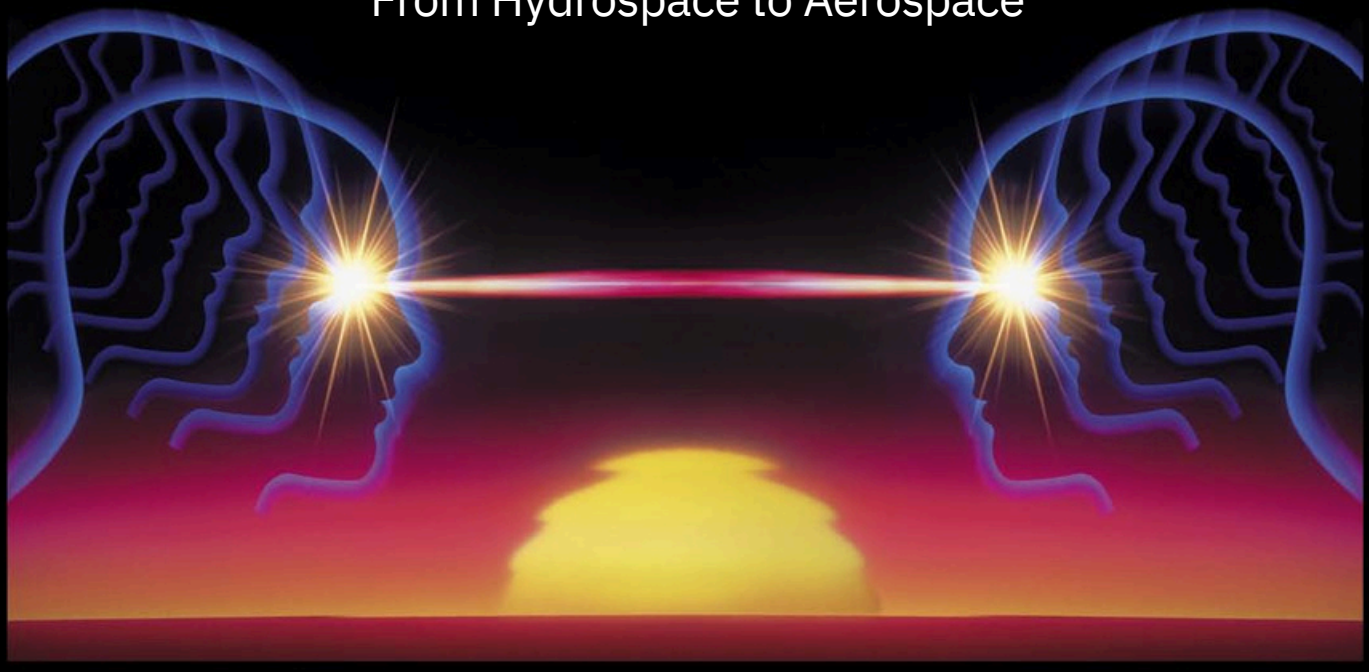
RUBBERCRAFT

Precision Sealing
From Hydrospace to Aerospace



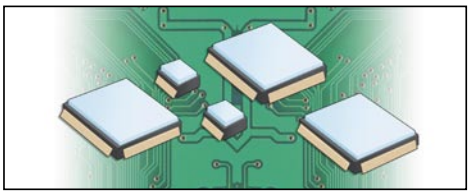
Engineered Solutions for
EMI Shielding & Thermal Management

Thermal Solutions – Protect Sensitive Electronics from Overheating

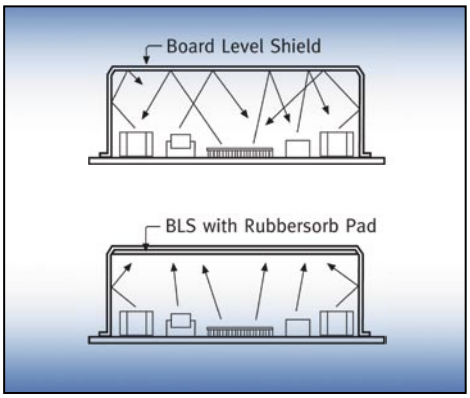
■ Rubbertherm™ Thermally Conductive Elastomers

High speed processors and high density electronic packages generate significant heat, which compromises optimum performance of computing devices and network systems. Rubbertherm removes and distributes heat build-up for reliable and efficient system operations.

