

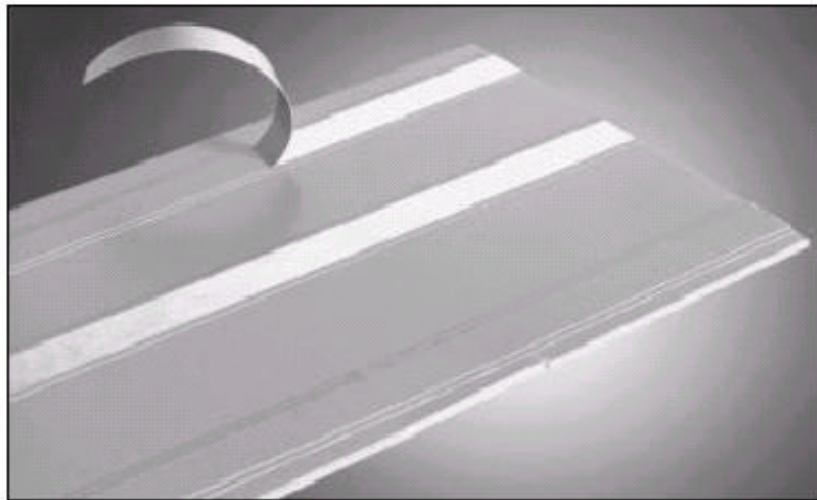
CHO-MASK[®] II Conductive Foil Tape with Peel-Off Mask

The CHO-MASK II family of EMI foil tapes includes both Standard Tack (ST) and High Tack (HT) versions for providing a conductive, non-corroding surface on painted metal electronic enclosures. CHO-MASK II tapes consist of recessed polyester paint masking film covering a layer of either 1 oz. (28.4g) or 2 oz. (56.7g) tin-plated copper foil. The back of the foil features a conductive pressure sensitive adhesive (PSA). CHO-MASK II tape is applied to clean metal frame, door and panel surfaces where electrical continuity is required. After painting, the peel-off mask is easily removed, allowing the paint to seal both edges of the foil layer. The foil imparts a clean, electrically conductive path from the panel, through an EMI gasket, to the cabinet frame. It also provides grounding points within the enclosure.

CHO-MASK II tape is easily applied in-house and is compatible with typical manufacturing procedures. The HT version is specially designed for the powder painting process, which requires high baking temperatures. Applying CHO-MASK II tape requires only a simple taping of panel flanges prior to painting and baking (see Application Instructions). This method eliminates plating, chromate conversion and/or spray coating operations, which can be inconsistent and difficult to control. Using CHO-MASK II ST & HT tapes eliminates the need to outsource conductive plating or painting. Techniques for applying CHO-MASK II tapes are the same as for other types of paint masks typically used in metal paint finishing processes.

FEATURES

- More cost-effective and environmentally friendly than plating and coating methods
- Peel-off mask is removed easily any time, at any temperature
- Mask is recessed from edges for paint overlap and corrosion protection
- Solvent/chemical resistant



- Maintains performance after 10,000 door closure cycles
- Passes MIL-STD Salt Fog testing
- Foil tape meets MIL-T-47012
- Tin-plating on foil meets MIL-T-10727
- Adhesive contains highly stable, conductive particles for long-term reliability
- When used in conjunction with Chomerics EMI gaskets, provides effective EMI shielding performance

For years, CHO-MASK II tapes have served the electronic enclosure market as the premier conductive contact material for EMI gaskets. CHO-MASK II tapes outperform plating, coatings, and conversion coatings as measured by cost, consistency, and EMI performance. Because different cabinets and coating processes have different requirements, Chomerics developed CHO-MASK II HT (High Tack) tapes, which join the original CHO-MASK II ST (Standard Tack) tape version. Both CHO-MASK II ST and HT tapes feature a polyester mask, which is easily removed after paint baking at temperatures up to 400°F (204°C). Both

tapes feature tin-plated copper foil as the conductive surface. The tin-plated copper offers long-term stability in humidity and salt fog. The HT and ST tape versions both provide long-term EMI performance stability.

CHO-MASK II HT TAPE

CHO-MASK II HT tape uses a new, electrically conductive acrylic adhesive that has exceptional adhesive strength at high temperatures (up to 400°). Because of this, we recommend that lengths in excess of 5 feet (1.5 m), baked at over 350°F (177°C), be installed with a gap of 0.062 inch (1.5 mm). Otherwise, the thermal expansion rate differences between copper and typical cabinet substrates can cause some buckling of long lengths.

continued

Application differences between CHO-MASK II ST and HT tape versions are shown below.

