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IPC 2010 APEX Conference

and IPC-A-610E, J-STD-001E, IPC-A-600H

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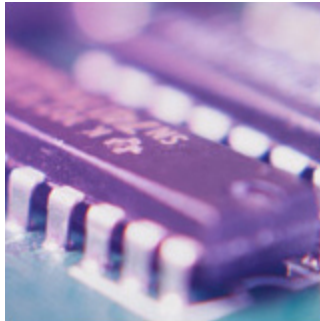
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IPC 2010 APEX Conference

and Highlights of IPC-A-610E J-STD-001E IPC-A-600H



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APEX 2010

- New Assembly and Joining Handbook – 820, Committee 7-35
- 001 Training and reading levels
- OPEN and CLOSE Book tests
- Testing scores

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APEX 2010

- 610 Training Task Group Beta Class will be in June
- Looking to have 7 hour days with an extra hour option to make up for any delays
- CIS programs will have the modules renumbered
- The program will have both close and open book testing segments
- Exams will require a score of 70% for each test, open and closed book, with no averaging of the scores



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APEX 2010

600 program in a nutshell

- Want to use more pictures in the exam
- Exam questions will be different from CIT and CIS programs
- Looks like we will be using 6012 and 6013 for the training program

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Careful of Your Certificate

- We have been made aware of counterfeit certificates
 - Verify all your instructors are certified by checking with the certification center
 - Check the date, the certificate number and the certification center

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610 Changes

- The inclusion of definition of wire overlap and overwrap in sections:
 - 1.5.11 and 1.5.12 and Section 6
- Torque requirements added to section 4 Hardware
- Connectors section moved to section 9.8
- Added Sect 4.2 Jack Post Mounting
- Modified press fit pin section 4.3.2

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610 Changes

Added the following:

- 4.5.1 Wire routing, added defective conditions for wire damage
- 4.5.2 Table 4-1 for violation of minimum bend radius
- Section 5.0 Soldering, new verbiage on lead-free solders
- 5.2.7.1 Soldering Anomalies, additional criteria on acceptance of solder balls
- 5.2.7.3 Excess solder, reworded and inserted criteria to inspect without magnification
- 5.2.11 Information on definition of Lead-Free fillet lift

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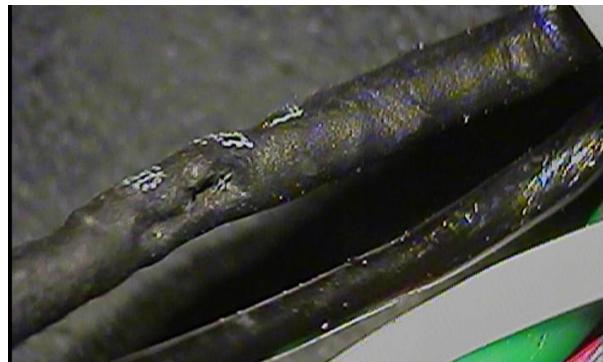


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610 – 6.2.4 Criteria added



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- Burnt shrink sleeve information added to section.



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610 Changes

- New sections 7.1.8.1 and 7.1.8.2 Connector Mounting
- Modified 7.2.2.1. Adhesive bonding
- Modified 7.3.5.1 new criteria for vertical fill of plated through holes for Class 2 products
- Modified 7.3.5.9, Lead trimming that cuts into the solder fillet must be reflowed
- New criteria 7.3.5.12 Board in Board for Class 1 and 2

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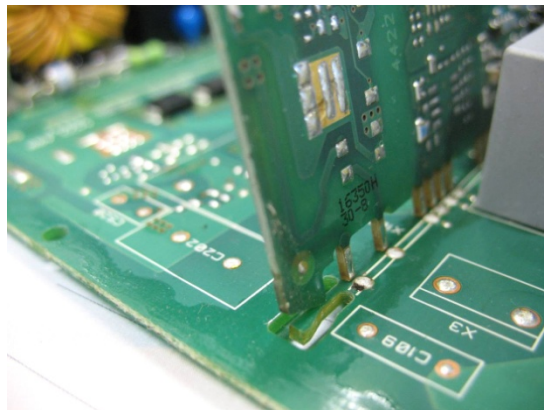
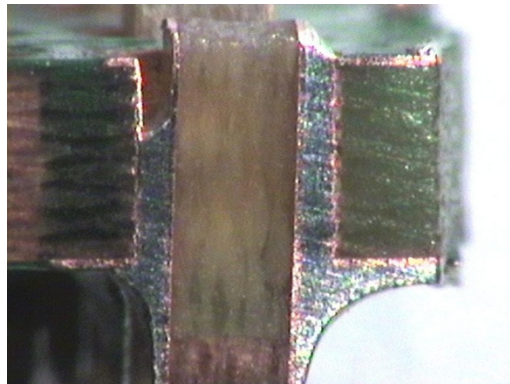