Rubbertherms are composed of silicone polymers filled with high thermally conductive fillers. Rubbertherms are used as thermal pads with or without a carrier (reinforcing material). Low modulus Rubbertherms accommodate stringent requirements of thermal conductivity, electrical insulation and fill gaps between heat generating components and heat dissipating surfaces.



Rubbertherm pad over heat generating components



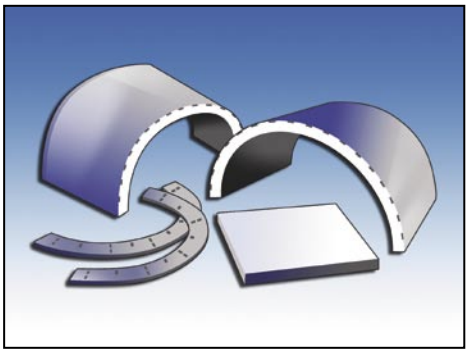
Board level shield (BLS) with and without Rubbersorb

Emission Absorption – Suppress and Eliminate Induced Noise

■ Rubbersorb™ Radar Absorbing Materials

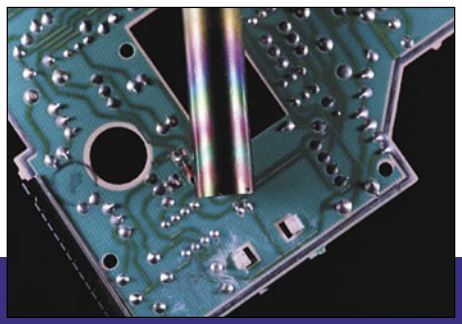
Traditionally used to protect military equipment and sensitive devices on aircraft, this proven technology is now applied to land-based and hand-held equipment. As computing devices migrate to ever higher frequencies, the need for Rubbersorb will be ever increasing.

Rubbersorbs are based on silicone, fluorosilicone or nitrile polymers filled with iron carbonyl or corrosion resistant fillers to meet various environmental requirements. Rubbersorbs are offered in die-cuts, sheet stock and custom molded parts.



Molded Rubbersorbs

AS91100:2001
ISO9001:2000



Emissions Control and Shielding Solutions

- **Radio Frequency Interference RFI**
- **Electromagnetic Interference EMI**
- **Electromagnetic Pulse EMP**
- **Electrostatic Discharge ESD**

Rubbershield™ Conductive Elastomers

EMI shielding and sealing devices provide electrical continuity between mating surfaces while ensuring environmental protection and vibration isolation.

Electrically Conductive

Excellent shielding performance while maintaining electrical integrity

Mechanically Durable

Excellent physical properties to ensure long life in critical applications

Resilient and Conformable

Excellent vibration isolation, conforms to mating components and maintains conductive properties

Rubbershield gaskets provide EMI shielding, EMP protection, environmental sealing and vibration isolation in a wide range of temperatures and pressures.

Rubbershield™ Applications

The use of conductive elastomers continues to spread rapidly with the advancements in digital technology and worldwide reliance on high density packaging. Some of the industries with significant demand include:

- **Aerospace**
- **Military electronics**
- **Telecommunications**
- **Electronic equipment**
- **Medical electronics**
- **Petroleum exploration and production**
- **Automotive**

Rubbershield™ - How it Works

Rubbershield elastomers are made by infusing conductive particulates in premium grade polymers. Silicones have historically been used as base polymers for conductive elastomers to provide reliable services at temperature extremes, good resistance to compression set and long term exposure to ozone. Fluorosilicone combines the attributes of silicone with additional resistance to hydrocarbons, and hydraulic fluids. Fluorocarbon-based elastomers are also used in petroleum exploration/production as well as automotive applications. The threat of nuclear, biological and chemical (NBC) warfare has created the demand for EPDM-based conductive elastomers.

