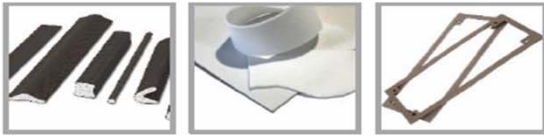


# Laird Performance Material Laird™

<https://www.laird.com/> A DuPont Business



**EMI MATERIALS**



**PRECISION METALS**



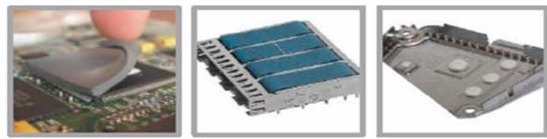
**THERMAL MATERIALS**



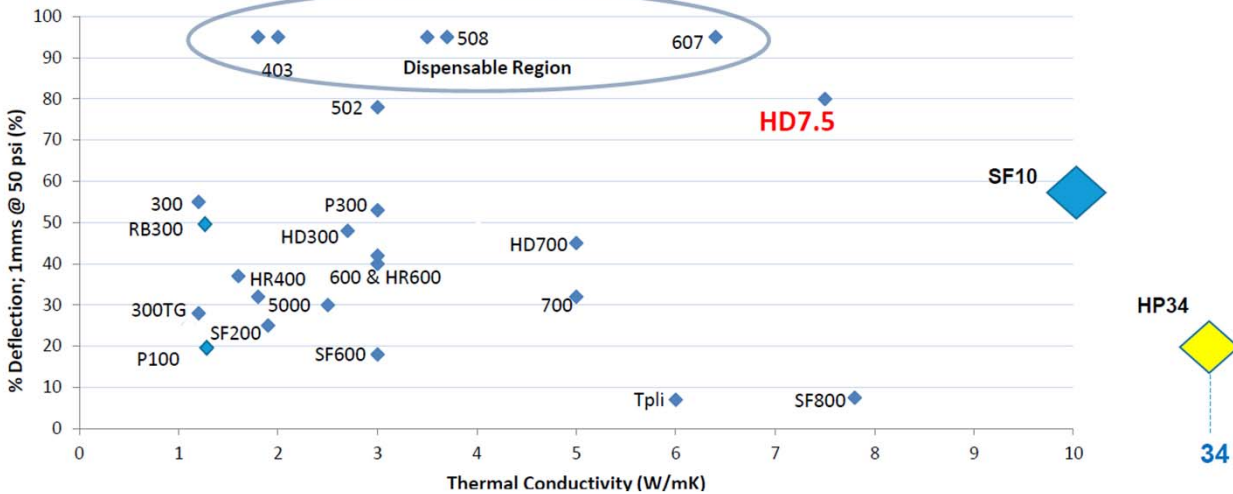
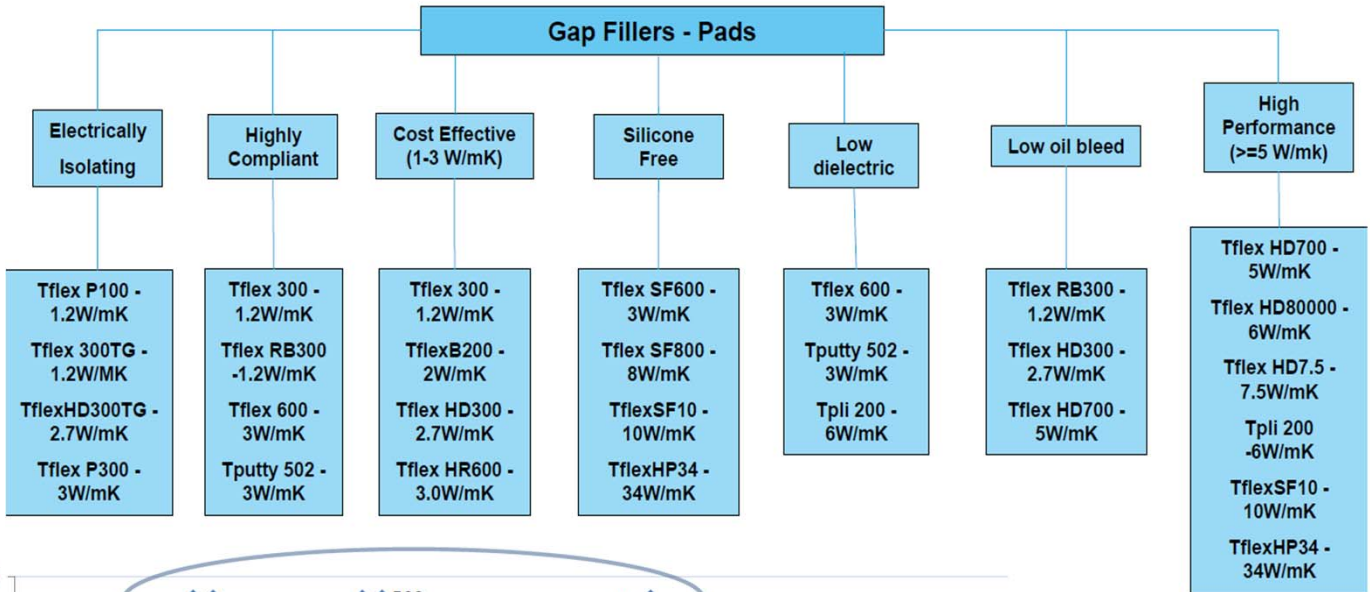
**RF / MICROWAVE ABSORBERS**



