

CHO-MASK® II

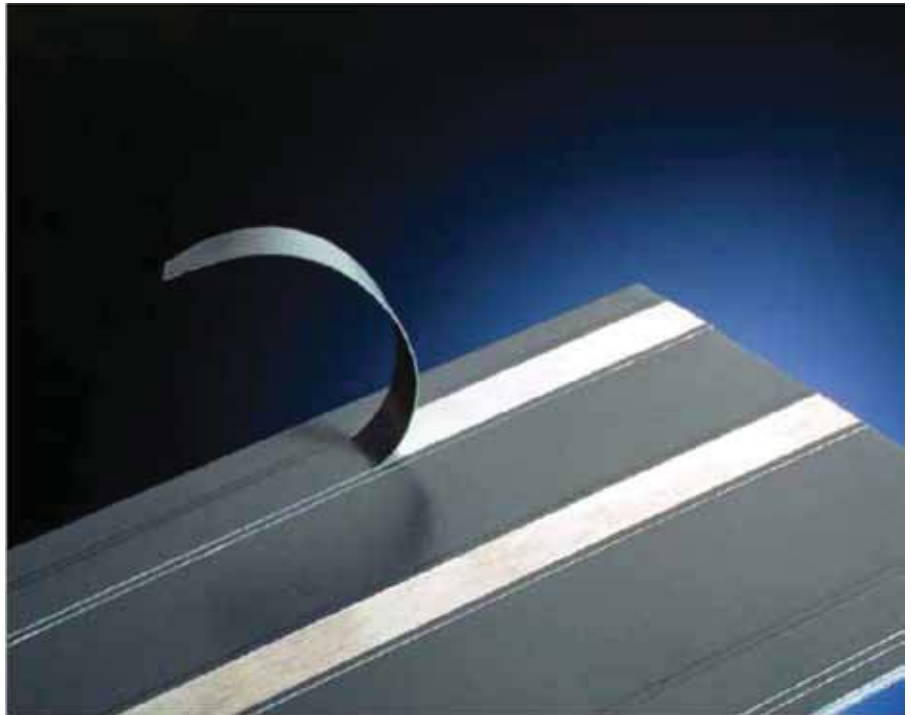
Conductive Foil Tape with Peel-Off Mask for Cabinet Painting Operations



Customer Value

Proposition:

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.



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Product 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 cycle
- Passes MIL-STD-810 Salt Fog testing
- Foil tape meets MIL-T-47012
- Tin-plating on foil meets MIL-T-10727
- Pressure sensitive adhesive contains highly stable, conductive particles for long term reliability
- When used in conjunction with Parker Chomerics EMI gaskets, provides effective EMI shielding performance



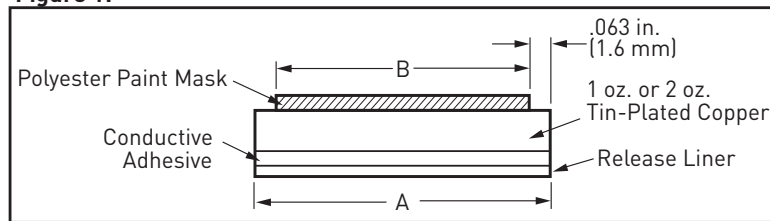
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CHO-MASK® II - Conductive Foil Tape with Peel-Off Mask

**Table 1: 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)

Figure 1:



CHO-MASK® II - Construction

Table 2:

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)

**Table 3: 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
SPRING-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 - Conductive Foil Tape with Peel-Off Mask

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

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

Figure 2:

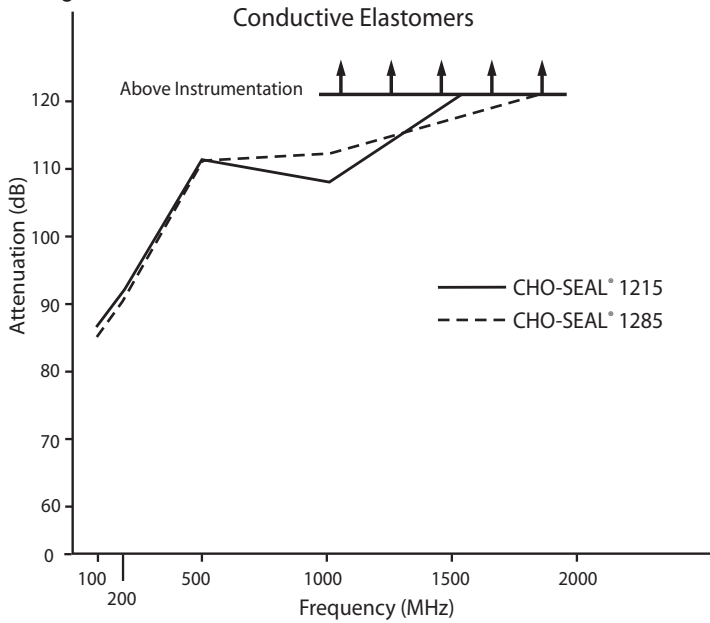


Figure 3:

