

CHO-SHIELD® Coatings

CHO-SHIELD Conductive Coatings

CHO-SHIELD coatings provide EMI shielding, anti-static protection, corona shielding, and surface grounding in a wide range of applications.

Our silver-filled systems possess exceptionally high conductivity, generally providing levels of EMI shielding of 60-80 dB in the 30 MHz to 1 GHz range. CHO-SHIELD 596 is an effective flange coating for salt spray environments, especially in use with silver-filled gaskets.

CHO-SHIELD 596 and 598 coatings can be applied with a brush or conventional spray painting equipment. Both systems offer excellent EMI and environmental protection when applied to plastic, glass, or epoxy substrates. Both can be cured at room temperature, although optimum results are achieved after elevated temperature cure.

CHO-SHIELD Acrylics

One-component CHO-SHIELD conductive acrylic, air-dry coatings are intended for EMI shielding of non-conductive substrates. Filler systems include nickel, silver, silver-copper, or nickel-silver blends. Highest levels of EMI shielding are provided by silver-filled CHO-SHIELD 4900 coating.

CHO-SHIELD conductive acrylic coatings help equipment meet specific radiated emission limits. These materials offer good chemical and abrasion resistance, and will not flake or crack when applied to a variety of substrates. CHO-SHIELD acrylic coatings are available for application on ABS, PC-ABS, polystyrene, PPO, polycarbonate, polyester, acrylic, and composite materials. They are easily applied with conventional spray equipment.

CHO-SHIELD 2052 conductive coating provides high levels of EMI shielding

effectiveness on a variety of plastic materials used for electronic enclosures. CHO-SHIELD 2052 coating is stable at high and low temperatures, and in high humidity and moderate salt fog environments. It is also UL746 (File No. E80068) rated for adhesion. Shielding effectiveness is 75 dB at 100 MHz to 2 GHz.

CHO-SHIELD 4966 conductive silicone coating is a three-component system which uses heat cure for coating silicone-based substrates. It provides 60 dB of shielding effectiveness at frequencies above 30 MHz. CHO-SHIELD 4925 silver/nickel coating provides 50-60 dB of EMI shielding at frequencies up to 1 GHz. It was developed specifically to be compatible with polycarbonate, in addition to other substrates as mentioned above.

For shielding an entire room, CHO-SHIELD 4076 coating is recommended. This durable, nickel-filled urethane adheres well to plaster, wood, glass, concrete, drywall, and most metals.

Specifications and Product Characteristics (Contact Chomerics for complete specifications and test procedures)

CHO-SHIELD Coatings	596	598	2052	4076	4900	4914	4916	4925	4966
Binder	epoxy	epoxy	acrylic	poly-urethane	acrylic	acrylic	acrylic	acrylic	silicone
Filler	Ag	Ag	Ag/Cu	Ni	Ag	Ni	Ni	Ag, Ni	Ag
Mix	100:37	100:25	1-part	1-part	1-part	1-part	1-part	1-part	100:15:1:2.6**
Consistency	medium fluid	medium fluid	thin fluid	medium fluid	thin fluid	medium fluid	heavy fluid	thin fluid	thin fluid
Specific Gravity (g/cc)	1.8 ±0.15	1.8 ±0.15	1.4 ±0.2 (8.8 lbs./gal.)	1.8 ±0.20 (15 lbs./gal.)	1.5 ±0.15	1.7 ±0.2 (14 lbs./gal.)	1.9 ±0.1 (15 lbs./gal.)	1.28 ±0.1	3.32 ±0.1
Suggested Spraying Viscosity #2 Zahn Cup	19-26 sec.	19-26 sec.	15-20 sec.	N/A	19-22 sec.	19-22 sec.	19-22 sec.	25 sec.	18-20 sec.
Maximum Surface Resistivity, ohm/sq.	0.06	0.06	0.05	0.5	0.03	2.0	0.7	0.2	0.15
Use Temperature	-85 to 257°F (-65 to 125°C)	-85 to 257°F (-65 to 125°C)	-40 to 212°F (-20 to 100°C)	-65 to 185°F (-54 to 85°C)	-65 to 200°F (-54 to 93°C)	-65 to 185°F (-54 to 85°C)	-65 to 185°F (-54 to 85°C)	-65 to 185°F (-54 to 85°C)	-40 to 212°F (-20 to 100°C)
Elevated Temperature Cure Cycle	1.0 hr. @ 250°F (121°C)	1.0 hr. @ 250°F (121°C)	5 min. @ RT followed by 20 min. @ 140°-160°F (60°-71°C)	N/A	N/A	N/A	N/A 150°F (66°C)	0.5 hr. @ 150°F (66°C)	0.5 hr. @
Room Temperature Cure Time	1 wk.	1 wk.	24 hrs.	24 hrs.	24 hrs.	24 hrs.	24 hrs.	24 hrs.	Not recommended
Working Life	8 hrs.	8 hrs.	N/A	N/A	N/A	N/A	N/A	N/A	-5 hrs.
Shelf Life, mos.	9	9	12	12	9 (bulk) 6 (spray)	9	12	12	6
Coverage, † ft.² (m²)	50/lb. (10.24/kg)	50/lb. (10.24/kg)	230/gal. (639.20/L)	200/gal. (568.2/L)	34/lb. (6.96/kg)	225/gal. (639.20/L)	225/gal. (639.20/L)	210/gal. (596.60/L)	75/qt. (71/L)
Recommended Thickness, in. (mm)	0.001 min. (0.03)	0.001 min. (0.03)	0.002 min. (0.05)	0.002 min. (0.05)	0.001 min. (0.03)	0.002 min. (0.05)	0.002 min. (0.05)	0.001 min. (0.03)	0.002 min. (0.05)