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IPC-A-610, New Item – Board inserted into slots



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610 Changes

- This page 8-25 is wrong, the Table 8-2 is correct, dimension “J” end overlap is required, it does not have tolerances included

8 Surface Mount Assemblies

8.3.2.8 Rectangular or Square End Chip Components - 1, 3 or 5 Side Terminations, End Overlap (J)

Figure 8-39

Acceptable - Class 1

- Wetted fillet is evident.

Acceptable - Class 2

- End overlap (J) between the component termination and the land is minimum 50% the length of component termination (T).

Acceptable - Class 3

- End overlap (J) between the component termination and the land is minimum of 70% the length of component termination (T).

Figure 8-40

Defect - Class 1,2,3

- Component termination area and land do not overlap.

Figure 8-41

Defect - Class 2

- End overlap (J) is less than 50% of the length of component termination (T).

Defect - Class 3

- End overlap (J) is less than 75% of the length of component termination (T).

PC-A-610E-2010 April 2010 8-25

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610 Changes

8.2.5 Flat Ribbon, L, and Gull Wing Leads

Table 8-5 Dimensional Criteria - Flat Ribbon, L, and Gull Wing Leads

Feature	Dim.	Class 1	Class 2	Class 3
Maximum Side Overhang	A	50% (W) or 0.5 mm [0.02 in], whichever is less; Note 1		25% (W) or 0.5 mm [0.02 in], whichever is less; Note 1
Maximum Toe Overhang	B	Note 1		
Minimum End Joint Width	C	50% (W)		75% (W)
Minimum Side Joint Length Note 6	when (L) is $\geq 3W$	(1W) or 0.5 mm [0.02 in], whichever is less	3 (W) or 75% (L), whichever is longer	
	when (L) is $< 3W$		100% (L)	
Maximum Heel Fillet Height	E	Note 4		
Minimum Heel Fillet Height	F	Note 3	(G) + 50% (T) Note 5	(G) + (T) Note 5
Solder Thickness	G	Note 3		
		Note 2		
		Note 2		
		Note 2		

8.3.5 Flat Gull Wing Leads

Table 8-5 Dimensional Criteria - Flat Gull Wing Leads

Feature	Dim.	Class 1	Class 2	Class 3
Maximum Side Overhang	A	50% (W) or 0.5 mm [0.02 in], whichever is less; Note 1		25% (W) or 0.5 mm [0.02 in], whichever is less; Note 1
Maximum Toe Overhang	B	Note 1		
Minimum End Joint Width	C	50% (W)		75% (W)
Minimum Side Joint Length Note 6	when (L) is $\geq 3W$	(1W) or 0.5 mm [0.02 in], whichever is less	3 (W) or 75% (L), whichever is longer	
	when (L) is $< 3W$		100% (L)	
Maximum Heel Fillet Height	E	Note 4		
Minimum Heel Fillet Height	(T) ≤ 0.38 mm [0.0149 in]	Note 3	(G) + (T), Note 5	(G) + (T), Note 5
	(T) > 0.38 mm [0.0149 in]		(G) + 50% (T), Note 5	
Solder Thickness	G	Note 3		
Formed Foot Length	L	Note 2		
Lead Thickness	T	Note 2		
Lead Width	W	Note 2		

Note 1. Does not violate minimum electrical clearance.

Note 2. Unspecified dimension, or variable in size as determined by design.

Note 3. Wetting is evident.

Note 4. See 8.3.5.5.

Note 5. In the case of a toe-down lead configuration, the minimum heel fillet height (F) extends at least to the mid-point of the outside lead bend.

Note 6. Fine pitch leads (component terminations on less than 0.65 mm [0.025 in] centers as defined by IPC-T-50) require a minimum side fillet length of 0.5 mm [0.02 in].

height (F) extends at least to the mid-point of the outside lead bend.
in.



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610 Changes

- Section 8.3.12.3 Surface Mount Area Array, added criteria for head in pillow criteria.



Figure 3-2: A head-on-pillow defect that was verified optically without the aid of mounting and polishing.

