ROGERS CORPORATION

Advanced Circuit Materials

Advanced Circuit Materials Division
100 N. Dobson Road
Chandler, AZ 85224
Tel: 480-961-1382, Fax: 480-917-5256
www.rogerscorporation.com

Data Sheet

R/flex® 1100 Circuit Materials
High Temperature Laminates

Description

The R/flex® 1100 high performance flexible circuit material system is designed for use in harsh, high temperature environments. The system combines the desirable properties of a thermosetting phenolic butyral adhesive with rolled annealed copper and Upilex®-S polyimide film, low in oxygen and moisture permeability. R/flex® 1100 laminates are UL rated with continuous operating temperatures of 150°C (302°F). The material system exhibits low moisture absorption, good dimensional stability and excellent chemical resistance.

The family of R/flex® flexible circuit materials is manufactured under rigorous process control. Process capabilities are continuously monitored for all critical properties such as peel strength and dimensional stability. Our manufacturing process assures that R/flex circuit materials are as consistent from lot-to-lot as they are from roll-to-roll and within a roll.

Product Features

- High temperature resistance for continuous operation at temperatures up to 150° C (302°F)
- Excellent chemical resistance designed to withstand harsh environments
- Low moisture absorption and uniform adhesive thickness for improved electrical performance in critical controlled impedance applications
- Improved dimensional stability for close tolerance complex circuitry

Applicable Specifications

Laminate - IPC-4204/10
Coversheet and Bonding Film- IPC-4203/11
UL File - #E122972

Available Configurations: *Special Order*

Laminate
Copper weight: ½, 1, or 2 oz./ft.^{2} treated rolled copper. (Other copper foils available on special order).
Polyimide film thickness: 1, 2, 3, or 5 mils (25, 50, 75,125 µm)
Adhesive thickness: Standard laminate adhesive thickness is 0.8 (~20 µm). Adhesive thickenss other than standard is available on special order.
Sizes:
Laminate available in rolls:
- 18" (457mm) wide.

Laminate Designation R/flex 1100-L-XXX
Side 1 copper thickness in oz./ft.^{2}
Polyimide film thickness in mils
Side 2 copper thickness in oz./ft.^{2}

Coversheet and Bonding Film
Adhesive thickness: ½, 1 and 1.8 mils (13, 25, 45 µm)
Polyimide film thickness: 1, 2, 3 or 5 mils (25, 50, 75,125 µm)
Sizes:
Coversheet and Bonding Film available in rolls:
- 18" (457mm) wide

Coversheet and Bonding Film also available in sheets upon special order.

Coversheet (C) and Bonding Film (B) Designation
R/flex 1100-C-XX0
1100-B-XXX
Side 1 adhesive thickness in mils
Polyimide film thickness in mils
Side 2 adhesive thickness in mils

For unsupported bonding film designation, please refer to R/flex 1000 data sheet.

Storage

R/flex® 1100 coversheets and bonding films use B-staged adhesive systems that will retain their original properties for six months if stored at 40-65°F (4-18°C) in their original packaging. It is recommended that laminates be stored in a clean and dry area.

Typical Values

R/flex® 1100

Properties		Units	Laminate (1 oz./2mil-1oz./50μm)	Coversheet (2mil/50μm)	Test Method
Electrical Properties					
Dielectric Constant		@1 MHz	3.8	3.8	IPC-TM-650, 2.5.5.3
Dissipation Factor		@1 MHz	0.010	0.010	IPC-TM-650, 2.5.5.3
Dielectric Strength		volts/mil	>8000	>8000	ASTM-D-149
Insulation Resistance		megohms	10^7	10^7	IPC-TM-650, 2.6.3.2
Volume Resistivity		megohms/cm	10^8	10^8	IPC-TM-650, 2.5.17
Surface Resistance		megohms	10^4	10^4	IPC-TM-650, 2.5.17
Moisture-insulation resistance		megohms	10^5	10^5	IPC-TM-650, 2.6.3.2
Physical and Thermal Properties					
Flammability (with coverfilm)			HB	HB	UL-94
Moisture Absorption		%	1.7	1.7	IPC-TM-650, 2.6.2
Solder Float (Method A)			PASS	PASS	IPC-TM-650, 2.4.13
Maximum Operating Temperature (MOT)		°C	150	150	UL746E
Dimensional Stability	Method A (MD)	%	NA	-0.02	IPC-TM-650, 2.2.4
	Method B (MD)		-0.07	NA	
Mechanical Properties					
Peel Strength	As received (to treated copper)	lb./in. (N/m)	6 (1050)	6 (1050)	IPC-TM-650, 2.5.9
	After solder float		6 (1050)	6 (1050)	
Flexural Endurance		cycles	1400	NA	IPC-TM-650, 2.4.3

