

PCB Guidelines 1.0



Base materials

		Standard	Special
Material types			
Rigid		FR2, CEM-1, CEM-3, FR4	FR4 (high performance, halogen free, high thermal High Speed material: Panasonic, EMC, Isola, TUC, Nelco Microwave: Taconic, Rogers, Arlon
IMS	Supplier	Bergquist, Ventec, KW, Laird, Iteq	Bergquist, Ventec, KW,
	Dielectric thickness	75-200µm	50-200µm
	Thermal conductivity	1-3 w/mk	1-7 w/mk
Flex		PI, PET	PI, LCP material

Base materials

	Standard	Special
Layer count		
Rigid Multilayer	1-12	1-48
Thickness overall (mm)		
2-4-Layer	0,6-3,2	0,4-8
6-10-Layer	0,8-3,2	0,6-8
12-Layer+	1,2-4	1-8
Thickness overall of flexible pcb (mm)		
1-2 Layers	0,1-0,4	0,07-0,4
Coverlay	0,03-0,08	0,025-0,075
Stiffener	0,075-1,6	0,025-4
Thickness (mm)		
Min. dielectric	0,1 for PCB, 0,025 for FPC	0,1 for PCB, 0,012 for FPC
Common prepreg thickness (mm)		
7628 (50%)	0,22	0,22
7628 (43%)	0,18	0,18
2116 (52%)	0,12	0,12
2116 (56%)	0,13	0,13
1080 (65%)	0,08	0,08
106 (75%)	0,05	0,05
Core thickness (mm)		
Standard core	0,2-1	0,1-2

Surface finish

	Thickness of deposit	Solderability	Handling concerns	Fine pitch / BGA & SMD	Excellent flatness	Press fit	Suitable for peelable	Assembly reworks	Wire bonding
HASL leadfree	1-40	+++				y	y	y	
HASL leaded	1-40	+++				y	y	y	
Flash gold	Au: 0,025-0,125 /Ni: 3-0,2-0,65	+		y	y		y		y (Alu)
OSP		+	y	y	y				
ENIG	Au: 0,05-0,125 /Ni: 3-6	+	y	y	y		y	y	y (Alu)
Immersion tin	1-1,2	+	y	y	y	y			
Immersion silver	0,12-0,4	+	y	y	y	y			
Carbon	8-25	/	/	/	/	/	y		
Edge hard gold contacts	Au: 0,8-1,5 /Ni: >2,5	/	/	/	/	y	y		

Circuitry

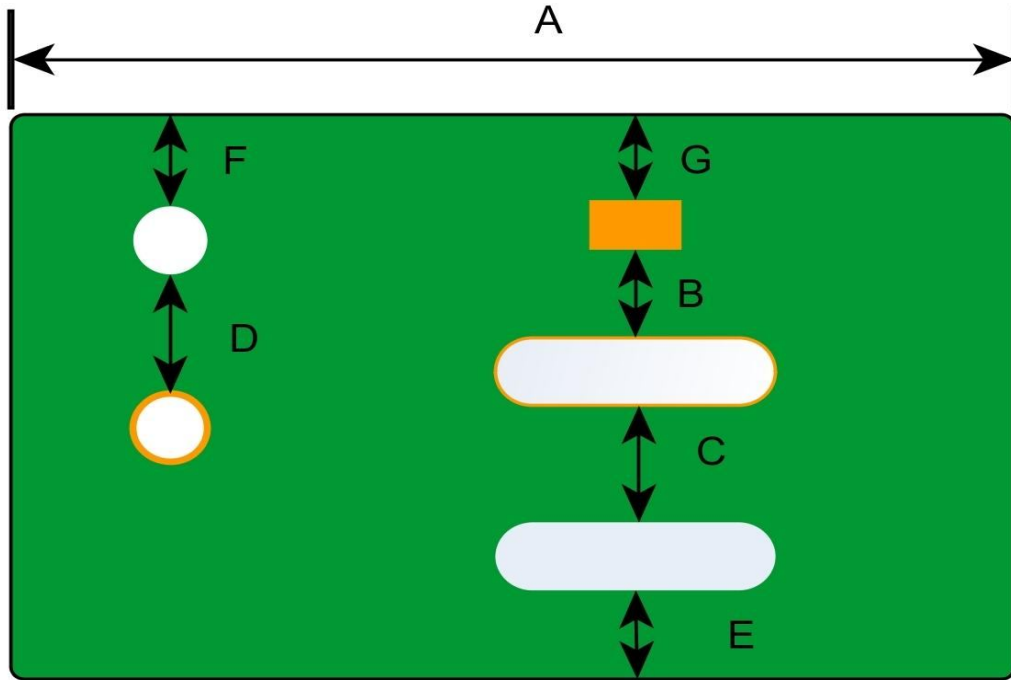
Track& Gap (mm)	Standard		Special	
	IL	OL	IL	OL
12µm Copper	-	-	0,075/0,075	0,075/0,075
18µm Copper	0,1/0,15	0,1/0,15	0,075/0,075	0,075/0,1
35µm Copper	0,125/0,15	0,125/0,15	0,1/0,1	0,1/0,1
70µm Copper	0,175/0,225	0,2/0,25	0,15/0,175	0,15/0,175
105µm Copper	0,225/0,275	0,25/0,3	0,2/0,25	0,225/0,275

