

# RigidFlex - Outer PCB

## Design rules and production limits

### Basic information

#### Stackup

RigidFlex board with one to two flexible copper layers placed on very top or very bottom side of asymmetrical stackup. Flexible layers are covered by coverlay or UV flexible solder mask

### Notation code

Flex are described using short code which describe number of copper layers. Code also shows position of flexible core inside symmetrical stackup

- **xRi-yF**

<b>x</b>	...	Number of copper layers above flex core (on rigid area of PCB)
<b>y</b>	...	Number of copper layers on flex core

- Example of our flexi PCB configurations:

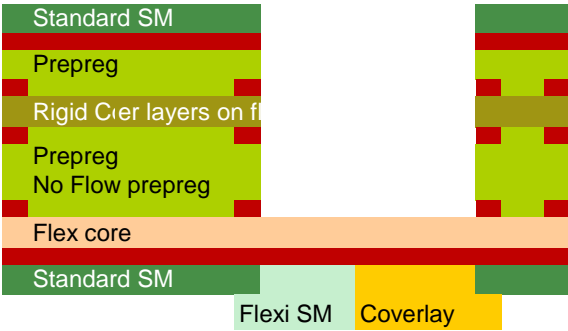
3Ri-2F	...	Total of five copper layers with 2 flex on the outer flex core
2Ri-1F	...	Total of three copper layers with 1 flex on the outer flex core

