

# Panasonic Industrial Devices Materials Europe GmbH Specification Sheet

Specification Sheet #	IPC-4101E /127		
Reinforcement	1: Woven E-Glass	2:	N/A
Resin System:	<b>Primary:</b> Epoxy <b>Secondary 1:</b> Multifunctional Epoxy Phosphorus Inorganic fillers		
Flame retardant mechanism	<b>Secondary 2:</b> N/A <b>Minimum UL94 Requirement: V-0</b>		
Fillers:	<b>UL/ANSI:</b> FR 4.1 <b>ANSI:</b> FR 4.1 / 127 secondary: 122 / 125 / 128		
ID Reverence:	<b>Mil-S-13949:</b> N/A † 900 ppm max Br or Cl and 1500 ppm max Br+Cl		
Glass transition (TG):	110°C minimum		

<b>Product name</b>	<b>Laminate: R-1566 / R-1566W</b>	<b>Prepreg: R-1551 / R-1551W</b>
<b>UL-Designation</b>	R-1566	R-1551

Laminate	IPC Specification < 0,5mm	IPC Specification ≥ 0,5mm	Units	Typical values < 0,5mm	Typical values ≥ 0,5mm	Methode IPC -TM 650 (or as noted)
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### Physical Property

<b>Peel strength, minimum</b>							
A: Low profile an very low profile copper foil, all copper foils > 18µm	18µm	0,7	0,7	N / mm	-	-	2.4.8 2.4.8.2 2.4.8.3
B: Standard profile copper foil	35µm	-	-		-	-	
1. After thermal stress		0,8	1,05		1,5	1,6	
2. at 125°C		0,7	0,7		1,4	1,5	
3. after process solutions		0,55	0,8	1,5	1,6		
<b>Moisture Absorption, maximum</b>		-	0,8	%	-	0,14	2.6.2.1
<b>Flexural strength</b>	A: Length direction	-	415	N / mm <sup>2</sup>	-	595	2.4.4
	B: Cross direction	-	345		-	412	
<b>Flammability</b> (laminated and laminated prepreg)	copper removed	V-0	V-0	rating	V-0	V-0	UL 94
<b>CTE (pre / postTg)</b>							
Z	copper removed	-	60/300	ppm / °C	-	40/180	2.4.24
X		-	-		-	13	
Y		-	-		-	15	
T260 (TMA)		-	-		minutes	-	
T288	-	-	-	-	> 120		
<b>Density</b>		-	-	g / cm <sup>3</sup>	2,0	2,0	
<b>Decomposition temperature (5% loss)</b>		-	-	°C	-	350	2.4.24.6

### Electrical Property

<b>Volume resistivity, minimum</b>	A: 96/35/90	10 <sup>6</sup>	-	MΩ-cm	5x10 <sup>7</sup>	1x10 <sup>9</sup>	2.5.17.1
	B: After moisture resistance	-	10 <sup>6</sup>		-	1x10 <sup>7</sup>	
	C: at elevated temperature E-24/125	10 <sup>3</sup>	10 <sup>3</sup>		-	1x10 <sup>10</sup>	
<b>Surface resistivity, minimum</b>	A: 96/35/90	10 <sup>4</sup>	-	MΩ	1x10 <sup>8</sup>	1x10 <sup>8</sup>	2.5.17.1
	B: After moisture resistance	-	10 <sup>4</sup>		-	1x10 <sup>8</sup>	
	C: at elevated temperature E-24/125	10 <sup>3</sup>	10 <sup>3</sup>		-	1x10 <sup>9</sup>	
<b>Dielectric breakdown*, minimum</b>		-	40	KV	-	> 52	2.5.6
<b>Permittivity, maximum</b>	at 1MHz	5,4	5,4	-	N/A	4,95	2.5.5.2/3/9
(laminated and laminated prepreg)	at 1 GHz	-	-	-	N/A	4,7	
<b>Loss tangent, maximum</b>	at 1MHz	0,035	0,035	-	0,014	0,014	2.5.5.2/3/9
(laminated and laminated prepreg)	at 1 GHz	-	-	-	0,011	0,011	
<b>Arc resistance, minimum</b>		60	60	sec	NI	NI	2.5.1
<b>Electrical strength**, minimum</b> (laminated and laminated prepreg)		30	-	KV / mm	70	70	2.5.6.2
<b>CTI (comparative tracking index)</b>		-	-	V	-	500	ASTM D3638
<b>CAF resistance</b>		-	AABUS	Pass / Fail	-	pass	2.6.25

### Thermal Property

<b>Thermal stress 10 sec at 288°C, minimum</b>	A: unetched	Pass	Pass	Rating	pass	pass	2.4.13.1
	B: etched .	Pass	Pass		pass	pass	
<b>Tg by DSC (TMA / DMA)</b>		110 min.	110 min.	°C	152,7	153 (145/180)	2.4.25
<b>Thermal conductivity</b>		-	-	W / mK	-	0,62	Laser flash
<b>Specific heat</b>		-	-	J/kgK	-	950	DSC

Prepreg Property	IPC Specification	Units	Typical Values	
<b>Shelf life, minimum</b> (from date of delivery)	A: Condition < 20°C, rel. H. <50%	90	Days	AABUS
	B: Condition < 5°C	180		
<b>Volatile content, maximum</b>		0,75	%	meets requirements
<b>Prepreg Parameters</b>		-	-	AABUS

\*1.6mm thickness

\*\*0.2mm thickness

AABUS= As agreed between user and supplier

Note:

text data contained in this data sheet represents typical values and does not constitute any warranty or guarantee. For review of critical specification tolerances, please contact a Panasonic Industrial Devices Materials Europe GmbH representative. Panasonic Electric Works reserve the right to change these typical values as a natural process of refining our test equipment and technics.