Annular ring of vias (mm)	IL	OL	IL	OL
12µm Copper	-	-	0,1	0,1
18µm Copper	0,1	0,1	0,1	0,1
35µm Copper	0,125	0,125	0,1	0,1
70µm Copper	0,2	0,2	0,175	0,175
105µm Copper	0,25	0,25	0,2	0,2

PTH to Copper (mm)	IL	OL	IL	OL
12µm Copper	-	-	0,175	0,2
18µm Copper	0,25	0,3	0,2	0,225
35µm Copper	0,25	0,35	0,225	0,3
70µm Copper	0,3	0,5	0,25	0,425
105µm Copper	0,4	0,65	0,3	0,525

NPTH to Copper (mm)	IL	OL	IL	OL
12µm Copper	-	-	0,2	0,2
18µm Copper	0,25	0,25	0,2	0,2
35µm Copper	0,25	0,25	0,2	0,225
70µm Copper	0,3	0,3	0,225	0,25
105µm Copper	0,3	0,3	0,25	0,275

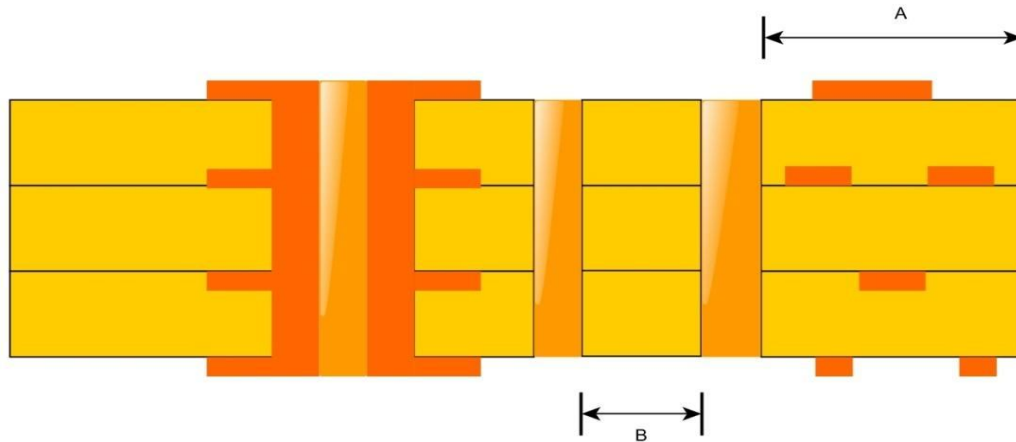
Profile



Routing tolerances(in mm)

