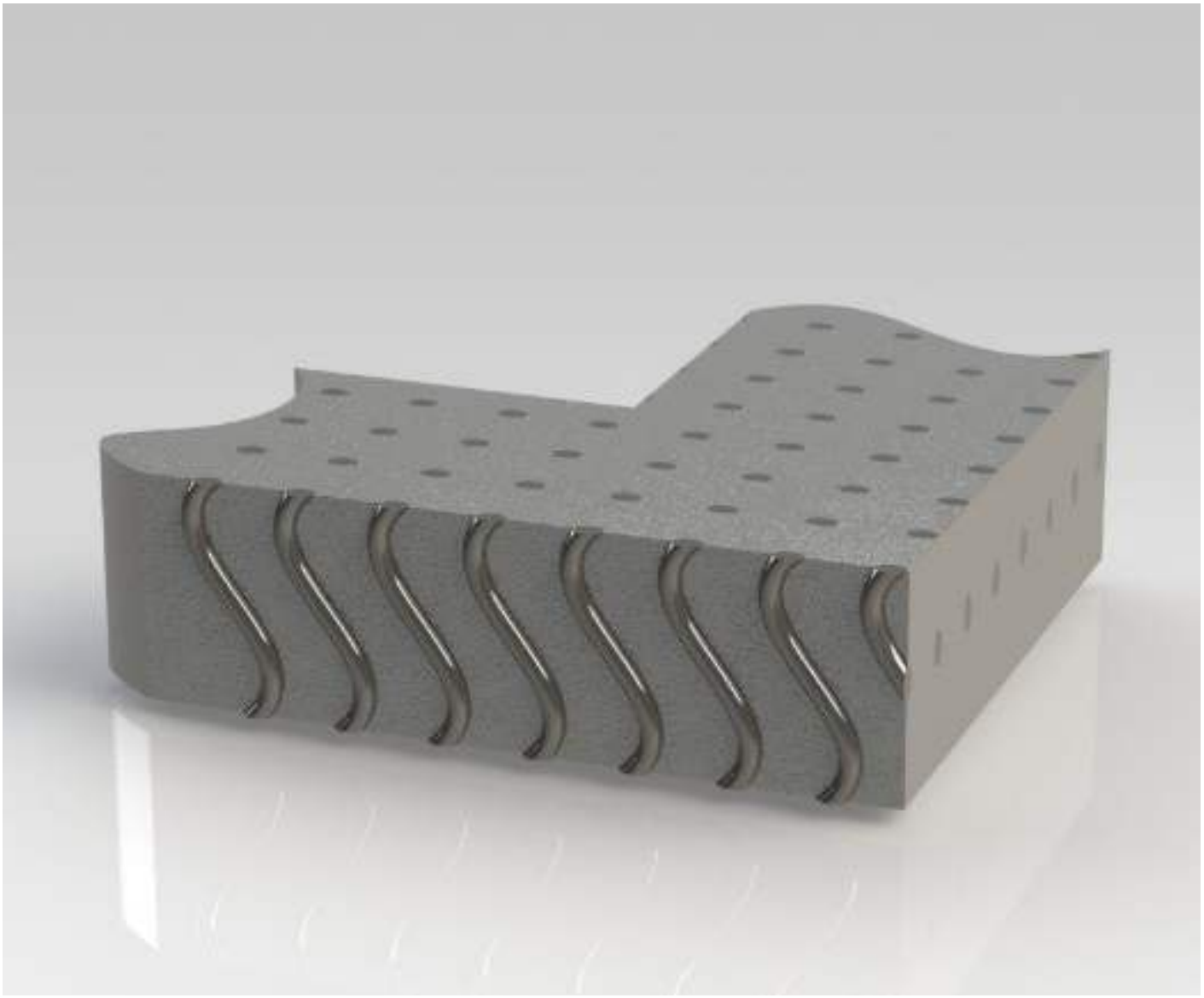
Kemtron
Proven EMC Shielding Solutions
Kemtron Ltd. is now part of

TE connectivity



ORIENTED WIRE IN SILICONE AND FLUOROSILICONE RUBBER

Product Overview

Oriented wire in silicone is an RFI/EMI/EMP shielding gasket material. The sheets are available in a range of thicknesses. Each sheet contains thousands of thin monel or aluminium wires that pass through the sheets thickness. These wires are crimped to form a slight zigzag which means that they do not drastically affect the compression forces required to make a seal. The wire types allow the designer to select the product best suited to their galvanic compatibility requirements. The softer blocks have a wire density of 100 wires/cm^2. The harder blocks have a wire density of 140 wires/cm^2. The wires are chemically bonded to the silicone or fluorosilicone during the manufacturing process. The elastomer provides the environmental sealing component, while the wires provide electrical grounding and the shielding aspect of the product. Under compression, the wires have bite into the mating surface and penetrate through thin oxide layers providing low contact resistance

A choice of silicone and wire variants are available allowing this product to be used in a wide range of applications. The three material groups are 410/420, 450/460, and 470/480.