CHO-MASK II ST Tape

- Oven bake under 350°F (177°C)
- Suitable for flat flange and radius applications
- No length restriction

CHO-MASK II HT Tape

- Oven bake up to 400°F (204°C) for 1 hour
- Suitable for knife edge, radius and flat surface applications
- Lengths of <5 ft. above 350°F (177°C) recommended

AVAILABILITY

CHO-MASK II tape is supplied in 108 yard (97 m) rolls. Alternate constructions and non-standard roll sizes are available. Please contact the factory for details. Standard rolls can be ordered using these part numbers:

CMT - XXX - 108 - XXXX

ST = Standard Tack
 HT = High Tack
 ST1 = (For 1 oz. copper)
 HT1 = (For 1 oz. copper)

Foil Tape Width			
-0430	.430 in. (1.09 cm)	-0800	.800 in. (2.03 cm)
-0500	.500 in. (1.27 cm)	-1000	1.000 in. (2.54 cm)
-0625	.625 in. (1.59 cm)	-1500	1.500 in. (3.81 cm)
-0750	.750 in. (1.91 cm)	-1750	1.750 in. (4.44 cm)

TECHNICAL DATA

CHO-MASK II conductive tape is a sturdy laminate of 1 oz. (28.4g) or 2 oz. (56.7g) tin-plated copper foil polyester film. Adhesion values and other technical data appear in the tables.

Property	Test Method	Typical Values CHO-MASK II ST (Standard Tack)	Typical Values CHO-MASK II HT (High Tack)
Foil Type/Thickness (mils)		2 oz. Tinned Copper (2.8) 1 oz. Tinned Copper (1.4)	2 oz. Tinned Copper (2.8) 1 oz. Tinned Copper (1.4)
Adhesive/Thickness (mils)		Acrylic (1.8)	Acrylic (2.0)
Total Thickness ¹	ASTM-D1000	2 oz. = 4.6 mils (0.12 mm) 1 oz. = 3.2 mils (0.08 mm)	2 oz. = 4.8 mils (0.12 mm) 1 oz. = 3.0 mils (0.08 mm)
Mask Type		Polyester	Polyester
Continuous Use Temperature Range		-40 to 180°F (-40 to 82°C)	-40 to 180°F (-40 to 82°C)
Paint Cure Cycle		Not to exceed 1 hour @ 365°F (185°C)	Not to exceed 1 hour @ 400°F (204°C)
Adhesion (foil to cabinet substrate)	ASTM-D1000	See Chart A	See Chart A
Adhesion ² (mask to foil)	ASTM-D1000	24 oz/in (263 N/m)	24 oz/in (263 N/m)
Electrical Resistance ²	Chomerics TM 71	<200 milliohms	<200 milliohms
Flame Resistance	UL Subject 510	Pass/File #E90722	Pass/File #E90722
Corrosion Resistance ³	MIL-STD-810	Pass	Pass
Chemical Resistance ⁴	ASTM-D896-84	Pass	Pass
Humidity Exposure ⁵	ASTM-D1001	Pass	Pass
Gasket Closure Cycling (10,000 cycles, 15% deflection)	Chomerics TR40	See Chart B	See Chart B
Adhesion After Heat Aging, 48 hours @ 365°F (185°C)	ASTM-D1000	2.8 lb/in (490 N/m)	2.8 lb/in (490 N/m)

¹Adhesive and foil total thickness

²After bake

³Salt Fog Chamber at 35°C, for 144 hrs. (CHO-MASK II tape adhered to steel plate, painted)

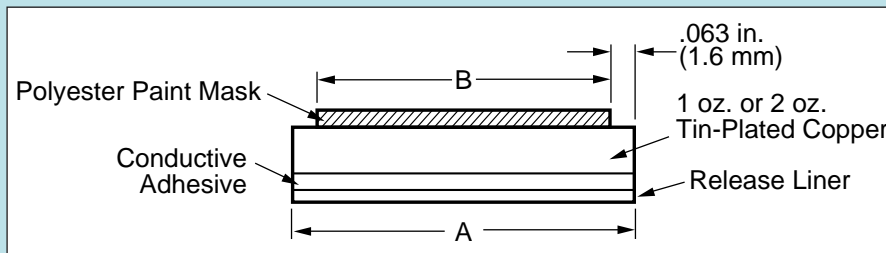
⁴Withstands 1,1,1 Trichloroethane, ethanol, acids, cleaning solvents, and alkaline solutions without degradation. Complete list available from Applications Department.