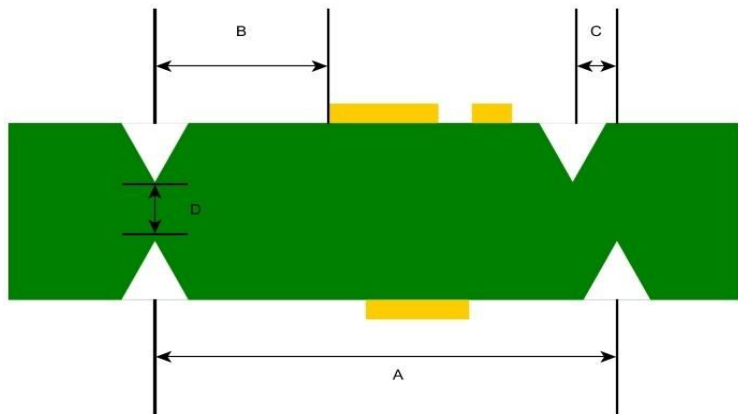
	Standard	Special
A : Routing	+/-0,15	+/-0,15
B : Slot to Pattern	+/-0,10	+/-0,075
C : Slot to slot	+/-0,10	+/-0,075
D : Hole to Hole	+/-0,10	+/-0,075
E : Slot to edge	+/-0,15	+/-0,125
F : Hole to edge	+/-0,15	+/-0,125
G : Pattern to edge	+/-0,15	+/-0,125
Recommend pattern to edge	0,30	0,20
Maximum PCB size	600 x770	500 x 1200

Drills



	Standard	Special
Drilling (in mm)		
Min. finished PTH size	0,20	0,15
Max finished PTH size	6,00	6,30
Min. slot	0,60	0,50
True positional tolerance	+/-0,10	+/-0,075
Aspect Ratio	10:1	15:1
A : Min. space between holes	0,30	0,25
B : Min. space between NPTH and edge	0,30	0,25

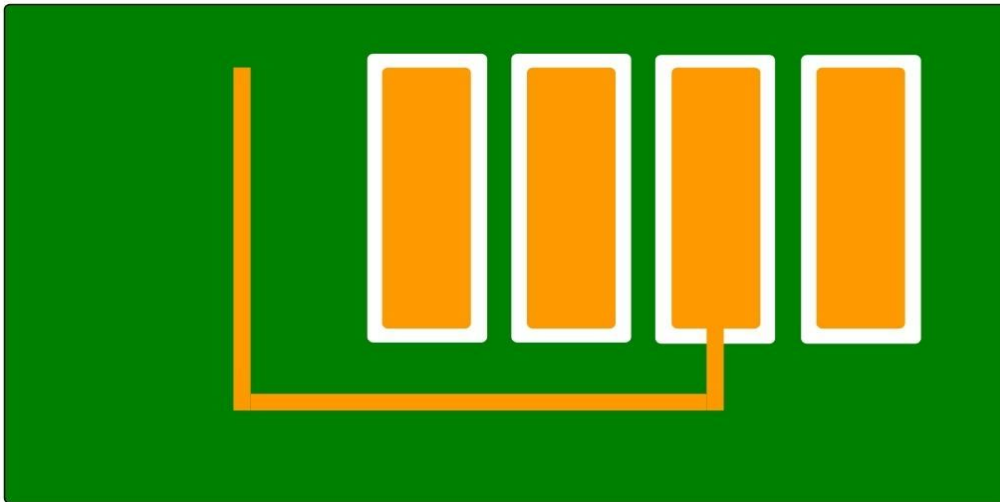
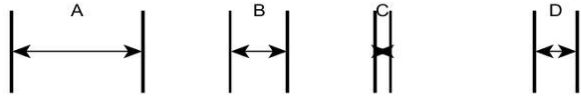
Routing