Rubbershield™ Capabilities/Solutions

- **Custom molded components**
- **O-Rings and intricate shapes**
- **Sheet stock and die-cuts**
- **Fabricated seals and gaskets**
- **Extruded profiles**
- **Vulcanized to metals and composites**
- **Airframe and structural seals**
- **Reinforced and high performance seals**

Rubbershield™ Conductive Elastomers – Military and Aerospace Grade

Description	Test Method	Tol.	SRS-110	SRS-111	SRS-112	SRS-113	SRS-115	SRS-116	SRS-117	SRS-120	SRS-121	SRS-122
Material Type per	MIL-DTL-83528C		A	B	C	D	E	F	G [3]	K	L	M
Polymer			Silicone	Silicone	F. Silicone	F. Silicone	Silicone	F. Silicone	Silicone	Silicone	Silicone	Silicone
Filler*			Ag/Cu	Ag/Al	Ag/Cu	Ag/Al	Ag	Ag	Ag/Cu	Ag/Cu	Ag/Ni	Ag/G
Electrical Properties												
Volume Resistivity (ohm-cm)	MIL-DTL-83528C											
As Received	para 4.5.11	Max	0.004	0.008	0.010	0.012	0.002	0.002	0.007	0.005	0.005	0.006
After Life Testing	para 4.5.15	Max	0.010	0.010	0.015	0.015	0.010	0.010	0.010	0.010	0.010	0.015
After Break	para 4.5.9	Max	0.008	0.015	0.015	0.015	0.010	0.010	N/A	0.010	0.010	0.009
During Vibration	para 4.5.13	Max	0.006	0.012	0.015	0.015	0.010	0.010	0.010	0.010	0.010	0.009
After Vibration	para 4.5.13	Max	0.004	0.008	0.010	0.012	0.002	0.002	0.007	0.005	0.005	0.006
After EMP Exposure[1]	para 4.5.16	Max	0.010	0.010	0.015	0.015	0.010	0.010	0.010	0.010	0.010	0.015
Shielding Effectiveness (dB)	MIL-DTL-83528C para 4.5.12											
200 KHz (H-Field)		Min	70	60	70	60	70	70	70	70	70	50
100 MHz (E-Field)		Min	110	100	110	100	110	110	110	110	110	100
500 MHz (E-Field)		Min	110	100	110	100	110	110	110	110	110	100
2 GHz (Plane Wave)		Min	110	100	110	100	110	110	110	110	110	100
10 GHz (Plane Wave)		Min	110	100	110	100	110	110	110	110	100	100
Physical Properties												
Specific Gravity	ASTM D792		3.50	1.90	3.75	2.10	3.6	4.00	4.20	3.50	4.00	1.90
Hardness (Shore A)	ASTM D2240	+/- 7	65	65	75	70	65	75	80	85	75	65
Tensile Strength (PSI)	ASTM D412	Min	200	200	180	180	300	250	600	400	200	200
Elongation (%)	ASTM D412	Range	100/300	100/300	100/300	60/260	200/500	100/300	N/A	100/300	100/300	100/300
Tear Strength (PPI)	ASTM D624	Min	25	30	35	35	50	40	70	40	30	30
Compression/ Deflection (%)	ASTM D575	Min	3.5	3.5	3.5	3.5	2.5	3.5	2.5	2.5	3.5	3.5
Compression Set (%)	ASTM D395	Max	32	32	35	30	45	60	N/A	35	32	30
Upper Temperature (°C)	ASTM	Max	125	160	125	160	160	160	125	125	125	160
Lower Temperature (°C)	ASTM D1329 TR/10	Max	-55	-55	-55	-55	-55	-65	N/A	-45	-55	-55
Fluid Immersion [2]	MIL-DTL-83528C para 4.5.17	N/S	N/S	N/S	SUR	SUR	N/S	SUR	N/S	N/S	N/S	N/S

***Filler Nomenclature:** Silver: Ag, Silver-coated Copper : Ag/Cu, Silver-coated Aluminum: Ag/Al, Silver-coated Nickel: Ag/Ni, Silver-coated Glass: Ag/G, Nickel-coated Graphite: Ni/C, Carbon: C

Chart Notes: **1.** 0.9 kA per linear inch of perimeter **2.** SUR ~ Survivable: N/S ~ non-survivable; when tested for fluids per MIL-STD 83528C **3.** Reinforced with expanded copper foil and available in 0.027 +/- 0.005 inch thick sheet stock and die-cuts **4.** N/A ~ Not applicable