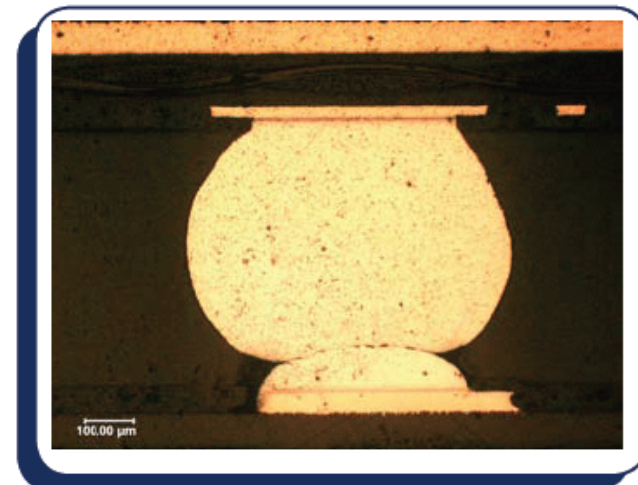


Figure 3-3: Head-on-pillow that required high magnification to be clearly identified



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610 Changes

- New section 8.3.12.6 Surface Mount Area Array, - Package on Package
 - This is a stack up of BGA types of packages
- New Section 8.3.15 Flattened Post Connections, Round Solder Land
 - Criteria for Class 3 has not been established for this device, so only requirements are for Class 1 and 2

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Highlights of 001 Changes

- Alloy composition to table 3-1
- Reorganization of paragraphs
- Introduction the term Overlap and Overwrap
- Document flowdown related to COTS -1.9
- Added moisture sensitive and process sensitive component usage – 3.8
- Changed gold removal process - 4.5.1
- Added heat shrinkable soldering devices - 4.19
- Updated wire and cable preparation -5.1.1
- Updated wire wrap tables – Table 5.3
- Plus many editorial and format changes

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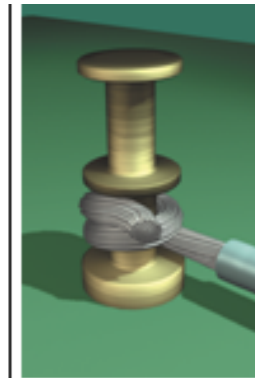
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Couple of 001 Picture Changes

Add figures



610D Fig 6-62



620A Fig 4-20

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- Now acceptable wire wrap criteria



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001 Changes

- No more text boxes

Examples:

<u>N</u>	<u>No requirement has been established for this Class</u>
<u>A</u>	<u>Acceptable</u>
<u>P</u>	<u>Process Indicator</u>
<u>D</u>	<u>Defect</u>

[A1P2D3] is Acceptable Class 1, Process Indicator Class 2 and Defect Class 3
[N1D2D3] is Requirement Not Establish Class 1, Defect Classes 2 and 3
[A1A2D3] is Acceptable Classes 1 and 2, Defect Class 3
[D1D2D3] is Defect for all Classes.



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001 Changes

- New:
- Table 3-1 Maximum Limits of Solder Bath Contaminant to accommodate the new lead-free solders
- Section 4.19 Heat Shrinkable Soldering Devices
- Information on assembling and soldering wires to terminals related to overlap and overwrap
- SMT tables as discussed earlier in the 610 document
- Table 7-19 Flatten Post Connections
- Section 10.3 Staking (Adhesives)

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A-600 Additions 2.5.6 Cap Plating

2.5.6 Cap Plating of Filled Holes – (Visual)

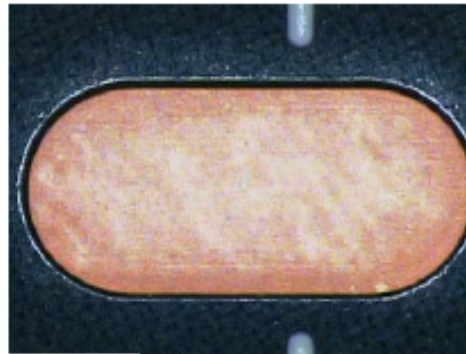


Figure 256a

Target Condition – Class 1, 2, 3

- Copper surface is planar with no indication of cap plating

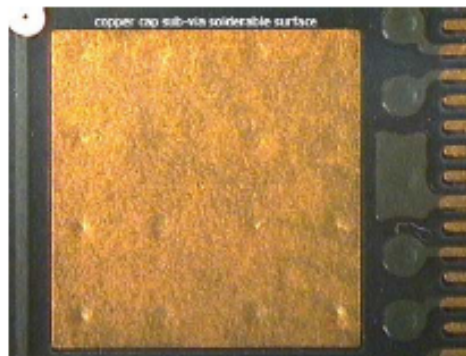


Figure 256b

Acceptable - Class 1, 2, 3

- When cap plating of the filled via is specified on the procurement documentation, the requirements of 2.7.1.1 and the requirements of IPC-6010 for rectangular and round surface mount pads shall apply.
- No voids over the resin fill area.
- Visually discernable protrusions (bumps) and/or depressions (dimples) over via fill are acceptable providing they meet the microsection requirements of IPC-6010.