	Standard	Special
V-Cut (in mm)		
A : Position accuracy	+/-0,15	+/-0,10
B : Keep out area (dimension)	0.50	0.45
C : Blade offset	+/-0,15	+/-0,10
D : Web thickness (@1.6mm)	0.45 +/-0.15	0.45 +/-0.15
Min board thickness	0,60	check
Max board thickness	2,40	check

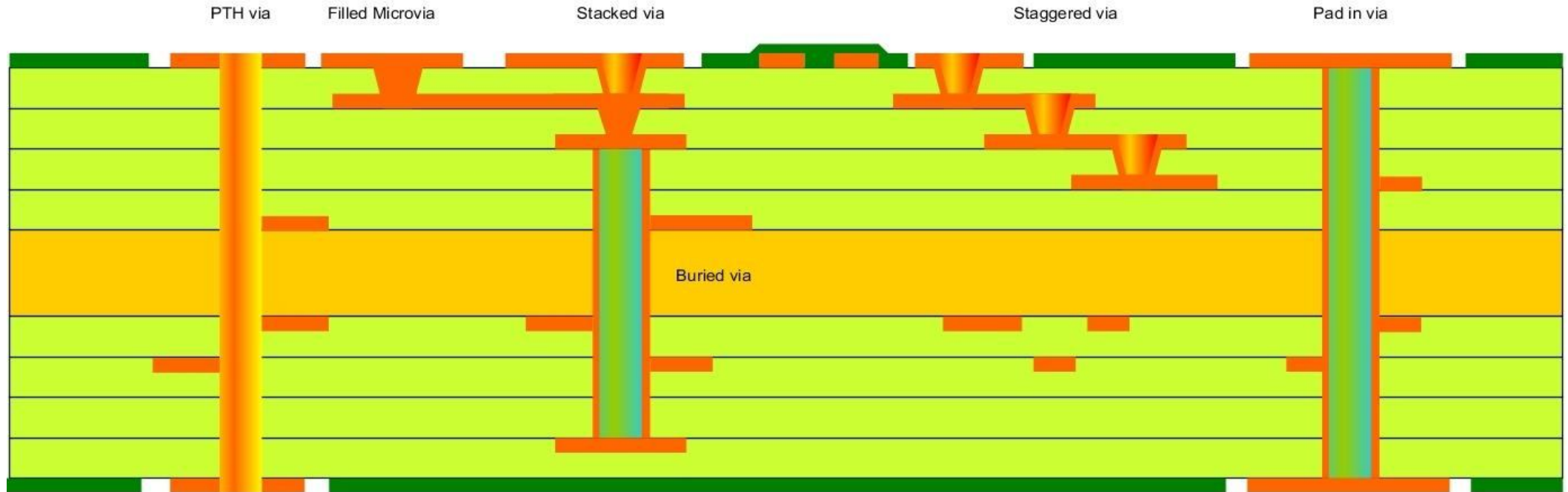
For boards <0,60mm or >2,40mm thickness: it is not recommend to use v-cut

Soldermask



	Standard	Special
(in mm)		
A : SMT to covered copper	0,15	0,10
B : Spacing copper to copper	0,20	0,18
C : Soldermask oversize	0,06	0,05
D : Minimum soldermask dam	0,08	0,08
Thickness	10-30µm on Cu, 5µm on Cu edge	
Colours	green, red, blue, white, matte black, bright black, yellow	