**MAGNETIC CERAMIC PRODUCTS**



**MULTI-FUNCTIONAL SOLUTIONS**



# Dispensable Gap Fillers

Property	Tputty™ 403	Tflex™ CR350	Tputty™ 506	Tputty™ 508	Tputty™ 607	Tflex™ CR607	Tflex™ CR900	Tputty™ 900
Composition	1 part	2 part	1 part	1 part	1 part	2 part	2 part	1 part
Thermal Conductivity (W/mK)	2.1	3.6	3.5	3.7	6.4	6.4	8.5	9.2
Operating Temp. Range (C)	-45 to 150	-55 to 200	-45 to 200	-45 to 150	-45 to 150	-55 to 200	-55 to 200	-55 to 200
Density (g/cc)	2.5	3.2	1.7	3.2	3.45	3.5	3.5	3.4
Flammability	UL V0	UL V0	UL V0	UL V0	UL V0	UL V0 pending	UL V0 pending	UL V0 pending
Outgassing (TML %)	0.05	0.58	0.46	0.04	0.01	TBD	TBD	TBD
Volume Resistivity (Ω-cm)	1x10 <sup>13</sup>	2.6x10 <sup>14</sup>	1.8x10 <sup>14</sup>	1x10 <sup>13</sup>	1x10 <sup>13</sup>	1x10 <sup>13</sup>	TBD	TBD
Dielectric Constant	4.9	7.1	5.3	8.6	15	14	TBD	TBD
Minimum Bond line (µm)	50	85	100	90	150	150	330	330
Cure Time	NA	30min at 100°C	NA	NA	NA	24hrs at 25°C	24hrs at 25°C	NA
Shelf Life (months)	24	9	24	6	6	6	6	6