Rubbershield™ Conductive Elastomers – Commercial and Specialty Materials

Description	Test Method	Tol.	SRS-123	SRS-127	SRS-124	SRS-125	SRS-126	SRS-128	SRS-129	SRS-130
Material Type per	MIL-DTL-83528C		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Polymer			F. Silicone	F. Silicone	Silicone	EPDM	EPDM	EPDM	Silicone	EPDM
Filler*			Ag/Al	Ni/C	Ni/C	Ag/Ni	Ag/Al	Ni/C	C	C
Electrical Properties										
Volume Resistivity (ohm-cm)	MIL-DTL-83528C									
As Received	para 4.5.11	Max	0.012	0.100	0.100	0.010	0.010	0.100	5.00	20
After Life Testing	para 4.5.15	Max	0.015	0.100	0.100	N/A	N/A	N/A	5.00	N/A
After Break	para 4.5.9	Max	0.012	0.100	0.100	N/A	N/A	N/A	N/A	N/A
During Vibration	para 4.5.13	Max	0.015	0.100	0.100	N/A	N/A	N/A	N/A	N/A
After Vibration	para 4.5.13	Max	0.012	0.100	0.100	N/A	N/A	N/A	N/A	N/A
After EMP Exposure[1]	para 4.5.16	Max	0.015	0.100	0.100	N/A	N/A	N/A	N/A	N/A
Shielding Effectiveness (dB)	MIL-DTL-83528C para 4.5.12									
200 KHz (H-Field)	Min	60	50	50						
100 MHz (E-Field)		Min	100	100	100	100	100	80	70	70
500 MHz (E-Field)		Min	100	100	100	100	100	80	60	60
2 GHz (Plane Wave)		Min	100	100	100	100	90	70	50	50
10 GHz (Plane Wave)		Min	90	100	100	100	90	70	30	30
Physical Properties										
Specific Gravity	ASTM D792		2.00	2.20	2.00	3.20	1.90	2.00	1.30	1.2
Hardness (Shore A)	ASTM D2240	+/- 7	75	70	60	75	75	75	70	75
Tensile Strength (PSI)	ASTM D412	Min	180	190	200	200	200	200	600	2000
Elongation (%)	ASTM D412	Range	60/260	60/260	100/300	100/300	100/300	100/300	100/300	200/500
Tear Strength (PPI)	ASTM D624	Min	35	35	35	50	50	50	50	50
Compression/ Deflection (%)	ASTM D575	Min	2.5	3.0	3.5	2.0	2.0	2.0	2.0	2.0
Compression Set (%)	ASTM D395	Max	30	30	30	40	40	40	40	40
Upper Temperature (°C)	ASTM	Max	160	150	150	125	125	125	160	125
Lower Temperature (°C)	ASTM D1329 TR/10	Max	-55	-45	-55	-40	-40	-40	-50	-40
Fluid Immersion [2]	MIL-DTL-83528C para 4.5.17	N/S	SUR	SUR	N/S	N/A	N/A	N/A	N/S	N/A

***Filler Nomenclature:** Silver: Ag, Silver-coated Copper : Ag/Cu, Silver-coated Aluminum: Ag/Al, Silver-coated Nickel: Ag/Ni, Silver-coated Glass: Ag/G, Nickel-coated Graphite: Ni/C, Carbon: C

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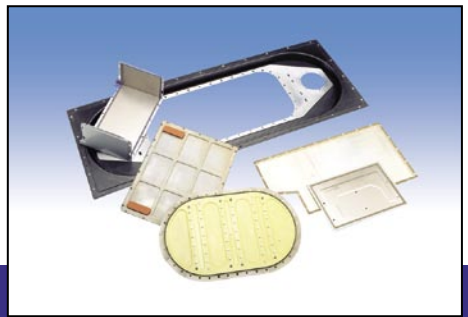
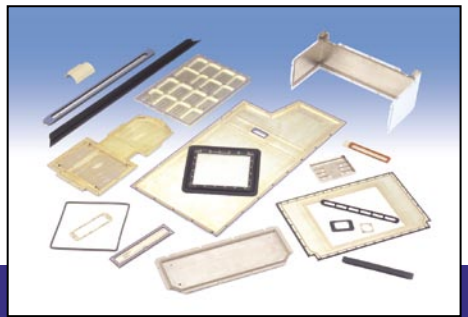
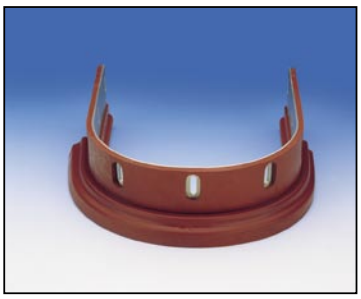
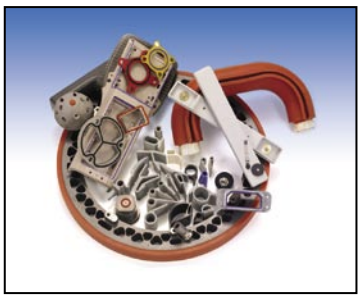
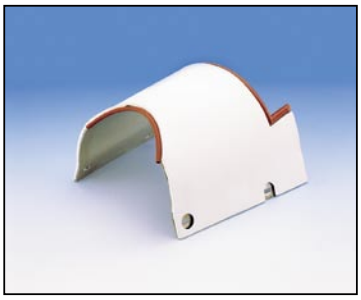
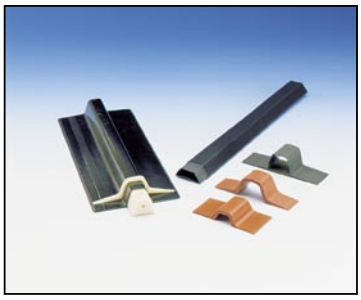




