1.2.1 Embedded Capacitor Passive Device Designations

Table 1-1 Sample Embedded Capacitor Passive Device Designation

IPC-4821	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
4821 / S	**C**	**2**	**N**	**2**	**A**	**1/2**	**A**
Where S is specification (slash) sheet number	Device Type	Form of Dielectric	Reinforcement	Chemistry	Filler	Conductor Type	Encapsulant

Example The sample from Table 1-1 will be written as C 2 N 2 A 1/2 A.

Note The letter "X" **shall** be entered into the designation where an item is not specified and does not matter.

Level 1: Passive device type = C

Level 2 Form of Dielectric
Fully cured polymer = 1
Paste = 2
Liquid = 3
Ceramic = 4
B-Stage Resin = 5 (Replaces: *Prepreg = 5*)
Other = 9

2.1 IPC
IPC-TM-650 Test Methods Manual

2.4.25 Glass Transition Temperature and Cure Factor by DSC
2.4.39 Dimensional Stability, Glass Reinforced Thin Laminates
2.5.5.2 Dielectric Constant and Dissipation Factor of Printed Wiring Board Material - Clip Method
(Note: 2.5.5.2 replaces: *2.5.5.9 Permittivity and Loss Tangent, Parallel Plate, 1 MHz to 1.5 GHz*)
2.5.5.10 High Frequency Testing to Determine Permittivity and Loss Tangent of Embedded Passive Materials (Note: This test method was added to the listings in the Test Methods Manual)
[Also Note: Throughout the document, wherever the Test Method 2.5.5.9 was previously specified, it was replaced with Test Methods "2.5.5.2 or 2.5.5.10" – This includes this defined replacement in: a) Table 3-1, rows 14, 15 & 18; b) Table 3-2, rows 9, 10 & 13; c) Sections 3.14.1.1, 3.14.1.2, 3.14.1.5, 3.14.2.1, 3.14.2.2 & 3.14.2.5 & d) all Specification Sheets.**]**

3.1.1 Embedded Planar Capacitor
The term embedded planar capacitor refers to two closely spaced conductor planes within the printed wiring board that serve as power supply (power and ground) distribution planes within the board, spanning the majority of the area of the board.
(Note: The following two sentences have been deleted from the end of this paragraph that forms Section 3.1.1:
An embedded planar capacitor does not imply that the material used to create it was a laminate. Closely spaced conductor planes used for power distribution can be formed by a number of methods.)

3.1.2 Embedded Discrete Capacitor
The term embedded discrete capacitor signifies that the capacitance function exists within the substrate of the printed wiring board. Embedded discrete capacitors come in two forms. One is referred to as "formed" and the other is referred to as "placed." A formed embedded discrete capacitor is one where the specific capacitance function has been created at the time the substrate has been fabricated. A placed embedded discrete capacitor is one where a preformed, discrete, packaged capacitor such as an SMT chip capacitor is placed into the substrate, generally by creating a cavity within the substrate. **The dielectric type referred to as B-stage resin in 1.2.1 may only be used in discrete capacitor applications.** (Note: This last sentence was added to this first paragraph in Section 3.1.2.)

(Note: The following section **4.3.2** was deleted, in its entirety):
4.3.2 Structurally Similar Construction
When testing products at the primary stage of manufacture, materials whose thickness details will not affect test results will be considered structurally similar.
(Also Note: Deletion of this section results in the re-numbering of the section **4.3.3** that follows, to **4.3.2**)