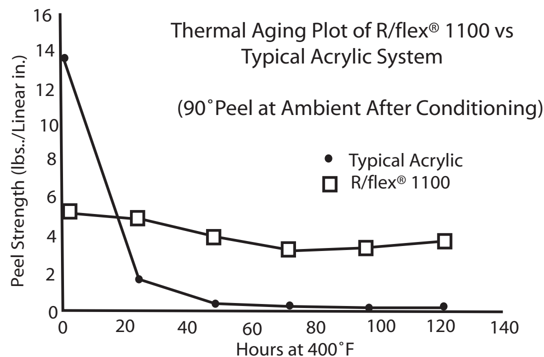
Typical values are a representation of an average value for the population of the property. For specification values contact Rogers Corporation.

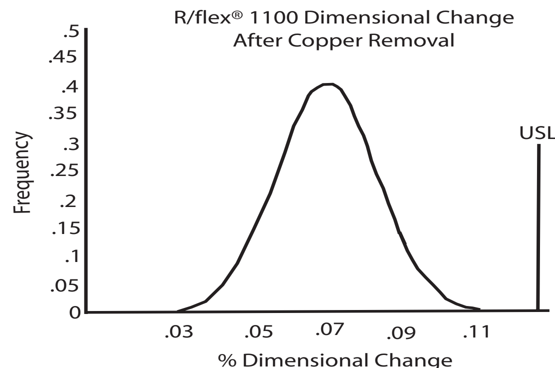
*Chemical Resistance**

	Condition(1)		Effect (2)
Water	25°C	30 min.	none
H_2SO_4 10%	25°C	5 min.	none
HCl 20%	25°C	5 min.	none
NaOH 5%	100°C	5 min.	none (3)
$(NH_4)_2S_2O_8$	100°C	30 min.	none
$FeCl_3$ 42Be	60°C	30 min.	none
Alkaline copper etching solutions, photoresists and strippers (except hot phenol types)	60°C	30 min.	none

* Refers to cured adhesive

	Condition(1)		Effect (2)
Aromatic hydrocarbon	25°C	6 months	none
Straight chain hydrocarbon	25°C	6 months	none
Trichloroethylene	25°C	30 min.	none
Freon TF	25°C	30 min.	none
Freon TMC	25°C	30 min.	none
Methyl alcohol	25°C	30 min.	none
Isopropyl acohol	25°C	30 min.	none
Methylene chloride	25°C	5 min.	(4)
MEK	25°C	5 min.	none
Cresols, phenol	100°C	2 min.	dissolves adhesive





Footnotes: (1) Preconditioning by drying at 100°C prior to immersion is necessary to remove moisture. (2) "None" signifies no noticeable change in surface condition at 10x magnification. (3) Strong, hot NaOH solutions (30%) will dissolve the polyimide film and should be avoided. (4) Adhesive swells and is slightly softened. Upon drying, adhesive recovers to initial condition.

The information in this data sheet is intended to assist you in designing with Rogers' circuit materials. It is not intended to and does not create any warranties express or implied, including any warranty of merchantability or fitness for a particular application. The user should determine the suitability of Rogers' circuit materials for each application.

R/flex is a licensed trademark of Rogers Corporation.
Upilex is a registered trademark of Ube Corporation.
©1998, 2002, 2008 Rogers Corporation, Printed in U.S.A

Revised 02/2008, -0208-0.5-CC, **Publication# 14-004**