*Theoretical coverage. Actual coverage will be 50-100% of this value, depending on part geometry, operator skill, etc. ** Kit is preweighed for direct mixing of all parts.

† Coverage is at the recommended thickness.

PRODUCT NOTES

596	Long pot life. Highly conductive. Resists solvents, abrasion, high temperature and salt spray.	4914	Low cost. Bonds to ABS, Noryl, and polyester. High solvent resistance. Fast tack and dry. (Not for use with polycarbonate or polystyrene).
598	Same as 596, with superior resistance to salt spray corrosion.	4916	Bonds to ABS, Noryl, polystyrene, polycarbonate. Air drying. No primer required.
4076	Bonds well to plaster, concrete, drywall, glass, wood, most metals. Exceptional room shielding. Quick air dry. No primer required.	4925	Compatible with polycarbonate and ABS. Thin (1 mil) coverage provides excellent shielding at low cost. Modified formulation available for use on Noryl housings.
4900	Highest EMI shielding performance. Excellent for anti-static protection and grounding surfaces. Fast tack and dry.	4966	Designed for coating silicone materials. Highly conductive. Very flexible.
2052	Bonds to ABS, PC-ABS, Noryl, † PVC and polycarbonate. Good chemical, environmental abrasion resistance. Preferred coating for low cost shielding of typical commercial electronic enclosures.		

† Trademark of General Electric Co.

CHO-SHIELD Corrosion-Resistant Conductive Flange Coatings

CHO-SHIELD 2001, 2002 and 2003 electrically conductive coatings provide corrosion protection for enclosure flanges which mate with EMI shielding gaskets. They can also provide a corrosion resistant conductive surface coating on aluminum or non-conductive composite substrates. CHO-SHIELD 2000 series coatings have excellent chemical resistance, including stability in jet fuel (JP4), hydraulic fluids and motor oil, along with high abrasion resistance, even after jet fuel immersion.

CHO-SHIELD 2000 series coatings are 3-part, copper-filled urethanes whose filler systems have been treated to remain electrically stable at elevated temperatures. CHO-SHIELD 2001 and 2003 coatings are equivalent except for color. They contain soluble chromates to minimize the effects of galvanic corrosion of the aluminum substrate, even in the event of a coating scratch. CHO-SHIELD 2002 coating, intended for composite sub-

strates or as a 2001 repair coating, is chromate free.

Corrosion resistance has been evaluated in terms of electrical stability of the coatings and their ability to protect aluminum substrates. When tested in accordance with the conditions specified in ASTM B117 (or MIL-STD 810, Method 509.2) salt fog, no corrosion occurs on the aluminum substrate after 500 hours exposure for CHO-SHIELD 2001 and 2003 coatings, and 100 hours exposure for CHO-SHIELD 2002 coatings.

Design Issues

Flange design and surface preparation have significant impact on the corrosion resistance offered by the CHO-SHIELD 2000 series of coatings. All three coatings best adhere to MIL-C-5541, Class 3 treated aluminum (use an alkaline etching cleaner to clean the aluminum before the conversion coating step) and to most plastics and composites. For best adhesion to aluminum, Chomerics' Primer 1091 is strongly recommended.



For technical and applications information on this primer, ask for Technical Bulletin 31.