Rubbercraft Quality Products...

Aerodynamic Seals

- Rubber to Metal, Plastic
- Vulcanized to Teflon
- Fabric Reinforced (Fiber glass, polyester, Nomex/ceramics)

Composite Bonding

- Composite tooling
- Inflatable bladders
- Isogrid structures
- Intensifiers
- Mandrels

Aircraft Interiors

- Window and door seals
- Armrest and tray tables
- Cockpit and canopy seals
- Decorative color matching
- Light and video fixture seals
- Cargo door and overhead bin seals

Launch Vehicle Components

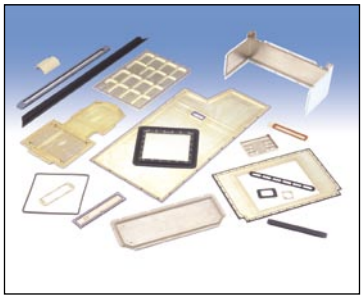
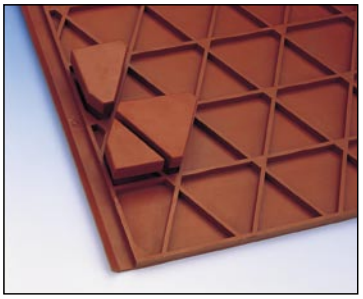
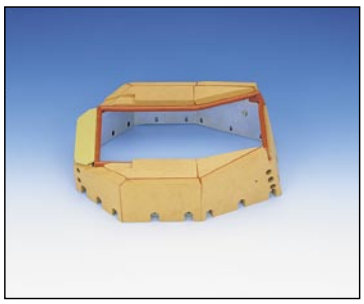
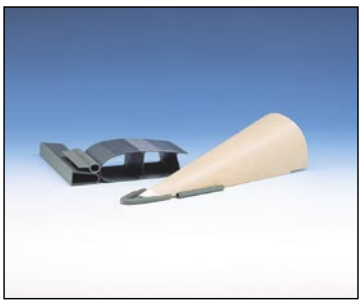
- Raceway covers
- Fairings
- Thermal barriers
- Light weight materials
- Ablative materials

Precision Sealing Solutions from Hydrospace to Aerospace

If your application calls for molded or extruded rubber parts, Rubbercraft has the solution. Our experienced technical staff can help you identify the best techniques and the right materials with hundreds of die patterns, extrusions, molds, as well as custom solutions. Request our free catalog or visit us on the web at www.rubbercraft.com.

Molded & Extruded Elastomers

- Full range of elastomers for aerospace, medical, automotive and electronics
- Design freedom
  - Mold-in-place
  - Extruded continuous lengths
  - Die cut from sheet
- Wide range of magnetic and nonmagnetic fillers
- Rubber-to-metal / plastic bonding
- Teflon skin and fabric reinforced seals
- Color matching FED-STD-595
- EMI/RFI/ESD shielding to MIL-DTL-G-83528C
- Shielding effectiveness ~ 80-115 dB
- Complete tooling services
- Complete laboratory services
- QPL-approved compounds
- Custom formulations
  - Silicone
  - Fluorosilicone
  - Neoprene
  - EPDM
  - SBR
  - Natural rubber
  - Urethane
  - Nitrile
  - Viton
  - Fluorel
  - And More...

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