410/420 grades are 40 Shore A solid silicone with monel/aluminium wires. These grades are for use in applications where higher compression forces allow for better environmental sealing.

450/460 grades are 50 Shore A solid fluorosilicone with monel/aluminium wires. These grades are available for use in environments where fuels/oils/hydraulic fluids and other contaminants are present.

470/480 grades are 20 Shore A soft silicone with monel/aluminium wires. These grades are for applications that require lower compression forces. Kemtron Ltd developed these new grades of materials to fulfil a need that meets the performance of silicone sponge materials but with improved environmental sealing qualities. We have achieved this by using a very soft solid silicone with a reduced wire count of 100 wires per cm^2 which is the same as silicone sponge. The advantages of these new materials over silicone sponge are that we can manufacture increased sheet widths of up to 225mm with a minimum thickness of 0.8mm. Material consistency is a great advantage over silicone sponge as there is no uneven cell structure to consider that can affect moisture ingress and closure force.

Application

- A good solution for achieving RFI/EMI/EMP and environmental sealing in a single gasket
- Ideal for use as access panels, seals, connector gaskets etc
- Good conformity to allow for uneven surfaces

Availability

Kemtron Ltd. is now part of TE Connectivity, can offer a wide variety of options as the in-house manufactured material is cut from large blocks. The blocks are manufactured in either 150mm or 225mm widths. The sheets are cut using our high-speed slicer, enabling us to offer all thicknesses (subject to material type) to suit the customer's exact design requirement.

- Die-cut gaskets
- Large fabricated gaskets
- Sheet material
- Strip material available in continuous lengths
- Self-adhesive backing to allow for easy assembly
- Can be fitted with compression limit stops or collars
- Small gaskets can be punched in one operation, keeping production costs to a minimum
- Larger gaskets can be produced cost effectively and without the constraint of sheet size limitation from strips of material fabricated into the required finished shape, thus avoiding waste material from the centre of the gasket
- A fluorosilicone version is available for use in environments where fuels/oils/hydraulic fluids and other contaminants are present
- Solid silicone 410/420, for use in applications where higher compression forces allow for better environmental sealing
- Soft solid silicone 470/480 for applications that require lower compression forces

Design Considerations

It is important that oriented wire in silicone isn't over compressed. If the design of the equipment does not allow for any mechanical method of preventing over-compression, by means of a compression limiting stop, the gasket should be fitted with compression limiters. These can be either compression stops or collars. Stops and collars are normally manufactured in a material that is suitable for the galvanic compatibility requirements and take the form of precisely manufactured cylinders or washers.

There is no need for a conductive connection where strips or sheets are joined. This is because the wires forming the EMC contact run through the thickness of the sheet. An environmental seal is achieved by vulcanising the mating join with the corresponding silicone or fluorosilicone adhesive. The material is not suitable for frequent opening/closing or sliding applications. If your application requires this functionality, please contact your customer services representative at TE Connectivity or Kemtron Ltd.

Recommended compression: 15% to 20%

Tolerances:
Sheet Widths +0.0/-5mm
Thickness ± 0.13mm

When specifying an oriented wire in fluorosilicone (450/460): self-adhesive backing (SAB) is not recommended for use with this type of elastomer. This is due to the SAB's component chemical's ability to perform in line with the fluorosilicone elastomer. Typically, SAB is supplied with a shelf life of 6 months. Minimum material width should not be less than 2mm or at least the material thickness in any part of the gasket. If this cannot be achieved around fixing holes, consider using a slot. Particular attention is required if specifying compression collars in holes. Particular consideration must be given to compression forces (see data in this section) hole centres, size and number of fixings and rigidity of mating flanges.

Production Capabilities

Kemtron Ltd. holds large stocks of raw material blocks, which are cut in-house on one of the most advanced slicing machines in Europe, and which enables us to produce bespoke gaskets economically and on time.

We are able to cut sheets up to 228mm wide by 1000mm long, whilst holding a parallel tolerance of ± 0.2mm and can apply self-adhesive backing prior to die cutting and or fabrication.

Gasket fabrication is a routine feature of our work, enabling us to produce economic gaskets by maximising material usage, without the limitations of sheet width. Joins are vulcanised using a silicone compound and overcompression stops or collars can be fitted to the gasket if required. Our in-house production facilities are suitable for prototype, short and medium production runs, up to commercial quantities.

