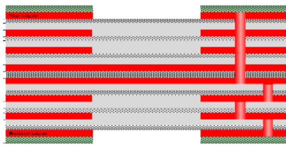
Design rules
SLIM.**flex**

Application in accordance with IPC 2223 Use A: Flex-to-install
No UL marking (all materials are UL listed)

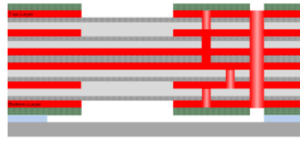
These design rules apply to:

Flexible circuit boards with 3 to 8 copper layers on flexible polyimide material, optionally with glued mechanical stiffener or solder carrier.

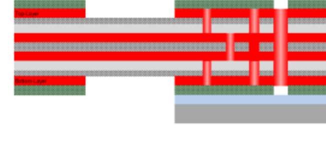
Examples:



SLIM.**flex** 8F
Standard: only microvias used



SLIM.**flex** 6F
Option: solder carrier, PTH

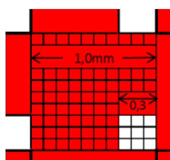


SLIM.**flex** 4F-Ri
Options: Stiffener, PTH

Nomenclature: F = Flex, Ri = Rigid (starr)

Basic instructions

- Please comply with general standards such as IPC or IEC.
- Please note the valuable information and tips in the WE Flex-Rigid Design Guide *
- Please refer to the WE Basic Design Guide for rules on conductor widths and spacings, via and pad sizes, and solder resist mask! *
- Essentially, marking print is not possible.
- Flexible circuit boards must be dried before they are assembled.
  Further information on this can be found on our website www.we-online.com/flex
- Copper openings in the ground or reference layers are required for drying.
  Recommendation:



⇨ Copper openings 0.3 mm per 1 mm length of copper

- Flex-to-install bending radius: Installation Use A in accordance with IPC-2223 up to 90° bending angle:
  - 1 or 2 copper layers: 10 x total thickness (IPC-2223 section 5.2.3.3)
  - More than 2 copper layers: 20 x total thickness (IPC-2223 section 5.2.3.3)
  - For use in more demanding conditions, please contact us
- We will be happy to create the optimal delivery panel for you (best price!)

* All documents can be found online at: www.we-online.com/slimflex

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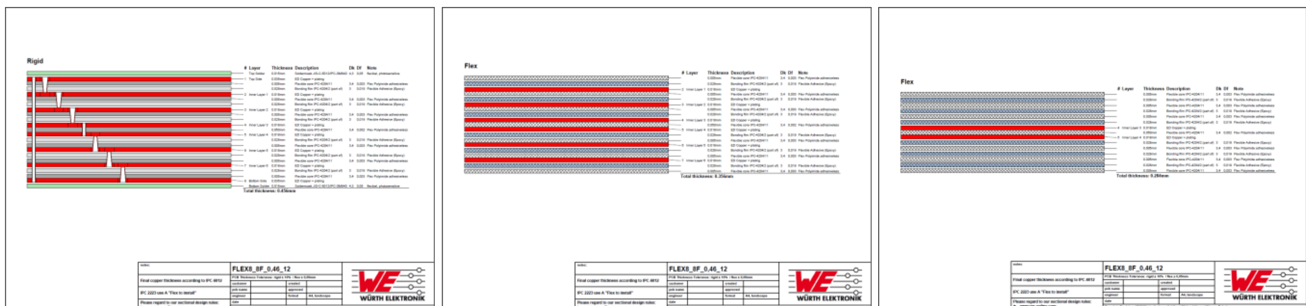
Material specifications

Material	Standard	Spec. sheet	Description	Application
flexible base material	IPC-4204	11	Polyimide adhesivless	Core of SLIM.**flex**
	IPC-4204	2	Polyimide with glue	Build-up layers of SLIM.**flex**
Flex soldermask	JIS C 5012/ IPC-SM840		green, photosensitive	Standard
Coverlay	IPC-4203	1 / 2	Polyimide coverlay film 25µm, acrylic or epoxy glue (multilayer process)	Option instead of Flex soldermask (extra charge)
Stiffener	IPC-4101	21	FR4 Tg 135°C	Option: Solder carrier

