Material Specifications

Spira's EMI/RFI products are made using the finest materials and processes in compliance with AS9100 and ISO 9001:2000. Material certifications are available upon request when your order is placed. Materials used are typically purchased to the following specifications unless otherwise noted or requested.

Material	Component / Process	Specification	Storage Temp	Operating Temp
Spiral	Beryllium Copper	ASTM-B-194	Ambient	-73 to 232° C, -100 to 450° F
	Stainless Steel	AMS-5906	Ambient	< 704° C, < 1300° F
Plating	Chemical Film	AMS-C-5541 Class 3	Ambient	< 66° C, < 150° F
	Gold	**MIL-DTL-45204**, Type II, Grade C, Class 1	Ambient	< 274° C, < 525° F
	Pure Tin (RoHS)	ASTM-B-545	Ambient	< 150° C, < 302° F
	Pure Tin (Honeycomb)	ASTM-B-545	Ambient	< 150° C, < 302° F
	Tin-Lead	90% Tin, 10% Lead per AMS-P-81728	Ambient	< 150° C, < 302° F
	Sulfamate Nickel	**AMS-QQ-N-290B, Class 2**	Ambient	< 649° C, < 1200° F
Rubber	EPDM (Solid)	ASTM D2000 M3 BA	Ambient	-80 to 275° C, -112 to 527° F
	Fluorosilicone (Solid)	Blue per AMS-R-25988, Type II, Class I, Grade 40	Ambient	-62 to 204° C, -80 to 400° F
	Fluorosilicone (Sponge)	AMS-3323	Ambient	-62 to 204° C, -80 to 400° F
	Neoprene (Sponge)	ASTM-D-6576, Type II, Grade A, Condition-Medium	Ambient	-54 to 121° C, -65 to 250° F
	PVC Cord	Black per MIL-I-631, Grade C, Class I, Category I, Type F, Form Ua, 80 Shore	Ambient	-30 to 160° C, -22 to 320° F
	Silicone (Solid)	A-A-59588, Class 2B, Grade 40 or 60 See product spec sheet for grade.	Ambient	-38 to 204° C, -100 to 400° F
	Silicone (Sponge)	Red per ASTM-D-6576, Type II, Grade C, Condition-Medium	Ambient	-38 to 204° C, -100 to 400° F
	Thermal Plastic Rubber	ASTM-D-2000 CA710, C32, EA14, F19	Ambient	-80 to 275° C, -112 to 527° F
Adhesive	Epoxy	2216 B/A per ASTM-D-2000	Ambient	-80 to 275° C, -112 to 527° F
	Fluorosilicone (Endur-o-Shield core)	Dow Corning 730 RTV MIL-24298	≤ 32° C	-57 to 260° C, -71 to 500° F
	Fluorosilicone (Red)	Dow Corning Q4-2817 Sealant	≤ 32° C	-57 to 260° C, -71 to 500° F
	Neoprene (Contact Cement)	MMM-A-1617, TYPE II	-16° to 27° C	-67 to 177° C, -89 to 351° F
	Silicone (Endur-o-Shield standard core)	Dow Corning 732 RTV Per MIL-A-46106, Group I, Type I	≤ 32° C	-60 to 177° C, -76 to 351° F
	Silicone (Endur-o-Shield Stainless Steel gaskets)	Dow Corning 737	≤ 32° C	-65 to 177° C, -85 to 351° F
	Silicone (Non-acetic acid base)	Dow Corning 3145 RTV Per MIL-A-46146, Group II, Type I	≤ 32° C	-50 to 200° C, -58 to 392° F
	Silicone (Clear, non-outgassing)	Dow Corning 61104	≤ 32° C	-60 to 177° C, -76 to 351° F
Other	Connector Frame	**6061-T4 Aluminum, AMS-4026M 6061-T6 Aluminum, AMS-4027N**	Ambient	< 343° C, < 650° F
	Environmental Connector Frame Core	**Stainless Steel, AMS-5516M**	**Ambient**	**< 704° C, < 1300° F**
	Dovetail Groove Cutter	**Tungsten Carbide**	Ambient	N/A
	Honeycomb Frame	6061-T4 Aluminum, AMS-QQ-A-200/8	Ambient	< 343° C, < 650° F
	Honeycomb Panel (Aluminum)	Aluminum per AMS-C-7438	Ambient	< 204° C, < 400° F
	Honeycomb Panel (Brass)	Brass per ASTM-B-36/B 36M. Foil soldered together per ASTM-B-32	Ambient	< 230° C, < 446° F
	Threaded Insert	Cadmium plated Alum. AMS-QQ-P-416	Ambient	N/A

