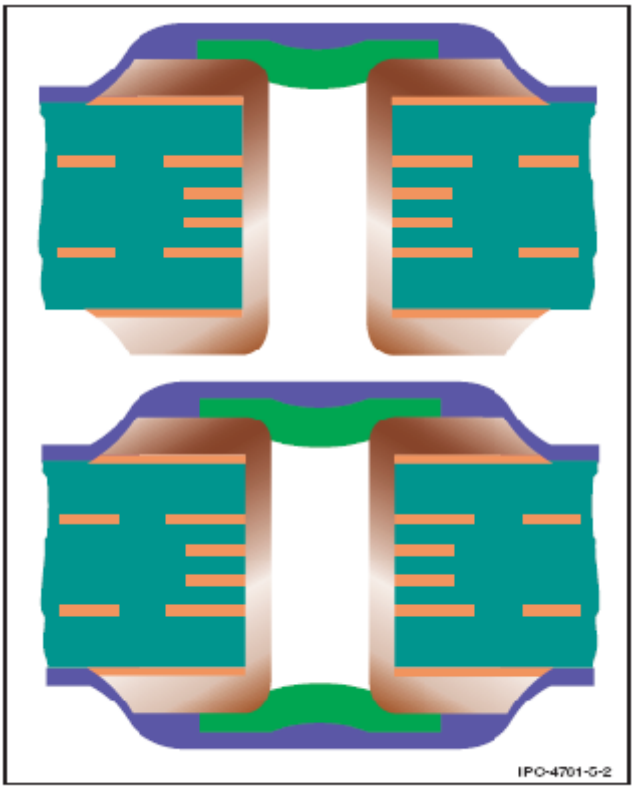
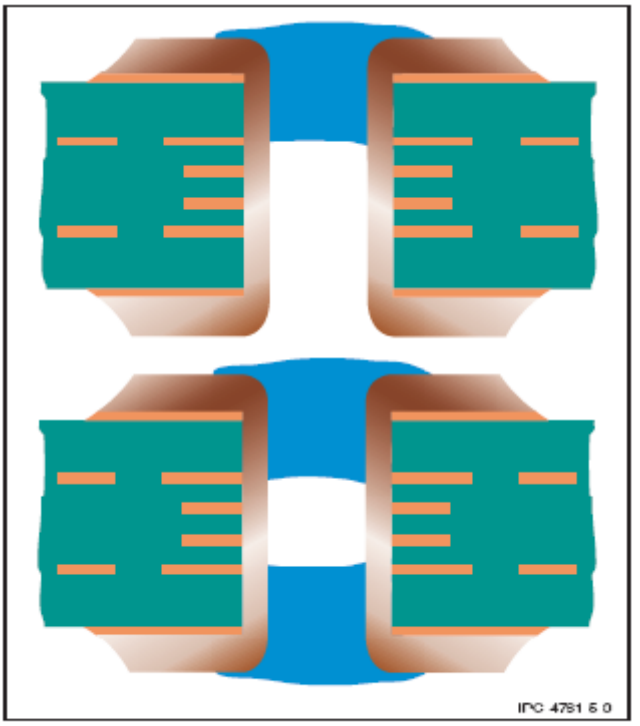
Table 5-1 Application Guidelines for Via Protection Types[1]

Description (Type)	Applications									
	Before Final Finish	After Non-Melting Metal Final Finish	Prevent air leakage in ICT (Vacuum Seal)[2]	Keeping chemistry or solder from passing through the via	Keeping chemistry or solder from being trapped in the via	Dielectric protection of via land	Fill holes in cores prior to lamination	Improves surface planarity	Best For thermal conductivity[3]	Prevent migration of solder, adhesives or encapsulants into vias
Tented - Single-Sided (Ia)	NOT RECOMMENDED[5]									
Tented - Double-Sided (Ib)	X	X	X	X	X	X				X
Tented and Covered – Single-Sided (IIa)	NOT RECOMMENDED[5]									
Tented and Covered – Double-Sided (IIb)	X	X	X	X	X	X				X
Plugged – Single-Sided (IIIa)	NOT RECOMMENDED[5]									
Plugged - Double-Sided (IIIb)	X	X	X	X	X	X		X		X
Plugged and Covered – Single-Sided (IVa)	NOT RECOMMENDED[5]									
Plugged and Covered Double-sided (IVb)	X	X	X	X	X	X				X
Filled (fully plugged) (V)	X	X	X	X	X		X	X	X	X
Filled and Covered (VI)	X	X	X	X	X	X				X
Filled and Capped (VII)[4]	X	X	X	X	X		X	X	X	X