Consult Chomerics for application to other substrates. CHO-SEAL 2001 and 2002 coatings are also available in brushable form. Contact Chomerics' Applications Engineering Department for assistance with design and material requirements.

Specifications and Product Characteristics <i>continued</i>				
CHO-SHIELD Coatings	2001	2002	2003	1091
Binder	urethane	urethane	urethane	primer for 2001, 2002, 2003
Filler	Cu	Cu	Cu	
Mix	pre-measured kit	pre-measured kit	pre-measured kit	1-part
Consistency	medium fluid	medium fluid	medium fluid	thin liquid
Specific Gravity (g/cc)	3.1	3.1	3.1	0.78
Suggested Spraying	19-27 sec.	19-27 sec.	19-27 sec.	N/A
Maximum Surface Resistivity, ohm/sq.*	0.10	0.10	0.10	N/A
Use Temperature	-85 to 185°F (-65 to 85°C)	-85 to 185°F (-65 to 85°C)	-85 to 185°F (-65 to 85°C)	-67 to 180°F (-55 to 82°C)
Elevated Temperature Cure Cycle	2 hrs. @ RT followed by 30 min. @ 250°F (121°C)	2 hrs. @ RT followed by 30 min. @ 250°F (121°C)	2 hrs. @ RT followed by 30 min. @ 250°F (121°C)	N/A
Room Temperature Cure Time	1 week	1 week	1 week	1 hr.
Working Life	2 hrs.	2 hrs.	2 hrs.	N/A
Shelf Life, mos.	9	9	9	15
Coverage, [†] ft. ² (m ²)	40/qt (3.5/L)	40/qt (3.5/L)	40/qt (3.5/L)	1200/lb (245.81/kg)
Recommended Thickness, in. (mm)	0.003 min. (0.08)	0.003 min. (0.08)	0.003 min. (0.08)	0.0001 min. (0.003)

PRODUCT NOTES

2001	Excellent corrosion and fluid resistance. Exceptional coating hardness and scratch resistance.
2002	Intended for use on composite and plastic surfaces.
2003	Dark brown version of 2001.
1091	Wipe on surface. Let air dry 60 min.

Ordering Information

Product	Ordering Part Number	Unit/Size
CHO-SHIELD 596	52-01-0596-0000	1 pound kit (0.5 kg)
CHO-SHIELD 596	52-00-0596-0000	3 ounce kit (85.1 g)
CHO-SHIELD 598	52-01-0598-0000	1 pound kit (0.5 kg)
CHO-SHIELD 598	52-00-0598-0000	3 ounce kit (85.1 g)
CHO-SHIELD 2052	52-02-2052-0000	1 quart (0.95 L)
CHO-SHIELD 2052	52-03-2052-0000	1 gallon (3.8 L)
CHO-SHIELD 2052	52-05-2052-0000	5 gallons (19 L)
CHO-SHIELD 4076	52-03-4076-050A	1 gal. (25 gal. min.) (3.8 L)
CHO-SHIELD 4900	52-01-4900-0000	1 pound can (0.5 kg)
CHO-SHIELD 4900	52-02-4900-0000	6 ounce spray can (0.17 kg)
CHO-SHIELD 4914	52-03-4914-0000	1 gallon (3.8 L)
CHO-SHIELD 4916	52-03-4916-0000	1 gallon (3.8 L)
CHO-SHIELD 4925	52-03-4925-0000	1 gallon (3.8 L)
CHO-SHIELD 4966	50-04-4966-0000	1 quart (0.95 L)
CHO-SHIELD 2001	52-00-2001-0000	250 grams (¹ / ₂ pint)
CHO-SHIELD 2001	52-01-2001-0000	700 grams (1 pint)
CHO-SHIELD 2001	52-04-2001-0000	1378 grams (1 quart)
CHO-SHIELD 2002	52-00-2002-0000	250 grams (¹ / ₂ pint)
CHO-SHIELD 2002	52-01-2002-0000	700 grams (1 pint)
CHO-SHIELD 2002	52-04-2002-0000	1378 grams (1 quart)
CHO-SHIELD 2003	52-00-2003-0000	250 grams (¹ / ₂ pint)
CHO-SHIELD 2003	52-01-2003-0000	700 grams (1 pint)
CHO-SHIELD 2003	52-04-2003-0000	1378 grams (1 quart)

Note: Custom packaging can be accommodated. Please inquire.

Every shipment of Chomerics' conductive compounds is accompanied by a *Certificate of Conformance* to Chomerics specifications. Additional test reports can be obtained for a service charge. Quality control procedures conform to MIL-I-45208.