Multilayer Stackup

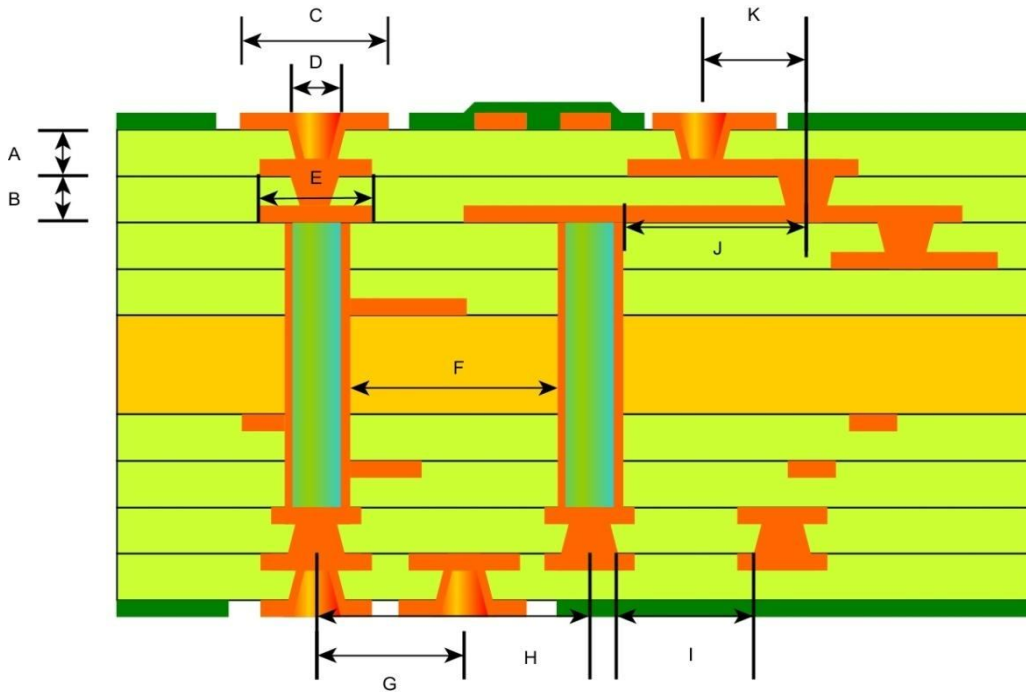


Layer description:

GTL	Toplayer
In1	Inner Layer 1
In2	Inner Layer 2
In...	Inner Layer...
GBL	Bottomlayer

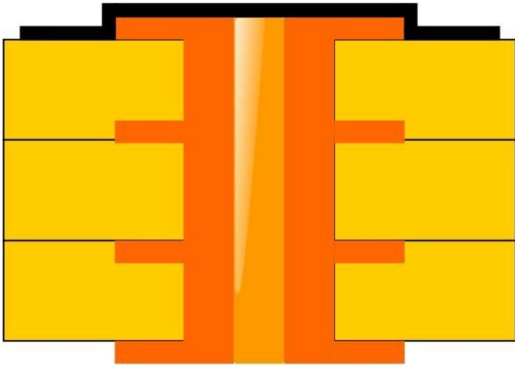
To avoid confusion in layerstack: It is recommend to mark all layers with numbers or text in the copper

Blind & buried micro vias

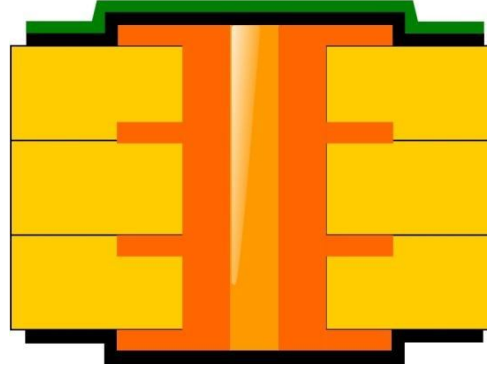


Features (in mm)	Standard	Special
A : Dielectric In1-In2 microvia	0,06-0,08	0,06-0,1
B : Dielectric for inner microvias	0,06-0,08	0,06-0,1
C : Entry pad	0,35	0,25
D : Microvia diameter	0,10	0,08
E : Capture Pad	0,30	0,25
F : Buried to Buried hole	0,40	0,30
G : Pitch (outer microvia)	0,50	0,30
H : Pitch (inner microvia)	0,45	0,30
I : Microvia to Microvia	0,30	0,25
J : Microvia to buried via	0,40	0,30
K : Pitch (staggered microvia)	0,40	0,25