Single Sided Tented and Covered Not Recommended

Figure 5-2 Examples of Type II Tented and Covered Vias



Single Sided Plugged Not Recommended

Figure 5-3 Examples of Type III Plugged Vias

Extracts from IPC 4761

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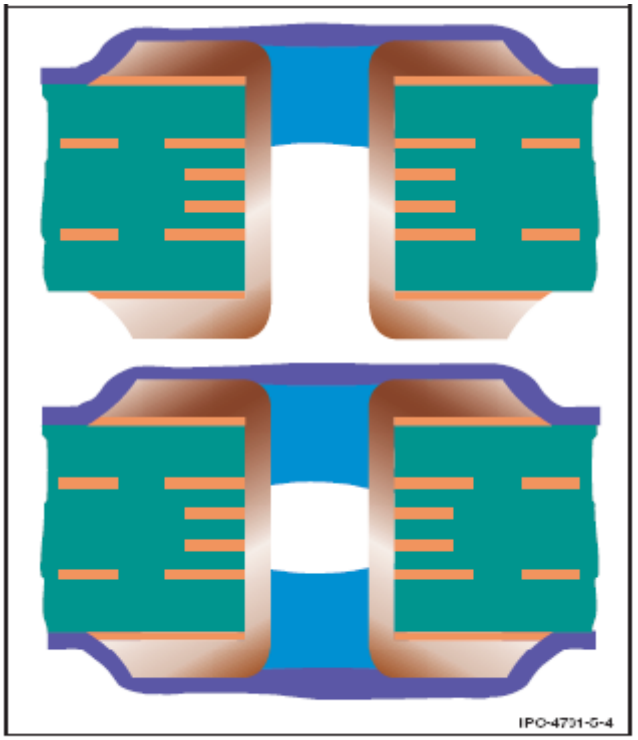

Single Sided Plugged and Covered Not Recommended

Figure 5-4 Examples of Type IV Plugged and Covered Vias

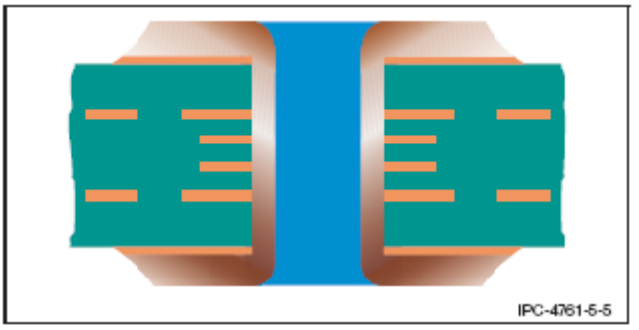

Figure 5-5 Example of Type V Filled Via

Process: Screened, roller-coated, or squeegeed.

Benefits: Complete fill of conductive or non-conductive material which eliminates contaminants. Process prevents solder balling. Benefits useful in sequential lamination processes.

