

**Description:**

POLYONICS XF-594 is a special 1 mil (25 $\mu$ ) polyimide film with a high-temperature permanent pressure sensitive silicone adhesive and a high opacity, matte white topcoat specifically designed for thermal transfer printing. Using a 1 mil vs. a 2 mil polyimide film base offers polyimide thermal performance at less cost.

**Properties:**

Labels printed with XF-594, in combination with the appropriate thermal transfer ribbon, resist the harsh chemicals, cleaners, and saponifiers used in PCB manufacturing; moreover, in combination with the appropriate thermal transfer ribbon, passes the requirements of **MIL-STD-202G, Notice 12, Method 215K** and **MIL-STD-883E, Notice 4, Method 2015.13**. The print resists smearing, even when the board and label are directly removed from a reflow or wave solder environment. Preheating the labeled product can further enhance print permanence in the case of extreme solvent and/or abrasion exposure, although this is not typically required for board processing applications.

**Applications:**

- POLYONICS XF-594 is specifically designed for high-temperature-lead-free solder applications.
- It is the ideal label to withstand surface mount board processes, on either the top or bottom side of the board environment.
- XF-594 is particularly useful in manufacturing processes where dimensional stability of the label is critical.
- 1 mil polyimide is perfect in applications where low profile labeling is required such as silk screening or stacking.
- IC labeling for work in process, permanent ID & warranty labeling
- Product ID, asset tracking
- Anywhere a label will be exposed to extreme temperatures

**Special Considerations:**

- The surface that you want to label should be clean, dry and free of any surface contamination, such as dust, oil or rust. Isopropyl alcohol would be a recommend solvent to clean the surface.
- When you apply the label, you must use firm pressure to increase the physical contact of the adhesive with the surface of the product.
- Pressure sensitive adhesives will provide stronger bonds to a warm surface, as compared to a colder one. The adhesive will 'flow' more readily, increasing the surface area and increasing the adhesion peel strength.
- The XF-594 top coat & print should not be contacted while exposed to elevated temperature.
- All values shown are averages and should not be used for specification purposes. Adhesion and tack values have a 15% tolerance allotted to the above values stated.
- Test data and test results contained in this document are for general information only and shall not be relied upon by POLYONICS customers for designs and specifications, or be relied on as meeting specified performance criteria.
- Customers desiring to develop specifications or performance criteria for specific product applications should contact Polyonics for further information



**Polyonics Material Specifications**

Properties	Test Method	Average Results	
		USA Units	SI Units
<b>Thickness</b>	<b>ASTM D1000</b>		
-Substrate		0.0015 inch	0.038 mm
-Adhesive		0.0018 inch	0.046 mm
-Total		0.0033 inch	0.084 mm
<b>Adhesion</b>	<b>Polyonics 80313</b>		
<b>Stainless Steel</b>	<b>20 minute peel</b>	≥ 40 oz/in	44N/100 mm
	<b>24 hour dwell</b>	≥ 44 oz/in	48N/100 mm
<b>Temperature Rating:</b>	-100 to 1000°F (-43 to 537°C)		
<b>Shelf Life</b>	6 months below 80°F (27°C) and 60% R.H.		
<b>Ribbon Recommendation</b>	Armor AXR7+, JPP1, Ricoh B110C, Union Chemicar US300, DNP R510		

**Durability Testing**

Properties	Test Method	Test Environment	PCS <sup>1</sup>	Read Rate <sup>2</sup>
<b>Heat/Chemical</b>	<b>Polyonics</b>			
		Kyzen Corp. Aquanox SSA 30% aqueous, 40-45°C, 5 min.	100%	99%
		Re-Entry KNI 2000 Terpene 40-45°C 5 min.	98%	100%
		Alpha Metals Inc. EC-7R Terpene 40-45°C, 5 min.	98%	100%
		Alpha Metals Inc. 2110 Saponifier, 10% aqueous, 65-70°C, 5 min.	97%	100%
		Isopropanol 99% 65-70°C, 5 min.	99%	100%
		Kyzen XJN+, 30% aqueous, 5 min.	99%	100%

**Chemical Testing**

Properties	Test Method	Test Fluid	Results
<b>Chemical Resistance</b>	<b>MIL-STD-202G, Notice 12, Method 215K MIL-STD-Notice 4, Method 2015.13</b>		
		Solvent A- 1 part IPA, 3 parts Mineral Spirits	No visible effect
		Solvent B- 1,1,1 Trichloroethane	Solvent deleted per notice 12
		Solvent C- Terpene Defluxer	No visible effect
		Solvent D- Saponifier	No visible effect

**Polyonics Material Compliance**

<b>RoHS- Restriction of Hazardous Substances (EU Directive 2002/95/EC)</b>	Limits set forth in Directive 2005/618/EC amending Directive 2002/95/EC
<b>REACH- Registration Evaluation and Authorization of Chemicals (EU Directive 1907/2006/EC)</b>	Limits set forth in Directive 1907/2006/EC Article 7 (2)
<b>Halogens- Restriction use of Halogen (IEC 61249-2-21)</b>	Limits set forth in International Electrochemical Commission



**Key for Tables on Page 2**

- All SI units are mathematically derived from U.S. conventional units.
- Labels printed with recommended thermal transfer ribbon. Labels printed with 6.7 mil X dimension bars at 2:5 ratio. Labels exposed to indicated environments.
- <sup>1</sup>PCS - Print Contrast Signal. PCS determined with Quick Check 650, 0.005" aperture, 660 nm wave length.
- Quick Check 650 manufactured by Photographic ScienceCorp
- <sup>2</sup> Read rate determined using PSC 850 laser scanner.

**Trademarks:**

Aquanox SSA™ is a trademark of Kyzen Corporation. Inc.  
EC-7R™ is a trademark of Petroferm Inc.  
RE-ENTRY™ is a registered trademark of Environsolv Inc.

**References:**

ASTM: American Society for Testing and Materials (U.S.A.)  
SI: International Systems of Units.



**WARRANTY-LIMITATION**

Polyonics' products are sold with the understanding that the buyer will test them in actual use and determine for him/herself their adaptability to his/her intended uses. Polyonics warrants to the buyer that its products are free from defects in material and workmanship, but limits its obligation under this warranty to replacement of the products shown to Polyonics' satisfaction to have been defective, provided that the Buyer has complied with the handling, storage and shelf life requirements as specified by Polyonics in applicable materials specifications.

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