Compression Limit Applications

Horseshoe Slot

Minimum Land

Typical Shielding Performance

Frequency	410/450	420/460	430/470	440/480
20 Mhz	94	95	94	94
40 Mhz	96	96	99	96
60 Mhz	100	97	99	100
80 Mhz	99	98	100	100
100 Mhz	111	105	109	111
200 Mhz	111	105	109	111
400 Mhz	112	107	105	110
600 Mhz	110	103	102	108
800 Mhz	116	110	109	116
1 Ghz	111	111	107	111
2 Ghz	106	112	112	112
4 Ghz	98	97	95	101
6 Ghz	91	90	89	90
8 Ghz	90	90	87	92
10 Ghz	84	89	84	88

Typical Closing Force Required

Code	Material Thickness	Compression %	N/cm²
410/420	0.8mm	10%	17
	0.8mm	15%	36
	0.8mm	20%	49
	1.6mm	10%	20
	1.6mm	15%	45
	1.6mm	20%	81
	2.4mm	10%	58
	2.4mm	15%	83
	2.4mm	20%	97
450/460	0.8mm	10%	15
	0.8mm	15%	38
	0.8mm	20%	61
	1.6mm	10%	22
	1.6mm	15%	52
	1.6mm	20%	88
	2.4mm	10%	78
	2.4mm	15%	102
	2.4mm	20%	129
470/480	0.8mm	10%	14
	0.8mm	15%	27
	0.8mm	20%	36
	1.6mm	10%	37
	1.6mm	15%	43
	1.6mm	20%	65
	2.4mm	10%	41
	2.4mm	15%	45
	2.4mm	20%	55

* The above data is representative of results from tests and show forces that you should expect to experience. When using these figures you should allow for tolerances in the gasket material and also on the hardware. These figures are given as a guide only.

Dimensional Tolerances

- Linear ± 0.8mm
- Hole Centres ± 0.4mm
- Thickness ± 0.13mm
- Sheet length +/- 10 mm

Handling Considerations

Care should be taken when handling this material as any exposed metal points may scratch unprotected skin.

Material Types and Sizes

Part No.	Material	Min Thickness	Sheet Width(s)	Max Sheet Length
410	Monel wires in solid silicone	0.8mm	225mm (+0/-5)	1000mm
420	Aluminium wires in solid silicone	0.8mm	225mm (+0/-5)	1000mm
450	Monel wires in solid Fluorosilicone	0.8mm	150mm (+0/-5)	1000mm
460	Aluminium wires in solid Fluorosilicone	0.8mm	150mm (+0/-5)	1000mm
470	Monel wires in Soft solid Silicone	0.8mm	225mm (+0/-5)	1000mm
480	Aluminium wires in soft solid silicone	0.8mm	225mm (+0/-5)	1000mm

How to Order

To order strips use the material type number followed by the thickness and width (expressed as 4 digits to one decimal place). Add SAB to the end of the part number if you require self-adhesive backing.

Examples

420-0008-0032SAB = 0.8mm thick aluminum wires in solid silicone, width 3.2mm with self-adhesive backing.

Standard Strip Material

Material	Material Code
Monel wire in solid silicone	410
Aluminium wire in solid silicone	420
Monel in Solid Fluorosilicone	450
Aluminium in Solid Fluorosilicone	460
Monel wire in soft solid silicone	470
Aluminium wire in soft solid silicone	480

Height	Width	Material Code						Part No.
		410	420	450	460	470	480	
0.8mm	3.2mm							0008-0032
0.8mm	4.8mm							0008-0048
0.8mm	6.4mm							0008-0064
0.8mm	9.5mm							0008-0095
0.8mm	12.7mm							0008-0127
1.6mm	4.8mm							0016-0048
1.6mm	6.4mm							0016-0064
1.6mm	9.5mm							0016-0095
1.6mm	12.7mm							0016-0127
1.6mm	15.9mm							0016-0159
1.6mm	19.1mm							0016-0191
2.4mm	4.8mm							0024-0048
2.4mm	6.4mm							0024-0064
2.4mm	9.5mm							0024-0095
2.4mm	12.7mm							0024-0127
2.4mm	15.9mm							0024-0159
2.4mm	19.1mm							0024-0191

Material Specifications

Wire	
Monel	BS 3075 NA13 – QQ-N-281-B
Aluminium	BS EN 573 pt3 – Alloy 5056

Elastomers	Specifications	Temp Range	Colour
Silicone Solid	A-A-59588	-60°C to 200°C	Light Grey
Soft Silicone Solid	A-A-59588	-60°C to 200°C	Light Grey
Fluorosolicone	MIL-R-25988 G 50	-55°C to 200°C	Blue

Test	Standard	Solid Silicone
Tensile strength	ASTM D412	2.5 MPa
Elongation	ASTM D412	250%

Notice

Information supplied in these data sheets is based on independent and laboratory tests which Kemtron believes to be reliable. Kemtron Ltd. has no control over the design of customer's product which incorporates Kemtron's products, therefore it is the responsibility of the user to determine the suitability for his particular application and we recommend that the user make his own test to determine suitability. The product described in this data sheet shall be of standard quality, however the products are sold without warranty of fitness for a particular purpose, either expressed or implied, except to the extent expressly stated on Kemtron's invoice, quotation or order acknowledgement. Kemtron does not warrant that products described in this data sheet will be free of conflict with existing or future patents of third parties. All risks of lack of fitness, patent infringement and the like are assumed by the user.

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