Layer stackups

Standard stackups see: www.we-online.com/slimflex



Standard design

1. Polyimide-core 50µm adhesiveless, sequential lamination of 5µm Polyimide film + Epoxy glue
   Minimum dielectric strength 500VDC at minimum dielectric thickness of 20µm
2. Base copper thickness on inner layers 17µm, outer layers 9µm + electroplating
3. Flexible soldermask, green, photosensitive
4. Standard vias: laser drilled microvias, plating thickness according to IPC6013.
5. Outline by laser cutting or mechanical milling, smallest milling tool diameter 1,6mm. V-scoring not allowed!
6. Solderable surface ENIG (electroless Nickel – immersion Gold)
7. Packaged in ESD shrink wrap

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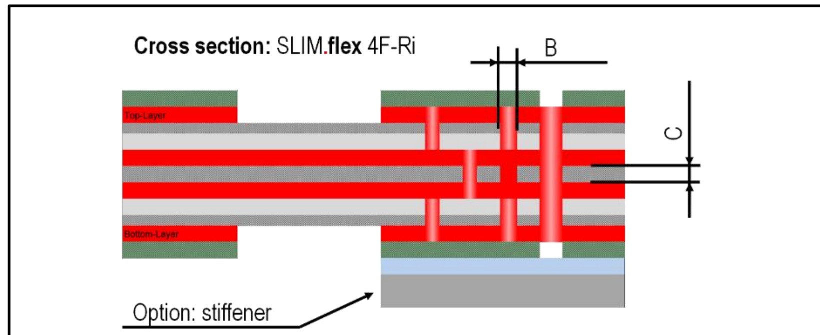

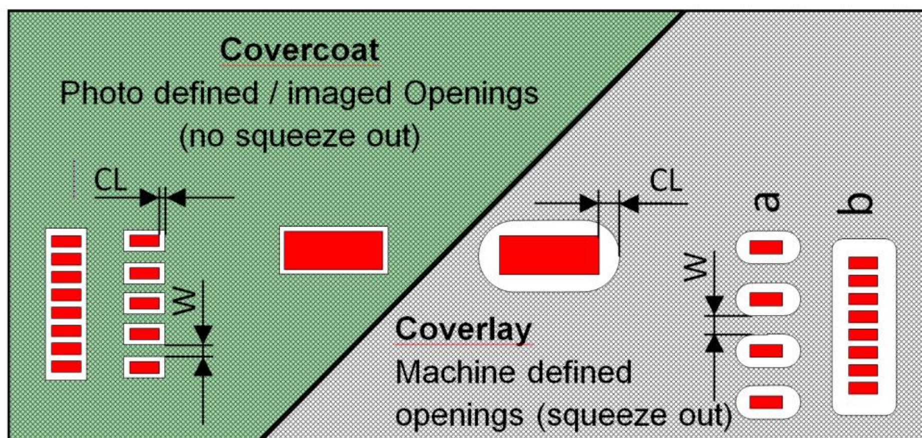

a: single Coverlay opening larger than pad **b:** window opening

Symbol	Description	Technical Standard	Advanced requirements
	Line widths and spacing	75µm/75µm, only Microvias	75µm/100µm with PTH
A	Minimum pad diameter for microvia	225µm	200µm
	Minimum pad diameter for PTH		450µm
B	Finished Hole diameter lasered microvia	70µm	70µm
-	Distance copper to outline	≥ 300µm	≥ 100µm (Lasercut)
-	Number x of copper layers (xF)	3-8	
C	Thickness of flexible material polyimide	50µm	75 / 100µm
-	Thickness of cold-bonded stiffener made of FR4 material	0,1 – 0,5mm	0,5 – 0,8mm
-	Thickness of cold-bonded solder carrier made of FR4 material	0,80mm	
-	Thickness of glue for stiffener	50µm	
CL (soldermask)	Minimum clearance of copper pad with photosensitive flex solder mask	70µm circumferential	
CL (Coverlay)	Minimum clearance of copper pad with coverlay (milled, lasered)	450µm circumferential	
W (soldermask)	Minimum bridge width photosensitive flex solder mask	70µm	
W (Coverlay)	Minimum bridge width coverlay (milled, lasered)	500µm	
Important:	**Avoid vias in bending areas! Use Teardrops! Don´t remove on-used Pads!**		
„ZIF“	**ZIF contact thickness tolerance**	± 0,05mm	
	⇨ Further specifications available on request, contact us: flex@we-online.com		