

R/flex® 1000 Circuit Materials

For Long Life Dynamic Flexing

Description

R/flex® 1000 circuit materials from Rogers Corporation are Kapton® film based laminates, with rolled annealed copper foil, and coversheets ideally suited for constructing single and double sided flexible circuitry. The R/flex 1000 system has been used for more than 20 years in demanding dynamic flexing applications where millions of flex cycles are required, in semiconductor packaging in which low levels of ionic contamination are advantageous, and in tape automated bonding (TAB) applications.

Its high modulus thermosetting phenolic butyral adhesive system exhibits excellent electrical properties and good chemical resistance. R/flex®1000 laminates are UL rated with continuous operating temperatures of 105°C.

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 flex life provides for improved long-term reliability in demanding dynamic flexing applications
- SPC manufacturing assures minimum variability and maximum lot-to-lot uniformity
- Uniform adhesive thickness improves performance in controlled impedance applications
- Good temperature resistance for continuous operation at temperatures of at least 105° C

Applicable Specifications

Laminate - IPC-FC-241/10, Revision C
 Coversheet and Bonding Film- IPC-FC-232/11, Revision C
 Meets the performance criteria of Class 2
 UL File - # E122972

Available Configurations: Many available configurations are not standard; please check with your Rogers representative.

Laminate

Copper weight: 1/3*, 1/2, 1, or 2 oz./ft.² treated rolled copper. (Other copper foils available on special order).

Polyimide film thickness: 1/2, 1, 2, 3, or 5 mils
 (13, 25, 50, 75, 125 µm)

Adhesive thickness: Standard laminate adhesive thickness is 0.8 mil (~20 µm). Adhesive thickness other than standard is available on special order.

Sizes: Laminate available in rolls:

- 24" (610mm) wide

Laminate also available in sheets upon special order.

*1/3 oz. - available single sided laminate only.

Laminate Designation

	R/flex 1000-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: 1/2, 1 and 1.8 mils
 (13, 25, 45 µm)

Polyimide film thickness: 1/2, 1, 2, 3, or 5 mils
 (13, 25, 50, 75, 125 µm)

Sizes:

Coversheet and Bonding Film available in rolls:

- 24" (610mm) wide

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

Coversheet (C) and Bonding Film (B)

	R/flex 1000-C-XX0
	1000-B-X00
Side 1 adhesive thickness in mils	_____
Polyimide film thickness: in mils**	_____
Side 2 adhesive thickness in mils	_____

** Use "H" for 1/2 mil Polyimide.

Storage

R/flex® 1000 coversheets and bonding films use B-staged adhesive systems that will retain their original properties for a minimum of 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® 1000

	Units	Laminate (1 oz./2 mil-1oz/50µm)	Coversheet (2 mil/50µm)	Test Method
Electrical Properties				
Dielectric constant	@ 1 MHz	3.6	4.0	IPC-TM-650, 2.5.5.3
Dissipation factor	@ 1 MHz	0.070	0.04	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 ⁹	10 ⁹	IPC-TM-650, 2.5.17
Surface resistance	megohms	10 ⁶	10 ⁶	IPC-TM-650, 2.5.17
Moisture-insulation resistance	megohms	10 ⁶	10 ⁶	IPC-TM-650, 2.6.3.2

Physical and

Thermal Properties

Flammability (with coverfilm)		VTM-1	NR	UL-94
Moisture absorption	%	2.4	2.5	IPC-TM-650, 2.6.2
Solder float (Method A)		PASS	PASS	IPC-TM-650,2.4.13
Maximum Operating Temperature (MOT)	°C	105	105	UL746E
Dimensional stability	%			IPC-TM-650, 2.2.4
Method A (MD)		NA	-0.06	
Method B (MD)		-0.07	NA	
Method C (MD)		-0.20	NA	

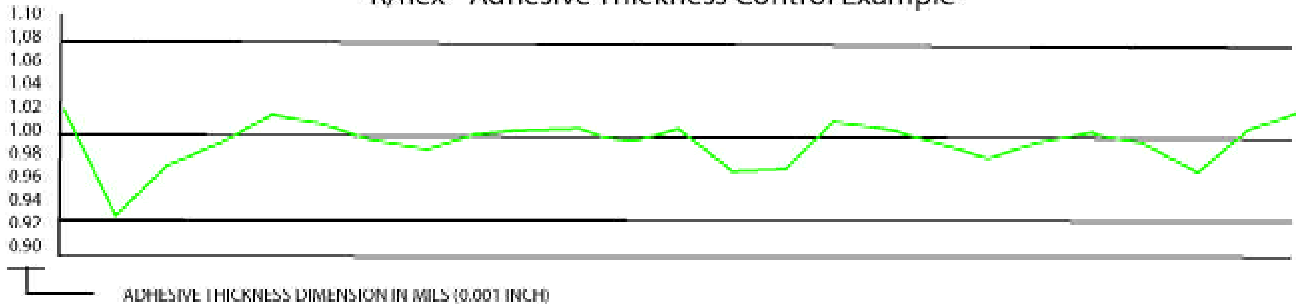
Mechanical Properties

Peel strength				IPC-TM-650, 2.4.9
As received (to treated copper)	lb./in. (N/m)	6 (1050)	6 (1050)	
After solder float	lb./in. (N/m)	6 (1050)	6 (1050)	
Flexural endurance	cycles	4000	NA	IPC-TM-650, 2.4.3

Chemical Resistance

	Condition (1)	Effect (2)		Condition (1)	Effect (2)
Water	25°C 30 min.	none	Aromatic hydrocarbon	6 months	none
H ₂ SO ₄ 10%	25°C 5 min.	none	Straight chain hydrocarbon	6 months	none
HCl 20%	25°C 5 min.	none	Trichloroethylene	25°C 30 min.	none
NaOH 5%	100°C 5 min.	none (3)	Freon TF	25°C 30 min.	none
(NH ₄) ₂ S ₂ O ₈	100°C 30 min.	none	Freon TMC	25°C 30 min.	none
FeCl ₃ 42 Be	60°C 30 min.	none	Methyl alcohol	25°C 30 min.	none
Alkaline copper etching solutions, photoresists and strippers (except hot phenol types)	60°C 30 min.	none	Isopropyl alcohol	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

R/flex® Adhesive Thickness Control Example



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.

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Revised 11/02, 0638-1102-0.5CC, **Publication# 14-001**