



THE FUTURE OF RIGID FLEX CIRCUITRY

NEWS RELEASE

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PCi tackles the issue of UL Approval on rigid flex circuits...

Printed Circuits, Inc. (Minneapolis, MN – USA) – PCi has received UL 94V0 and UL 796 approval for the most comprehensive qualification of rigid flex printed circuit boards in the world. Rigid flex engineers, designers and buyers can now receive UL approved boards from prototype to production, without the delay and cost of UL testing.

Ken Tannehill, President of PCi, said “We have been getting more requests for UL approval on rigid flex and multilayer flex circuit boards. Many of our customers simply don’t have a choice – the requirement is driven by the OEM’s and their insurance carriers. However, most folks don’t realize how difficult it is to qualify rigid flex boards.”

“The problem with maintaining a comprehensive UL file for rigid flex is that you have to submit and test every possible combination of materials for both the flexible and rigid sections of a board.”

A table shows how quickly the number of variables can grow when submitting rigid flex constructions for UL approval.

Variables for UL Approval on Rigid, Multilayer Flex and Rigid Flex PWB's

Materials	Rigid PWB		Multilayer Flex		Rigid Flex			
Rigid Laminate:	Thinnest core	2			Thinnest core	2		
	Thickest core				Thickest core			
	Thinnest copper	2			Thinnest copper	2		
	Thickest copper				Thickest copper			
Rigid Prepreg:	Thinnest prepreg	2			Thinnest prepreg	2		
	Thickest prepreg				Thickest prepreg			
Overall:	Thinnest multilayer	2			Thinnest multilayer	2		
	Thickest multilayer				Thickest multilayer			
Flex Laminate:					Thinnest polyimide	2	Thinnest polyimide	2
					Thickest polyimide		Thickest polyimide	
					Adhesiveless	3	Adhesiveless	3
					Thinnest adhesive		Thinnest adhesive	
			Thickest adhesive	2	Thickest adhesive	2		
			Thinnest copper		Thinnest copper			
		Thickest copper	Thickest copper					
Flex Bondply:			No polyimide	3	No polyimide	3		
			Thinnest polyimide		Thinnest polyimide			
			Thickest polyimide	2	Thickest polyimide	2		
			Thinnest adhesive		Thinnest adhesive			
		Thickest adhesive	Thickest adhesive					
Flex Coverlayer:			Thinnest polyimide	2	Thinnest polyimide	2		
			Thickest polyimide		Thickest polyimide			
			Thinnest adhesive	2	Thinnest adhesive	2		
			Thickest adhesive		Thickest adhesive			
Overall:			Thinnest multilayer	2	Thinnest flex cable	2		
			Thickest multilayer		Thickest flex cable			
Possible Variables:		16	Possible Variables:		576	Possible Variables:	9,216	

“The flexible materials are copper clad laminates, coverlayers and bondplies, each of which can have different thicknesses for the polyimide film, the acrylic adhesive and copper cladding. The rigid materials are copper clad laminate and prepreg, in multiple copper weights and dielectric thicknesses.”

“If you decide to pursue FR4 and polyimide materials for the rigid sections, the number of samples required doubles again. The number of possibilities is daunting and the costs are hard to justify.”

Ken continued “In October of 2004, we put together a list that we thought would include every possible combination of materials for multilayer rigid flex boards, from the thickest to the thinnest, medical to military to telecom and industrial, controlled impedance work to the implications of RoHS. We looked at all of our builds at the time, and the technology trends, and put together our wish list of possible combinations.”

“It then took us about a year and a half to build, submit and test each of the samples. The end result is a UL Qualification file that will provide customers with UL approval on virtually any rigid flex construction. Another bonus for our customers is that in the process, we were also approved on every possible combination of multilayer flex.”

Ken finished “This has been a long project, longer than we expected, and I just want to thank Dennis Cantwell of PCi, Chuck Schenetzke of Microtek Laboratories, and Deanna Dean of UL for having the scope to grasp the whole project, as well as the ability to wrestle through all of the details, and finally their patience in seeing it through to completion.”

About Printed Circuits, Inc...

PCi is a 29 year old manufacturer of advanced technology rigid flex and multilayer flex circuit boards that are typically used in medical, military, and industrial electronic applications that require high density packaging in small, thin, light weight printed circuit boards. Additional information on rigid flex circuits and PCi can be found at www.printedcircuits.com; their UL File number is E67398 and can be viewed at www.UL.com.