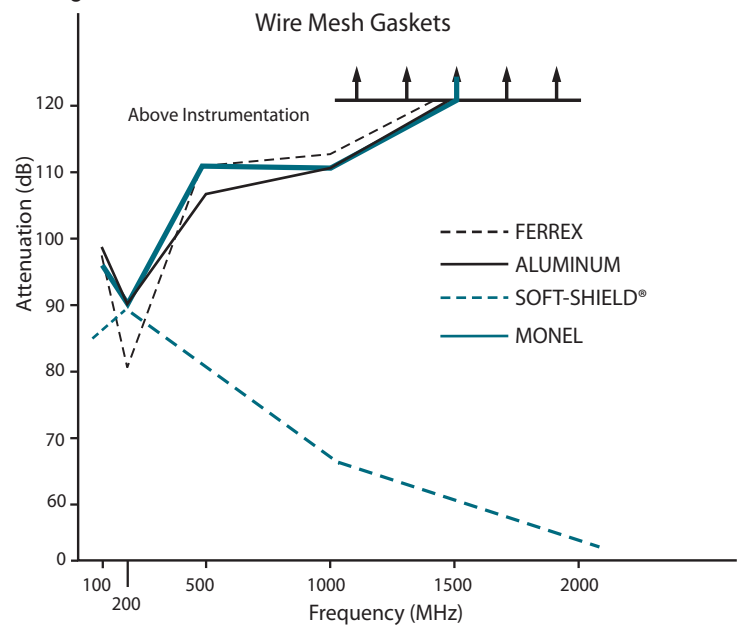


Table 4:

Gasket Type and Description	Frequency (MHz)				
	100	200	500	1000	2000
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

Table 5:

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

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

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.

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

Table 6: Technical Data

Property	Test Method	Typical Values CHO-MASK II ST (Standard Tack)	Typical Values CHO-MASK II HT (High Tack)
Foil Type/Thickness (mils)	Visual	2 oz. Tinned Copper = 2.8 mils (0.07 mm)	2 oz. Tinned Copper = 2.8 mils (0.07 mm)
		1 oz. Tinned Copper = 1.4 mils (0.04 mm)	1 oz. Tinned Copper = 1.4 mils (0.04 mm)
Adhesive/Thickness (mils)	Visual	Acrylic = 1.8 mils (0.05 mm)	Acrylic = 2.0 mils (0.05 mm)
Total Thickness ¹	ASTM-D1000	2 oz. = 4.6 mils (0.12 mm)	2 oz. = 4.8 mils (0.12 mm)
		1 oz. = 3.2 mils (0.08 mm)	1 oz. = 3.0 mils (0.08 mm)
Mask Type	Chomerics	Polyester	Polyester
Continuous Use Temperature Range	Chomerics	-40 to 180 °F (-40 to 82 °C)	-40 to 180 °F (-40 to 82 °C)
Paint Cure Cycle	Chomerics	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 Table 1	See Table 1
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 Subjects 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 Table 3	See Table 3
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)

¹ Adhesive and foil total thickness

² After bake

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

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

⁵ Tested at 60° C, 96 hrs, 95% RH.

Ordering Procedure

Standard rolls can be ordered using these part numbers:

CMT	—	XXX	—	108	—	XXXX
CHO-MASK® Tape Family		Material		Length Rolls yards (m)		Width inches (cm)
		ST: Standard Tack		108 (97 m)		0430 0.430 (1.09) 0800 0.800 (2.03)
		HT: High Tack				0500 0.500 (1.27) 1000 1.000 (2.54)
		ST1: For 1 oz. copper				0625 0.625 (1.59) 1500 1.500 (3.81)
		HT1: For 1 oz. copper				0750 0.500 (1.91) 1750 1.750 (4.44)

CHO-MASK® II - Suggested Application procedure

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 nonconductive. It is recommended that you monitor the surface resistivity of the cabinet flange (surface resistivity should be <math><100\text{ mOhms}</math>).