The shielding effectiveness of EMI gasketed joints can be significantly affected by corrosion. The corrosion of concern is a galvanic cell between the gasket and the joint surface in the presence of moisture or salt-fog atmospheres. The chart below lists six common materials used in EMI gaskets along with their degree of compatibility with common joint surface material/plating combinations. (The chart was extracted from ARP-1481, published by the Society of Automotive Engineers). The legend describes the degree of compatibility and/or requirements for obtaining a corrosion free joint. The term “requires sealing” means that the gasketed joint surfaces must be protected in some way from the moisture and/or salt-fog atmospheres.

Gasket Materials	Joint Surface Materials: Aluminum Clad 1000, 3000, 5000 6000 Series Casting 356								Aluminum 2000, 7000 Series								Carbon and Alloy Steel AISI-410									Corrosion Resistant Steels			High Nickel and PH Steels			Copper Alloys				Miscellaneous				Titanium	
Joint Surface Finishes	None	MIL-C-5541 Class 1A	MIL-C-5541 Class 3	Electroless Nickel	Cadmium Plated Bare	Cadmium Colored Chromate	Cadmium Clear Chromate	Chromium	MIL-C-5541 Class 1A	MIL-C-5541 Class 3	Electroless Nickel	Cadmium Plated Bare	Cadmium Colored Chromate	Cadmium Clear Chromate	Chromium	Tin	Cadmium Bare	Cadmium Colored Chromate	Cadmium Clear Chromate	Nickel	Electroless Nickel	Chromium	Tin	Lead	Silver	Passivated	Cadmium (Passivated)	Tin	Passivated	Cadmium (Passivated)	Tin	Tin	Silver	Gold	Solder (Lead-Tin)	Silver Paint	Zinc Paint	Silver Adhesive	Carbon Adhesive	None	Nickel
Aluminum	A	A	A	D	A	A	A	A	A	A	D	D	A	A	A	A	A	A	A	D	D	A	A	D	X	C	A	A	C	A	A	A	X	X	A	X	X	D	D	D	D
Tin Plated*	A	A	A	D	A	A	A	A	A	A	D	A	A	A	A	A	A	A	A	D	D	A	A	A	A	A	A	A	A	A	A	A	A	A	A	D	A	D	D	D	D
Monel	C	D	D	A	D	D	D	A	D	D	A	D	D	D	A	D	D	D	D	A	A	A	A	D	A	A	D	A	A	D	A	A	D	D	A	D	D	D	D	A	A
Silver Elastomer	E	C	C	D	C	C	C	A	C	C	D	E	C	C	A	A	C	C	C	D	D	A	A	X	A	D	E	D	D	E	D	D	A	A	D	A	X	A	A	D	D
Stainless Steel*	C	C	C	A	C	A	A	A	D	C	A	D	A	A	A	A	C	A	A	A	A	A	A	D	A	A	D	A	A	D	A	A	A	A	A	A	X	A	D	A	A
Beryllium Copper	C	C	C	D	C	C	C	D	C	C	D	C	C	C	D	C	C	C	D	D	D	C	C	D	D	C	C	D	C	C	C	C	C	C	C	D	C	C	C	C	C

**Standard gasket materials used by Spira.*

Legend:

A - Compatible
B - Requires sealing only if exposed to salt atmosphere or high humidity. Edge plating may be satisfactory
C - Requires sealing if exposed to humid environment
D - Compatible in environment of controlled temperature and humidity only
E - Requires sealing regardless of exposure
X - Not usable

RoHS Compliance

As noted throughout this catalog, there are RoHS compatible options available for all tin plated Spira gaskets. The RoHS versions (IW or EIW) use special tin plating instead of our standard tin/lead plating. The RoHS compatible tin plating has been tested for whisker growth and whisker growth was not detected. Please contact us for a copy of the test results or more information.

Spira products are protected under U.S. patents 3,502,784, 5,895,885 and 5,910,639.