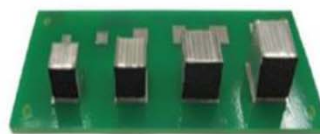
# PCM & Grease Properties

	Tpcm 905	Tpcm Al52	Tpcm FSF52	Tpcm 580	Tpcm 780	IceKap	Tpcm 5000	Tpcm 7000	Tgrease 1500	Tgrease 300x	Tgrease 2500
Color	Yellow	Gray	White	Gray	Gray	Gray	Gray	Gray	White	Gray	White
Construction / Compositions	BN filled, Non-Silicone, Non-Reinforced Film	Wax based PCM coated Aluminum Foil	Ceramic filled, wax based, free standing film	Filled, Non-Silicone, Non-Reinforced Film	Filled, Non-Silicone, Non-Reinforced Film	Filled Thermoplastic Elastomer	Filled, Non-Silicone, Non-Reinforced Film	Filled, Non-Silicone, Non-Reinforced Film	Filled silicone grease	Filled Silicone Grease	Filled non-Silicone Grease
Thickness	0.125mm (0.005")	0.076mm (0.003")	0.125mm (0.005")	0.075mm (0.003") 0.125mm (0.005") 0.200mm (0.008") 0.250mm (0.010") 0.400mm (0.016")	0.125mm (0.005") 0.200mm (0.008") 0.250mm (0.010") 0.400mm (0.016")	0.125mm (0.005") 0.200mm (0.008") 0.250mm (0.010")	0.125mm (0.005") 0.200mm (0.008") 0.250mm (0.010") 0.400mm (0.016")	0.125mm (0.005") 0.200mm (0.008") 0.250mm (0.010") 0.400mm (0.016")	Screen Printable to a wide range of thickness	Screen Printable to a wide range of thickness	Screen Printable to a wide range of thickness
Thickness Tolerance	±0.025mm (0.001")	±10%	±0.025mm (0.001")	±10%	±10%	±10%	±10%	±10%	±10%	±10%	±10%
Operating Range	-25 to 125C	-25 to 200C	-40 To 150C	-40 to 125C	-40 to 125C	-40 to 125C	-40 to 125C	-40 to 125C	-40 to 125C	40C to 150C	-55 to 150C
Density	1.3 g/cc	2.1 g/cc	2.0 g/cc	2.9 g/cc	2.5 g/cc	2.5 g/cc	2.5 g/cc	2.6 g/cc	2.6 g/cc	2.8 g/cc	2.5 g/cc
Softening Range or Phase Change Temp	50 to 70 C	52 C	52 C	50 C	50C to 70 C	70C to 80 C	50C to 70 C	50C to 70 C	N/A	N/A	N/A
Bulk Thermal Conductivity	0.7 W/mk	N/A	0.9 W/mk	3.8 W/mk	5.4 W/mk	5.5 W/mk	5.2 W/mk	7.5 W/mk	1.8 W/mk	3W/mk	3.8 W/mk
Minimum BLT	6µm	62µm	12µm	25µm	25µm	25µm	25µm	35µm	µm	25µm	50µm
UL	94 V0	94 V0	94 V0	94 V0	94 V0	94 V0	pending	pending	94 V0	94 V0	94 V0
Volume Resistivity	2x10 <sup>13</sup> Ω-cm	N/A	8x10 <sup>13</sup> Ω-cm	3x10 <sup>13</sup> Ω-cm	1x10 <sup>13</sup> Ω-cm	2x10 <sup>16</sup> Ω-cm	N/A	5 x10 <sup>15</sup> Ω-cm	7x10 <sup>11</sup> Ω-cm	N/A	3x10 <sup>12</sup> Ω-cm
Dielectric Constant @1 MHz	3.1	N/A	3.4	5.5	28	N/A	N/A	31.5	N/A	N/A	5.7

# Enclosure Seals



Fabric-Over-Foam (FOF)



Soft SMD Contacts



Microwave Absorbers



Conductive Fabrics / Tapes



Electrically Conductive Elastomers (ECE)



Form-in-Place Conductive Elastomers (FIP)



MaxAir

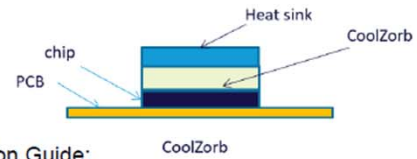
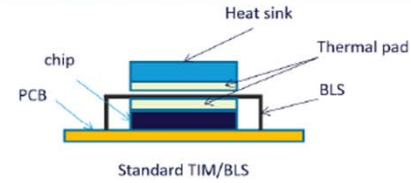
## CoolZorb – Thermal + Absorber

### When to use CoolZorb?

- Replace TIM in applications with EMI frequency concerns at 6 GHz and above to raise shielding effectiveness and suppress EMI noise
- High data transfer rate products (ex. optical modules) are now requiring EMI absorber and additional thermal interface material due to increased EMI frequency in the 10+ GHz range and more heat generation
- Elimination of board level shield need for low noise producing ICs by replacing existing traditional TIM