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 agent does not come in contact with the skin.

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

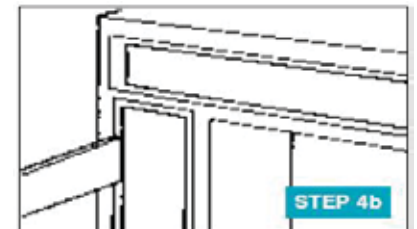
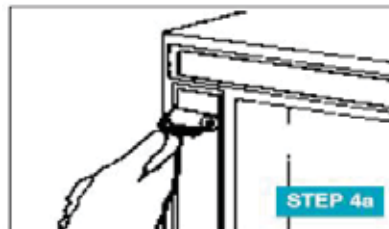
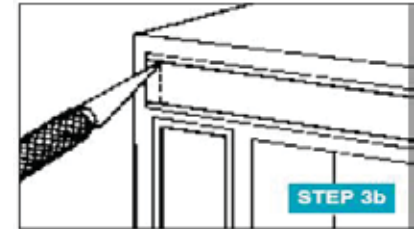
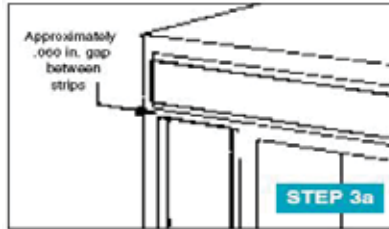
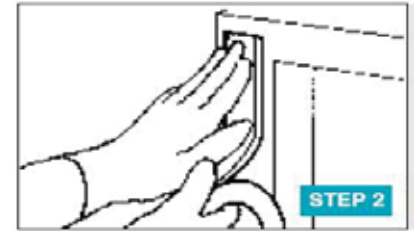
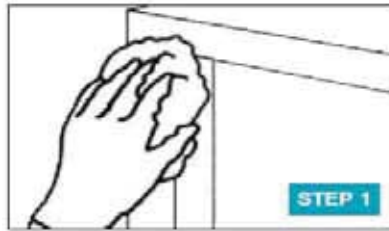
Note: If oxidation or rust is present, abrade surface with sandpaper to expose clean metal before cleaning.

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.

You will need: • Cotton Cloth or Rag • Industrial Cleaner (such as toluene)
• Rubber Gloves • Roller • Cutting Instrument razor blade



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.

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.

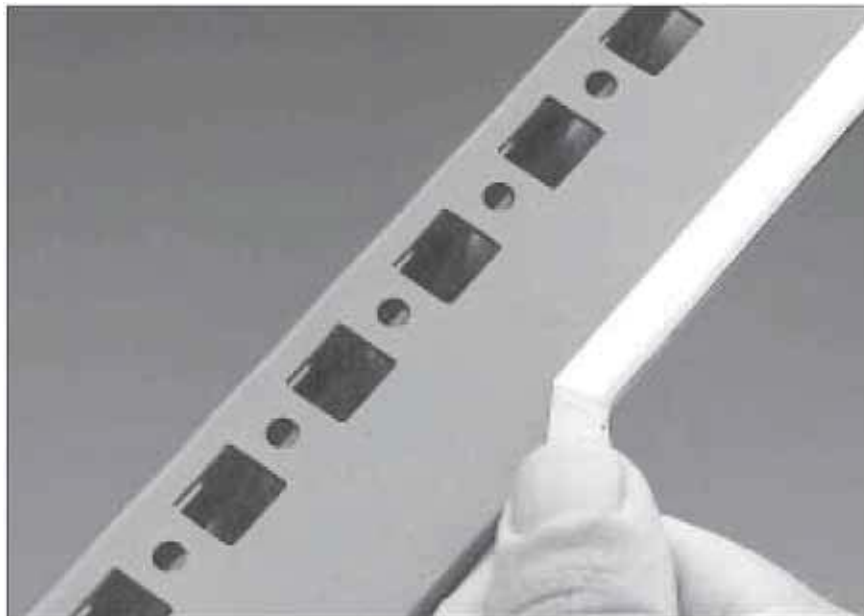
Note: Mask is easily removed at room temperature, with or without baking.

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

Table 7: Troubleshooting Problems in Applications

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 the edges of tape.	Make sure that 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).

Picture 1: Proper way to remove CHO-MASK mask



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