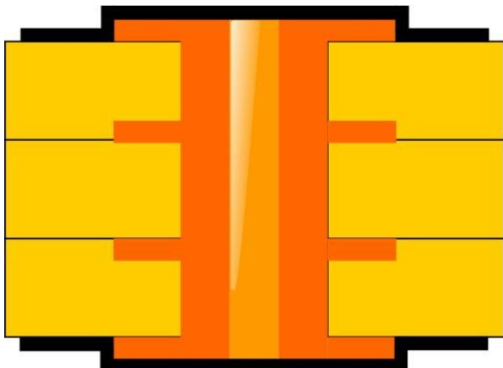
Via tenting (description according IPC 4761)



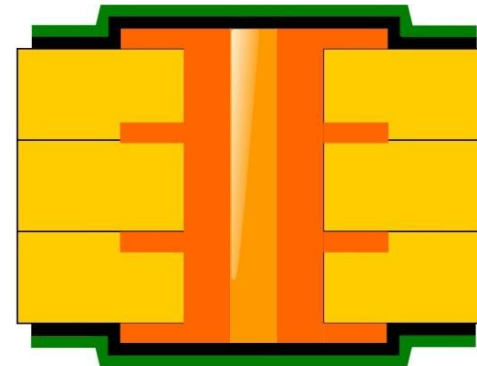
Tented Via Type I-a covered up with dry film on one side



Tented & covered Via Type II-a covered up with dry film and soldermask on one side

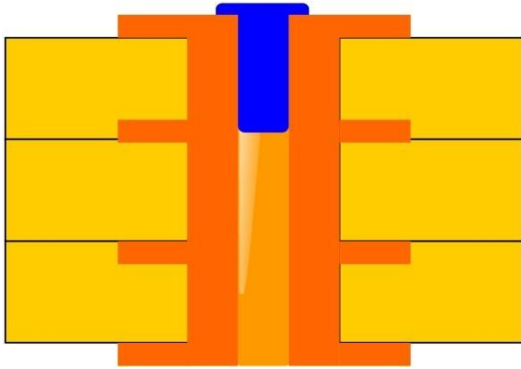


Tented Via Type I-b covered up with dry film on both sides

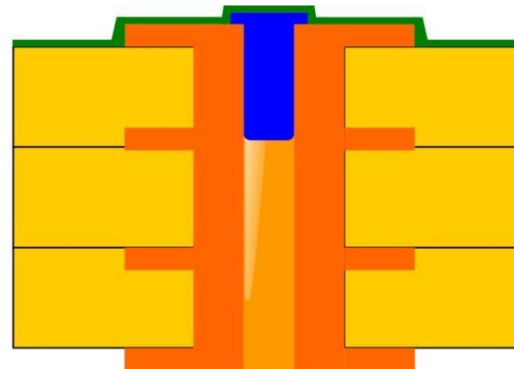


Tented & covered Via Type II-b covered up with dry film and soldermask on both sides

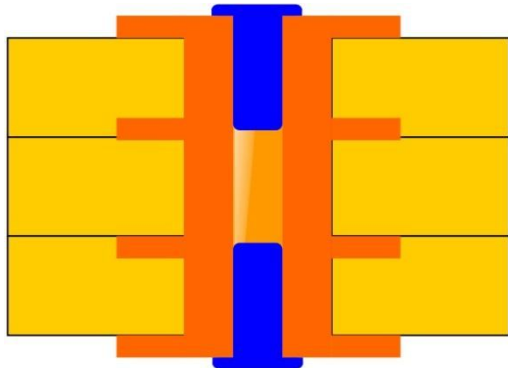
Via plugging (description according IPC 4761)