## Basic configurations

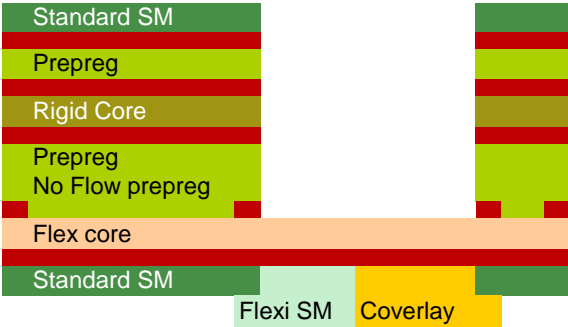
### Single sided flex

#### 1Ri-1F

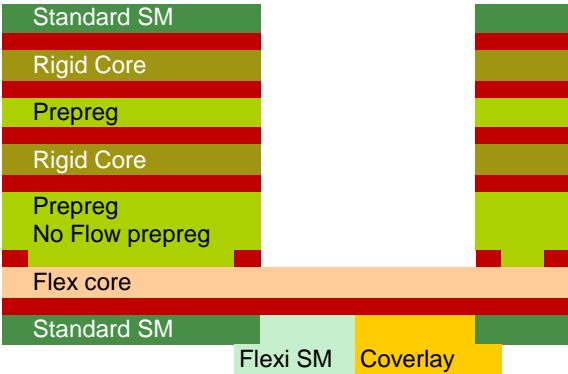
Datasheet



#### 3Ri-1F

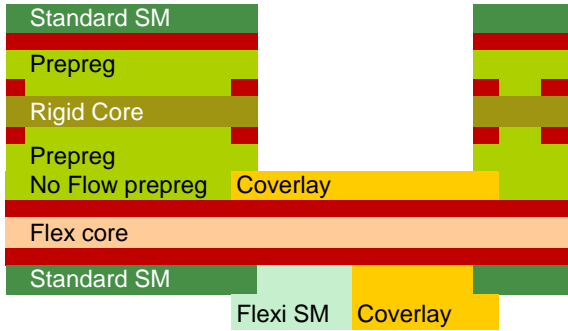


#### 4Ri-1F

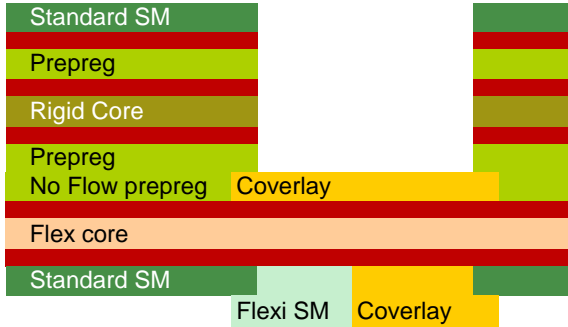


### Double sided flex

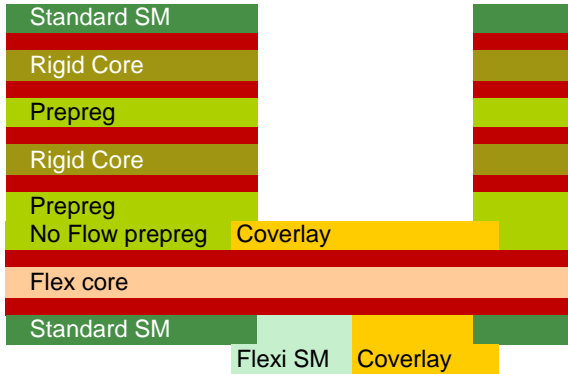
#### 1Ri-2F



#### 3Ri-2F



#### 4Ri-2F



## Materials

Basic materials								
Brand	Type	PI [ $\mu\text{m}$ ]	Cu [ $\mu\text{m}$ ]	Cu type	Adhesive [ $\mu\text{m}$ ]	TG [ $^{\circ}\text{C}$ ]	Diel. Stren. [kV]	Datasheet
Pyrалux AP	AP8525R	50	18/18	RA	Adhesiveless	220	13	<a href="#">Datasheet</a>
	AP9121R	50	35/35	RA	Adhesiveless	220	13	<a href="#">Datasheet</a>
Brand	Type	PI [ $\mu\text{m}$ ]	Cu [ $\mu\text{m}$ ]	Cu type	Adhesive [ $\mu\text{m}$ ]	TG [ $^{\circ}\text{C}$ ]	Diel. Stren. [kV]	Datasheet
ThinFlex W	W-2005RD	50	18/18	RA	Adhesiveless	350	11	<a href="#">Datasheet</a>
	W-2010RD	50	35/35	RA	Adhesiveless	350	11	<a href="#">Datasheet</a>
	A-4005RD	100	18/18	RA	Adhesiveless	250	27,6	<a href="#">Datasheet</a>

\*RA Rolled copper; \*ED Electrodeposited copper (not on stock)

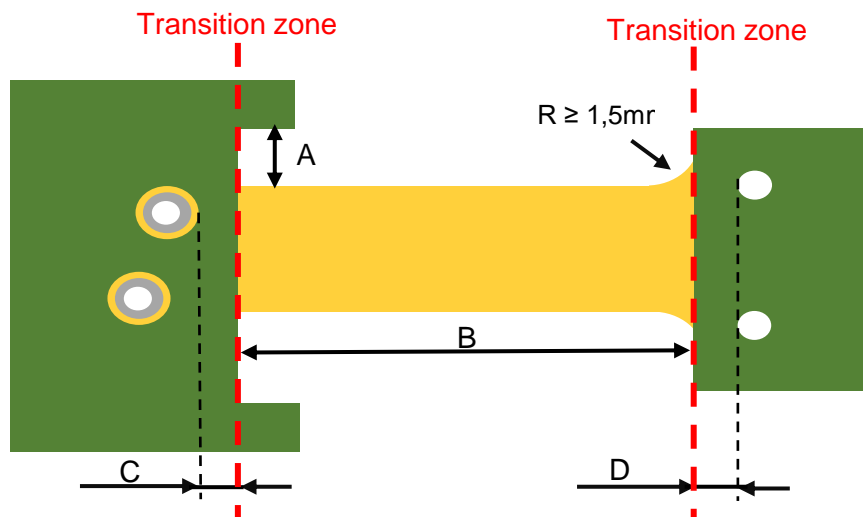
Coverlay						
Brand	Type	PI [ $\mu\text{m}$ ]	Adhesive [ $\mu\text{m}$ ]	TG [ $^{\circ}\text{C}$ ]	Diel. Stren. [kV]	Datasheet
Pyrалux LF	LF0110	25	25	220	5	<a href="#">Datasheet</a>
	LF0210	25	50	220	5	<a href="#">Datasheet</a>

Solder mask		
Brand	Type	Datasheet
Peters	SD 2460 UV-FLEX-HF	<a href="#">Datasheet</a>

Prepregs		
Standard prepregs	Tg	Datasheet
Isola IS400	150 $^{\circ}\text{C}$	<a href="#">Datasheet</a>
PCL370HR	170 $^{\circ}\text{C}$	<a href="#">Datasheet</a>
No Flow Prepreg		
Arlon 49NP	170 $^{\circ}\text{C}$	