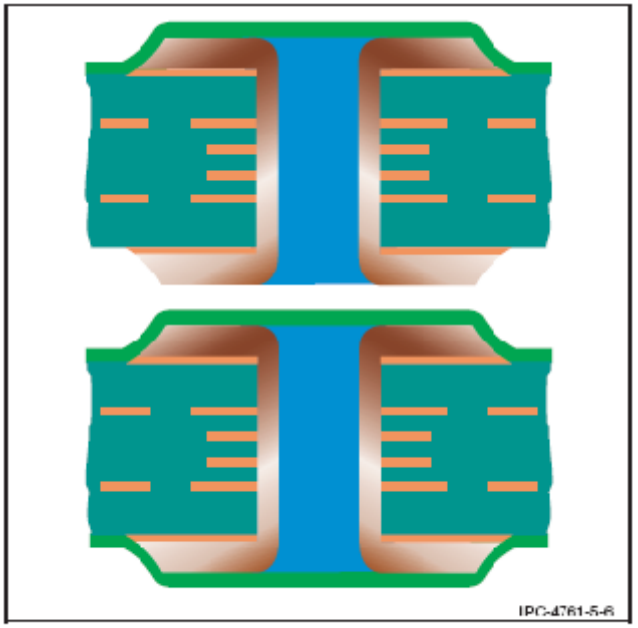

Figure 5-6 Examples of Type VI Filled and Covered Vias, Dry Film Cover

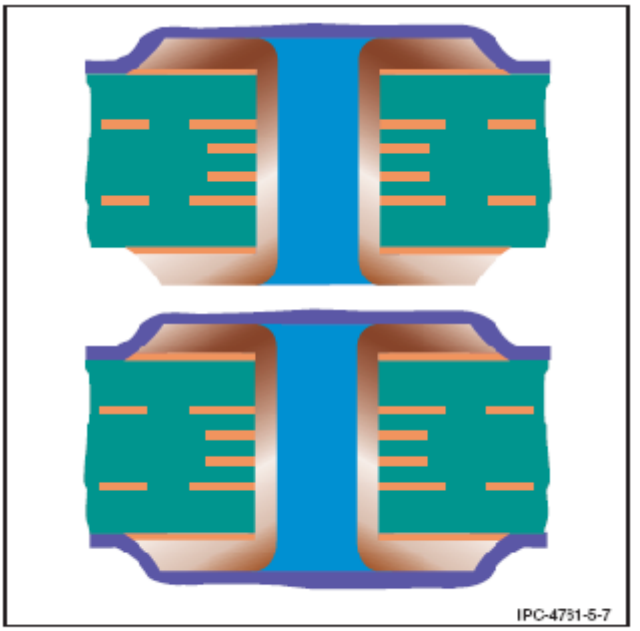

Figure 5-7 Examples of Type VI Filled and Covered Vias, Liquid Film Cover

Extracts from IPC 4761

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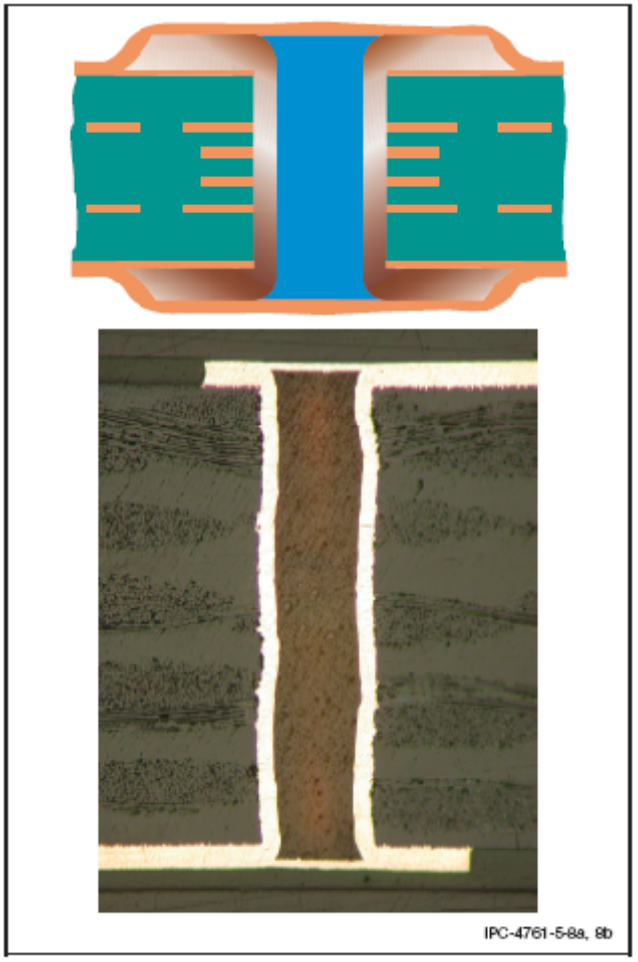

Figure 5-8 Examples of Type VII Filled and Capped Via

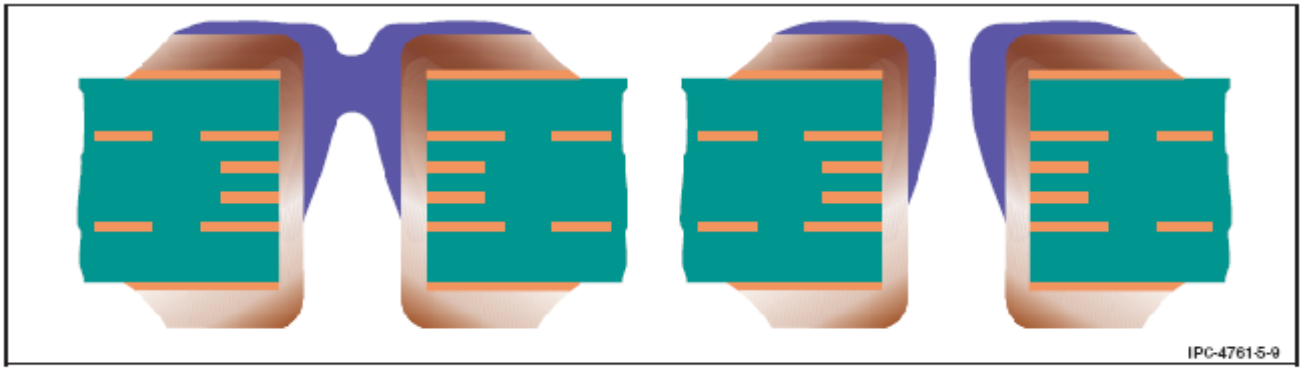

Figure 5-9 Examples of Partially Filled Vias

Extracts from IPC 4761
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