⁵Tested at 60°C, 96 hours, 95% RH

**CHART A: Typical Post Bake Adhesion for ST and HT Versions
(Tin-plated copper tape to cabinet substrate)**

Test Environment	To Aluminum lbs/in (N/m)	To Steel lbs/in (N/m)
Baked 1 hour @ 350°F (177°C)	4.0 (700)	3.9 (683)
Baked 1 hour @ 400°F (204°C)	5.1 (893)	5.0 (875)
Baked 48 hours @ 350°F (177°C)	3.1 (543)	3.0 (525)
Baked 168 hours @ 165°F/95% RH (74°C)	4.1 (718)	4.0 (700)

CHO-MASK II – Construction



Dimensions	
If "A" is ...	Then "B" is ...
.430 in. (1.09 cm)	.305 in. (.775 cm)
.500 in. (1.27 cm)	.375 in. (.953 cm)
.625 in. (1.59 cm)	.500 in. (1.27 cm)
.750 in. (1.91 cm)	.625 in. (1.59 cm)
.800 in. (2.03 cm)	.675 in. (1.71 cm)
1.000 in. (2.54 cm)	.875 in. (2.22 cm)
1.500 in. (3.81 cm)	1.375 in. (3.49 cm)
1.750 in. (4.44 cm)	1.625 in. (4.13 cm)

**CHART B: Adhesion Resistance
(10,000 Door closure cycles at 15% deflection of various Chomerics EMI gaskets)**

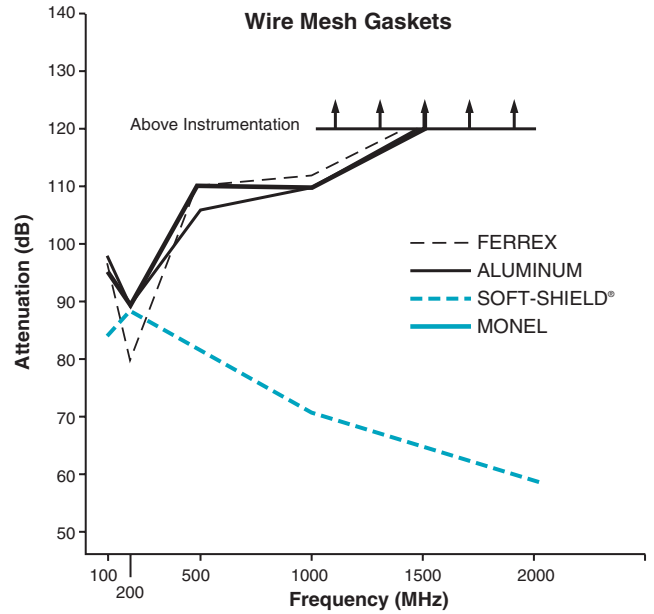
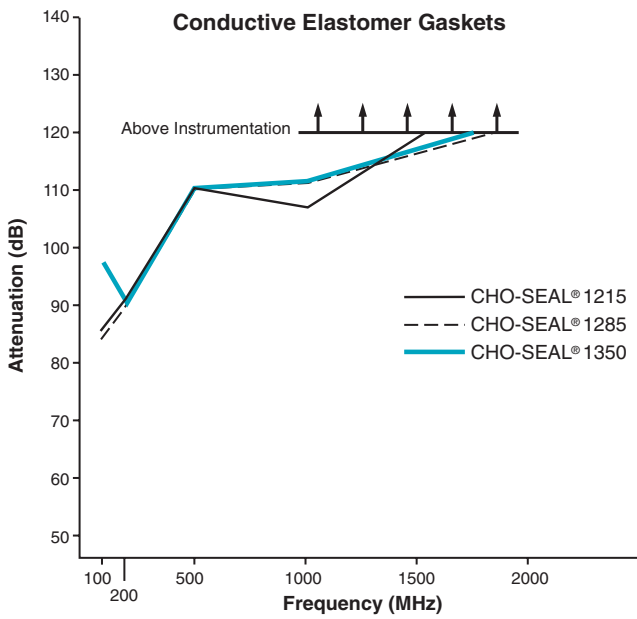
EMI Gasket Type	Test Results	Comments
SOFT-SHIELD® II fabric/foam	Pass	No defects/abrasions
Conductive fabric	Pass	No defects/abrasions
SPRNG-LINE™ beryllium copper	Pass	No defects/abrasions
Ag/Cu filled silicone elastomer	Pass	No defects/abrasions
Ag/Al filled silicone elastomer	Pass	No defects/abrasions
Ag filled silicone elastomer	Pass	No defects/abrasions
Ag/Ni filled silicone elastomer	Pass	No defects/abrasions
Ag/glass filled silicone elastomer	Pass	No defects/abrasions
Ag/Cu filled fluorosilicone elastomer	Pass	No defects/abrasions
Ag/Al filled fluorosilicone elastomer	Pass	No defects/abrasions
Ag filled fluorosilicone elastomer	Pass	No defects/abrasions
Ferrex®* knitted wire mesh	Pass	No defects/abrasions
Monel** knitted wire mesh	Pass	No defects/abrasions
Monel knitted wire mesh with urethane foam core (SOFT-SHIELD® gasket)	Pass	No defects/abrasions
Aluminum knitted wire mesh	Pass	No defects/abrasions