## Design rules

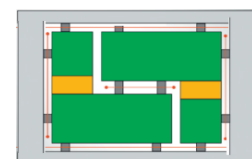
Design rules		
Legend	Description	Value
<b>Transition zone</b>	Is outline at which the layer structure changes from a rigid area to a flex only area and vice versa	
<b>A</b>	Countering of flex area	Min. 1.6 mm
<b>B</b>	Length of flex area	Min. 5 mm
<b>C</b>	PCB stackup <b>contains</b> coverlay on inner Flex layers	
	- Spacing via pad to flex-rigid transition	Min. 2 mm
	- Recommendation in IPC-2223D 5.2.2.3	3.18 mm+ ½ pad diameter
<b>C</b>	PCB stackup <b>doesn't contain</b> coverlay on inner Flex layers	
	- Spacing via pad to flex-rigid transition	Min. 1 mm
<b>D</b>	Distance of NPTH pad to Transition zone	Min. 0.5 mm



## Panelisation

PCB type	Panel [mm]	Single pieces [mm]
xRi-1F	min 2,5	min 4,5
xRi-2F (coverlay inside stackup)	min 12	min 12

- Larger spaces between PCB in panel better  $\geq 2,5$  mm (12mm if coverlay inside stackup)
- Panelise as "interlock" in order production panel utilization



## Surfaces

<b>HAL/HAL PbFree</b>	No
<b>Imersion Ni/Au</b>	Yes
<b>Imersion Ni/Ag</b>	Yes
<b>Galvanic Ni/Au</b>	Yes

## Other limits

<b>Maximal PCB dimension</b>	263 mm x 385 mm
<b>Minimal PCB dimension</b>	20x20mm or 400mm <sup>2</sup>
<b>Min. track/isolation</b>	100 μm
<b>Minimal stiffener thickness</b>	100μm

## General recommendations

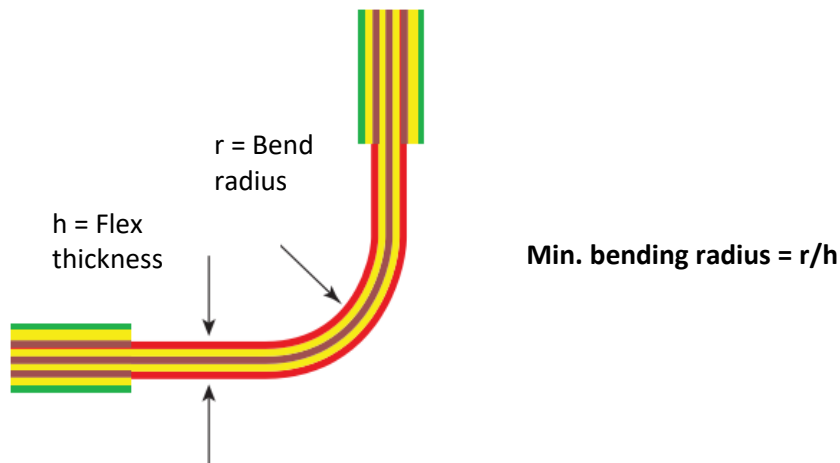
We recommend following the design recommendations listed in **IPC-2223 Sectional Design Standard for Flexible/Rigid-Flexible Printed Boards** when designing a Flex or RigidFlex PCB.

IPC standard is available in online store:

[shop.ipc.org](http://shop.ipc.org)

Datasheet

Flexi PCB types according to number of bending cycles		
Types	Number of bending	Min. bending radius
<b>Dynamic</b>	Frequent	100-150 x flex layer thickness
<b>Semi-Dynamic</b>	Max. 20x	> 20 x flex layer thickness
<b>Stable</b>	Bend to install	> 10 x flex layer thickness



How to select the right material			
Flex type	Dynamic	Semi-Dynamic	Stable
<b>Flex covering</b>			
Covering type:	Coverlay	Coverlay or flexi SM	Coverlay or flexi SM
Material:	Pyralux LF Pyralux LF	Pyralux LF Elp. SD 2460 UV-FLEX	Pyralux LF Elp. SD 2460 UV-FLEX
<b>Flex core</b>			
Copper type:	RA copper	RA or ED copper	RA or ED copper
Material:	Pyralux AP/ Thinflex	Pyralux AP/ Thinflex	Pyralux AP/ Thinflex