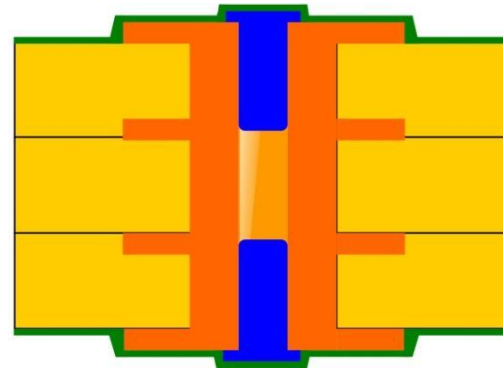
Plugged Via Type III-a
sealed with a non-conductive material on one side



Plugged & covered Via Type IV-a
sealed with a non-conductive material on one side and covered up with soldermask on one side

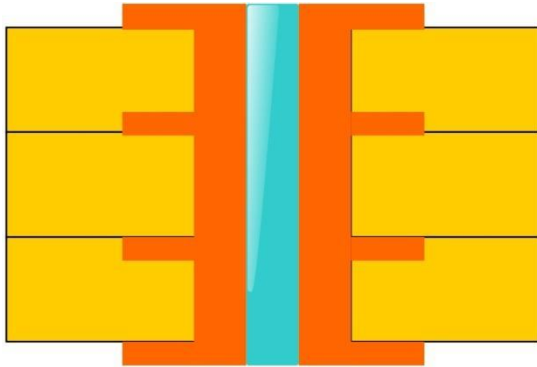


Plugged Via Type III-b
sealed with a non-conductive material on both sides

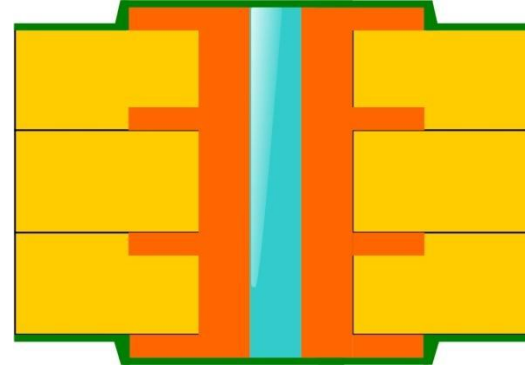


Plugged & covered Via Type IV-b
sealed with a non-conductive material and covered up with soldermask on both sides

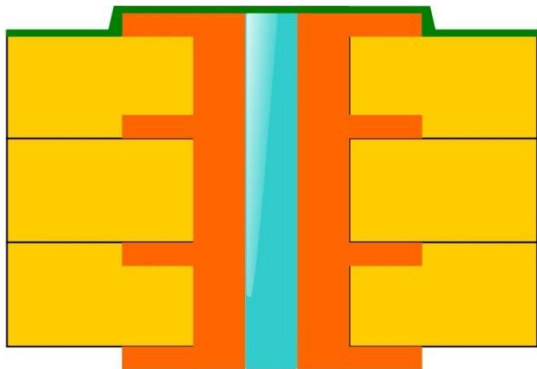
Via filling (description according IPC 4761)



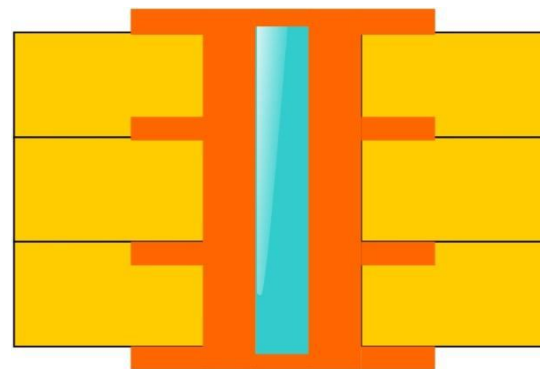
Filled Via Type V
filled with a non-conductive material completely



Filled & covered via Type VI-a
filled with a non-conductive material completely and covered up with soldermask or dry film on both sides



Filled & covered via Type VI-a
filled with a non-conductive material completely and covered up with soldermask or dry film on one side



Filled and capped Via Type VII
filled with a non-conductive material and covered up with copper on both sides