3M

Thermal Transfer Polyimide Label Material 7812

Technical Data **September 1, 1999**

Construction

(Calipers are nominal values.)

Facestock	Adhesive	Liner
2.0 mil (51 micron) Polyimide Film 1.0 mil (25 micron) White Thermal Transfer Printable Topcoat	2.0 mil (51 micron) #100 Acrylic	3.0 mil (76 micron) 50# Densified Kraft

Features

- Matte white thermal transfer topcoat for easy readability of barcodes and variable information
- #100 High-temperature acrylic adhesive will not degrade when exposed to a wide variety of harsh processing conditions.
- 50# densified kraft liner assures consistent die cutting.
- UL and CSA approvals are pending. After approval, see UL (File MH16411) and CSA (File 99316) listings for details.

Application Ideas

- Printed circuit board tracking labels that see the following conditions:
  - Solder reflow
  - Top and/or bottom side wave solder
  - Most cleaning processes and chemicals
- Labeling on parts exposed to high temperatures

Typical Physical Properties

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

Adhesion: 180° peel test procedure is ASTM D 3330.

	Initial (10 Minute Dwell/RT)		**Conditioned for 3 Days at Room Temperature 72°F (22°C)**	
	180° Peel		**180° Peel**	
Surface	**Oz./In.**	**N/100 mm**	**Oz./In.**	**N/100 mm**
Stainless Steel	32	35	53	58
Polycarbonate	34	37	58	63
Epoxy PC Board	44	48	62	68

	Conditioned for 3 Day at 120°F (49°)		**Conditioned for 24 Hours at 90°F (32°C) at 90% Relative humidity**	
	180° Peel		**180° Peel**	
Surface	**Oz./In.**	**N/100 mm**	**Oz./In.**	**N/100 mm**
Stainless Steel	66	72	64	70
Polycarbonate	56	61	62	68
Epoxy PC Board	67	73	44	48

Liner Release: 180° Removal of Liner from Facestock

Rate of Removal	**Grams/Inch Width**	**N/100 mm**
90 inches/minute	150	5.7
300 inches/minute	111	4.2

Environmental Performance

The properties defined are based on four hour immersions at room temperature (72°F/22°C) unless otherwise noted. Samples were applied to stainless steel panels 24 hours prior to immersion and were evaluated one hour after removal from the solution for peel adhesion. Adhesion measured at 180° peel angle (ASTM D 3330) at 12 inches/minute.

Chemical Resistance:

	Adhesion to Stainless Steel		Appearance	Edge Penetration
Chemical	**Oz./in.**	**N/100 mm**	**Visual**	**Millimeters**
Isopropyl Alcohol	47	51	No change	0
Detergent (1% Alconox®*)	53	58	No change	0
Engine Oil (10W30) @ 250°F (121°C)	96	105	No change	0
Water for 48 hours	54	59	No change	0
pH 4	53	58	No change	0
pH 10	50	55	No change	0
409®* Cleaning Solution	51	56	No change	0
Toluene	25	27	No change	0
Acetone	13	14	No change	0
Brake Fluid	53	58	No change	2
Gasoline	39	43	No change	1
Diesel Fuel	49	54	No change	0
Mineral Spirits	47	51	No change	0
Hydraulic Fluid	49	54	No change	0

Temperature Resistance:

530°F (277°C) for 30 seconds: no significant visual change

500°F (288°C) for 7 minutes: slight browning

-40°F (-40°C) for 24 hours: no significant visual change

Humidity Resistance:

24 hours at 100°F (38°C) and 100% relative humidity: no significant change in appearance or adhesion

Accelerated Aging:

ASTM D 3611: 96 hours at 150°F (65°C) and 80% relative humidity:

	Rate of Removal	Grams/Inch Width	N/100 mm
180° Removal of Liner from Facestock	90 inches/minute	169	6.5
	Rate of Removal	**Oz./In. Width**	**N/100 mm**
180° Peel Adhesion from Stainless Steel	12 inches/minute	34	37

Printed Label Performance:

Samples were printed with a Ricoh™ D110A resin ribbon on a Zebra™ 170xi printer at a rate of 2 in./min. and a burn setting of 22. Labels were printed with a 3:1 ratio barcode with 6 mil. X-dimension. Printed labels were exposed to the listed conditions, which are representative of PCB assembly conditions. After chemical exposure, labels were rinsed with tap water, dried and examined.

Condition	Print Contrast Signal (PCS)	Read Rate
7812 Control	97	100
530° F, 30 sec.	97	100
500° F, 7 min.	94	100
IPA 75%, 106° F, 15 min.	97	100
IPA 100%, RT 2 min.	97	100
Deionized Water, 140°F, 5 min.	97	100
Alconox®* 10%, 135° F, 2 min.	97	100
D-Limonene RT, 2 min.	97	100
Monoethanolamine, 135° F, 2 min.	97	100
BIOACT®* EC-7R, 77° F, 10 min.	92	100
BIOACT®* EC-15, 77° F, 10 min.	92	100
Wave Solder	95	100

The Print Contrast Signal, PCS, was determined using a PSC QUICKCHECK™ 850, with a 0.003" aperture, 660 nm wavelength. The read rate was determined using a PSC laser diode scanner, model 4100. Wave soldering was performed on an Electrovert Co., Microline 250 wave solder machine. Preheat temperature was 250° F, solder temperature was 470° F, line speed was 2 ft./min. Boards were pre sprayed with a Kester Solder Co. 923 flux.

Shelf Life

One year from date of manufacture of product when properly stored at 72°F (22°C) and 50% relative humidity.

Processing

Printing:
Facestock is topcoated and is designed for thermal transfer printing. Refer to the 7812 Guide to Thermal Transfer Printing or call 3M Customer Service at 1-800-223-7427 for additional information.

* Recommended Ribbons
Ricoh™: D110A
Union Chemicar™: US300

The following ribbons can be used but may require higher burn temperatures:
Sony™: 5070
Mid City Columbia™: CGL-80HE
Dai Nippon™: R510

Die Cutting:
Rotary die cutting is recommended.

Dispensing:
Hand dispensing is recommended.

Packaging:
Finished labels should be stored in plastic bags.

Special Considerations	For maximum bond strength, the surface should be clean and dry. Typical cleaning solvents are heptane and isopropyl alcohol.** **NOTE: When using solvents, read and follow the manufacturer's precautions and directions for use. For best bonding conditions, application surface should be at room temperature or higher. Low temperature surfaces, below 50°F (10°C), can cause the adhesive to become so firm that it will not develop maximum contact with the substrate. Higher initial bonds can be achieved through increased rubdown pressure.
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