### Key usage benefits:

- One layer / two functions
- Suppresses unwanted radiation from IC
- Suppresses radiating electromagnetic fields coupling between IC and heat sink
- Simplified board design & layout



### Frequency Selection Guide:

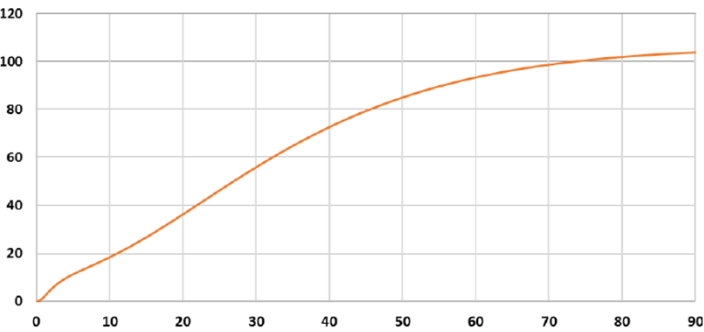
- <2 GHz: **CoolZorb-200**
- 2 GHz - 20 GHz: **CoolZorb-200** or **CoolZorb-600** based on thermal needs
- 20+ GHz: **CoolZorb-600** or **CoolZorb-500** based on thermal needs
- High Deflection Requirement: **CoolZorb-HD500**

Typical Properties	CoolZorb 500	CoolZorb 600	CoolZorb 200
Thermal Conductivity	4.0 W/m-K	3.0 W/m-K	1.7 W/mK
Hardness	55 Shore 00	60 Shore 00	56 Shore 00
Temperature Range	-40 ~ 175°C	-40 ~ 175°C	-40 ~ 175°C
UL Flammability / ROHS	UL94V0 / Yes	UL94V0 / Yes	UL94V0 / Yes
Attenuation @ 5GHz & 15 GHz	9.4, 17.3dB/cm	18.3, 49.8dB/cm	25, 33 dB/cm

## CoolZorb Ultra

CoolZorb Ultra Attenuation (dB/cm)

Attenuation (dB/cm)



TYPICAL PROPERTIES	DATA	TEST METHOD
Color	Dark gray	Visual
Thermal conductivity	12.0W/mK	Hot Disk
Density g/cc	2.96	ASTM D792
Hardness 3 seconds	72 Shore 00	ASTM D2240
Hardness 30 seconds	61 Shore 00	ASTM D2240
Tensile strength	TBD	ASTM D638
Deflection @ 10psi on 1mm	10.0%	ASTM D575
Deflection @ 50psi on 1mm	22.3%	ASTM D575
Temperature Range	-40°C to 125°C	NA
UL Flammability	94V0 Pending	UL

## Board Level Components

### Ferrite Chip Bead/ Inductor



**Laird Strength:** Higher Rated Current  
Laird  
1A to 10 A

**Competitor:**  
1A to 6 A

### High Frequency Ceramic Inductor



### Small Size / Less Height with LOW DCR & High Current Power Common Mode Choke



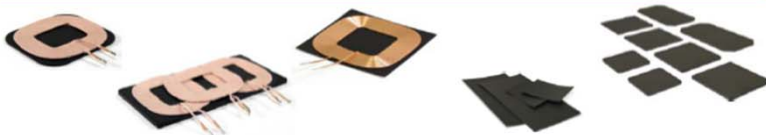
### High Current & Low Profile SMD Power Inductors



### Wireless Charging Module

- Flexible Ferrite Sheet
- Receiver (RX) module

### Ferrite Plate & Transmitter (TX) module



### Ferrite Cable Core (28A, 28R, 28B, LFB, HFA, HFB Series)



- High Frequency HF Part Series (300 MHz – 2 GHz)
- Broadband 28 Part Series (30 MHz – 1 GHz)
- Low Frequency LF Part Series (300 KHz – 30 MHz)

Agent:



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