* Tin-plated copper clad steel

** Nickel copper alloy

CHO-MASK II Shielding Effectiveness (E-Field) with Various EMI Shielding Gaskets

Shielding effectiveness tests are performed using standard 2 oz CHO-MASK gaskets



Gasket Type and Description	Frequency (MHz)				
	100	200	500	1000	2000
CHO-SEAL 1350 Silver-plated-glass filled silicone elastomer EMI gasket	97	90	110	112	120*
CHO-SEAL 1215 Silver-plated-copper filled silicone elastomer EMI gasket	85	90	110	107	120*
CHO-SEAL 1285 Silver-plated-aluminum filled silicone elastomer EMI gasket	85	90	110	112	120*

* Beyond limit of instrumentation

Gasket Type and Description	Frequency (MHz)				
	100	200	500	1000	2000
SOFT-SHIELD® Knitted wire mesh with urethane foam core EMI gasket	85	88	82	72	60
Aluminum Knitted wire mesh EMI gasket	98	90	106	110	120*
Ferrex Knitted wire mesh EMI gasket	99	89	110	112	120*
Monel Knitted wire mesh EMI gasket	95	90	110	110	120*

* Beyond limit of instrumentation

SUGGESTED APPLICATION PROCEDURE

You will need: • Cotton Cloth or Rag • Industrial Cleaner (such as toluene) • Rubber Gloves
• CHO-MASK II Applicator • Cutting Instrument (X-Acto® knife, razor blade)

Step 1: To ensure maximum adhesion, remove all surface oils and dust. In large volume applications, proceed through your normal automated cabinet cleaning procedures. Note that phosphatizing can render cabinet surfaces non-conductive. It is recommended that you monitor the surface resistivity of the cabinet flange (surface resistivity should be <100 mOhms).

In small volume applications, clean cabinet flanges thoroughly with a cloth dampened with an industrial cleaner (acetone, toluene, or isopropyl alcohol). Wear rubber gloves, so cleaning agents do not come in contact with the skin.

IMPORTANT: Avoid contact with or handling of the adhesive. Oils from the hand will affect adhesion.

Note: If oxidation or rust is present, abrade surface with sandpaper to expose clean metal before cleaning.

