Nippon Steel Chemical Co., Ltd

ESPANEX ®SPC Series

Polyimide Coverlay Film

ESPANEX® SPC series of polyimide coverlay films is developed to enhance the excellent electrical (low dielectric constant), mechanical and consistent dimensional stability properties of ESPANEX® adhesiveless copper clad laminates. ESPANEX SPC coverlay films are used with ESPANEX laminates for high flex life (dynamic) applications and multi-layer rigid flex circuitry.

■Features

(1) Low dielectric constant
(2) Excellent electro-migration performance
(3) Suitable for bending / dynamic flex applications
(4) Excellent dimensional stability
(5) Good flatness property after high temperature exposure
(6) Good fill / encapsulation
(7) Flammability UL 94(VTM-0)
(8) Excellent room temperature shelf life
(9) Excellent heat resistance to solder and wire bond assembly

■Application

Flexible circuits
Rigid-flex boards

■SPC Compositions

Polyimide adhesive 15, 25, 35 micron
Apical® Film※ 12, 25 micron

※ Apical® Film :KANEKA Co.Ltd.

● SPC	UL Type／EPC		
Part Number	Composition	Form	Production
SPC-15B-12A	Polyimide adhesive：15μm/ Apical®：12μm Low out-gassing type	roll	mass prod.
SPC-35A-25A	Polyimide adhesive：35μm/ Apical®：25μm Low migration type	roll	prod. to order
SPC-15A-12A	Polyimide adhesive：15μm/ Apical®：12μm Low migration type	roll	prod. to order

※Standard Specifications

※Please ask on demand.

■Characteristics

Properties		Unit	Data	Test Method
Tensile Strength		MPa	**88.3**	JIS C5016
		Kpsi	**12.8**	
Young's Modulus		MPa	**1451**	
		Kpsi	**213.2**	
Folding Endurance*1	R=0.38	Cycles	**1000**	JIS C5016 MIT Method
	R=0.8	Cycles	**6200**	
	R=2.0	Cycles	**200000**	
Initiation tear strength		mmN	**270**	IPC-TM-650 2.4.16
Propagation tear strength		mmN	**340**	IPC-TM-650 2.4.17.1
Glass Transition Temperature		℃	**80**	Only Adhesive
C.T.E x-y direction	30℃～180℃	1/℃	**3.2×10^{-5}**	TMA Method
Adhesion	Copper	lb/in	**7.6**	Peel Strength (180°) JIS C5016
		kgf/cm	**1.4**	
	Base film*1	lb/in	**4.9**	
		kgf/cm	**0.9**	
	Apical®*2	lb/in	**3.8**	
		kgf/cm	**0.7**	
Solder Float Resistance	After 105℃,1hr	℃	**280**	JIS C6481 ＜Test Sample＞ Base film is covered with Coverlay film
	After 23℃ 50%RH, 15hr	℃	**260**	
Chemical Resistance	5%H_2SO_4	—	**No Change**	
	5%NaOH	—	**No Change**	
	3%$KMnO_4$	—	**No Change**	
Dielectric Constant		—	**3.4**	IPC-TM-650 2.5.5.3
Dissipation factor		—	**0.01**	IPC-TM-650 2.5.5.3
Volume Resistivity		Ω・cm	**1.6×10^{16}**	IPC-TM-650 2.5.17
Electromigration Performance	85℃,85%RH 1.0atm,DC250V 1000hr	—	**Less than 10% change**	Comb pattern Line/Gap=0.2mm/0.1mm
Process Property	Filling	—	**Excellent**	
	Drilling	—	**No adhesive smear**	
Flammability		—	**94V-0**	UL-94

*1 Polyimide base film of ESPANEX ®:Adhesiveless copper clad polyimide

*2 KANEKA Corporation Apical ® 25 μm

■Electro-migration performance

Test Method

Base	:ESPANEX® SC18-25-00-FR
Coverlay	:SPC-35A-25A
Circuit Pattern	:Comb pattern
Line/Gap	:0.2mm/0.1mm
Condition	:85℃、85%RH、1atm
Bias potential	:DC250V