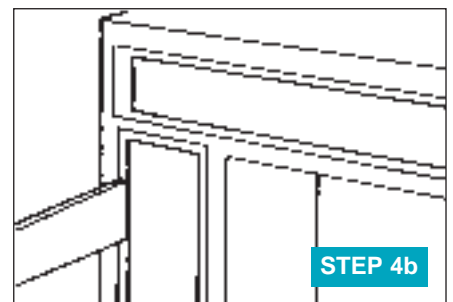
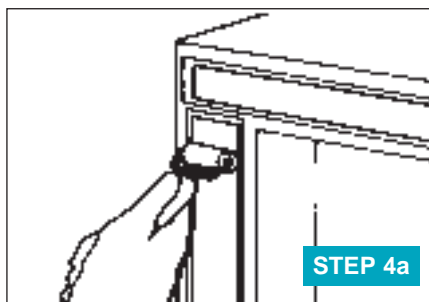
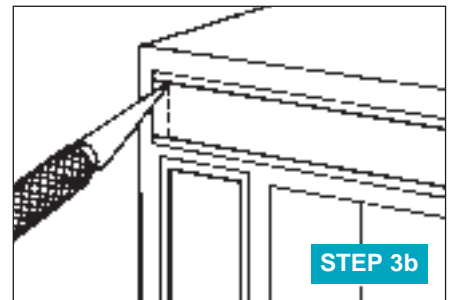
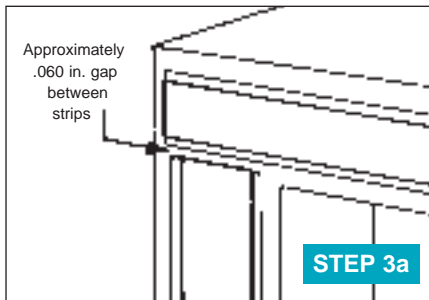
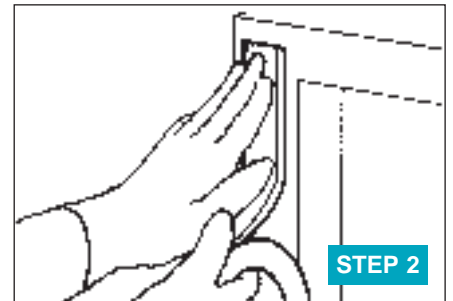
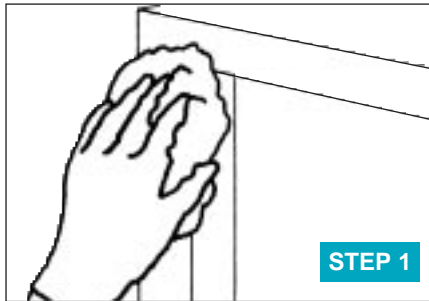
Step 2: Still wearing rubber gloves, peel away the release liner and apply the tape to cabinet flanges being careful to avoid wrinkles. Extend the tape beyond the corners and cut away excess. This prevents residual stress in foil from lifting tape at ends. Run a finger along the mask to provide initial adhesion.

Step 3a: The excess tape in each corner should now be trimmed. It is not necessary to overlap the tape in the corners. It is recommended that a gap be left between the vertical and horizontal strips. The gap should measure about .060 in. (1.5 cm) wide (which is equivalent to the recessed edge of the tape). Later, when paint is applied to the cabinet this gap will be filled and serve to edge seal the tape ends.

Step 3b: Using the X-Acto knife, cut about a .060 in. (1.5 cm) piece of the mask layer on each strip and remove. This will further ensure edge sealing when the cabinet is painted.

Step 4a: Smooth over the surface of the tape with a small rubber roller.

Step 4b: Using a similar tool as pictured in Step 4b, touch down the exposed tinned copper edges until they are flat and even. (Chomerics can provide a similar tool, at no charge.



Contact Chomerics' customer service and request part number T210000001.)

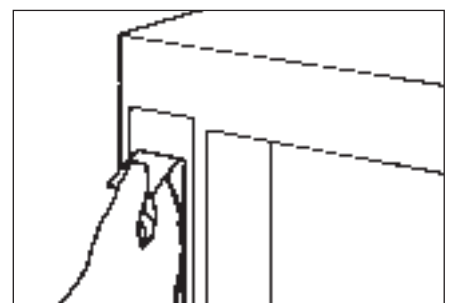
Note: Only moderate pressure is required (about 5 psi).

Step 5: Cabinet is ready for normal phosphatizing and painting. Follow the manufacturer's instructions for paint application and curing.

Note: Recommended paint thickness, including primer, is 4 mils (0.1 mm) or more.

Step 6: When the cabinet has reached room temperature, remove the mask at a 180° angle from the foil tape leaving a clean, conductive grounding surface.

Note: Mask is easily removed at room temperature, with or without baking.



TROUBLESHOOTING

Problem	Possible Causes	Solutions
Ends of the tape are lifting up.	Improper application, corner termination.	Make sure that Steps 2, 3a and 3b are completed properly.
Tape wrinkles during application.	Tape not being applied in straight segments. Tape not adequately adhered to flange.	Using the cabinet edge as reference, apply the tape in straight segments. Also be sure that Steps 4 and 6 are completed properly.
Voids in paint are appearing along the tape edges.	Paint has been applied too thin.	Paint should be applied in a thickness of 4 mils (0.1 mm) or greater.
Tape is not sticking well to the cabinet.	Oil, dust, contamination. Cabinet not cleaned properly. Not enough pressure was used with the applicator along edges of tape.	Make sure Step 1 is completed properly. See Step 4 for use of applicator.
Splice found in CHO-MASK II tape roll, or ran out of tape before completing flange.	N/A	Start new strip. Leave .060 in. (1.5 mm) gap between both pieces.
Design requires paint overlap at cut ends.	Mask not recessed in this area.	Recess the mask manually by cutting and removing about 0.125 in. (3 mm).