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A-600 Additions 2.5.6 Cap Plating

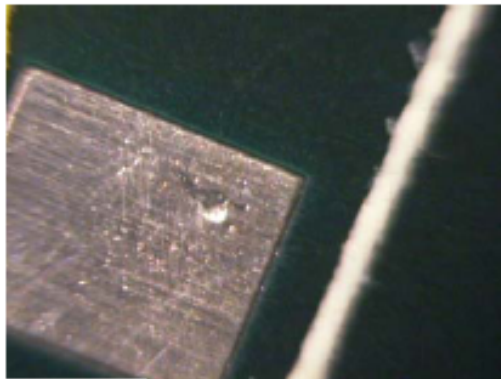


Figure 256c

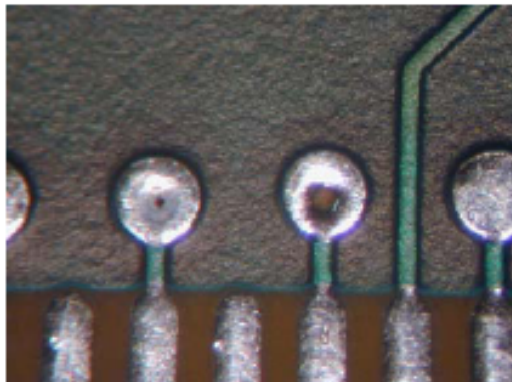


Figure 256d

Nonconforming - Class 1, 2, 3
• Defects either do not meet or exceed above
criteria



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2.9.7 Tenting of Via Holes

2.9.7 Tenting (Via Holes)

Tenting refers to a via with a dry film mask material applied bridging over the via wherein no additional materials are in the hole. It may be applied to one side or both sides of the via structure (see Figure 297c), though single sided tenting is not recommended.

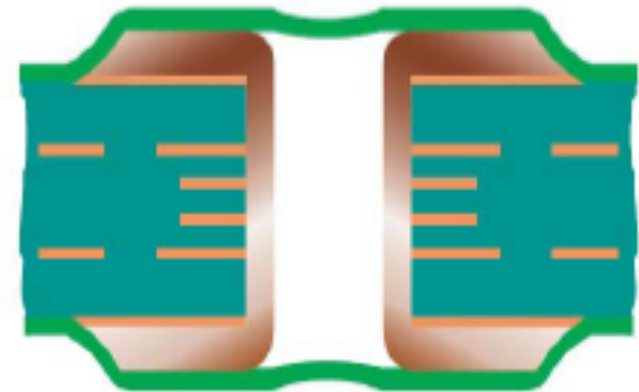


Figure 297c

Note: This graphic is for illustrative purposes only and does not require a microsection evaluation.

- Clarification of terms.

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Added Section 2.10.1.3 Conductor Thickness

2.10.1.3 Conductor Thickness



Target Condition - Class 1, 2, 3

- Conductor thickness meets dimensional requirements of artwork or procurement documentation.

Acceptable - Class 2, 3

- Any combination of isolated edge roughness, nicks, pinholes, depressions and scratches that reduces the conductor thickness by 20% of the minimum value or less.
- There is no occurrence (edge roughness, nicks, etc.) greater than 10% of the conductor length or more than 13 mm [0.512 in], whichever is less.

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2.10.2 Better explanation of annular ring

Measurement of
External Annular Ring

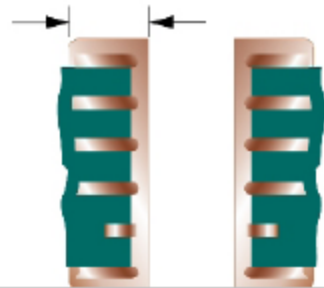
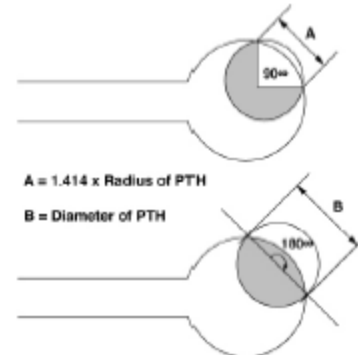


Figure 2012a External Annular Ring



$A = 1.414 \times \text{Radius of PTH}$
 $B = \text{Diameter of PTH}$

Figure 2012c Breakout of 90° and 180°

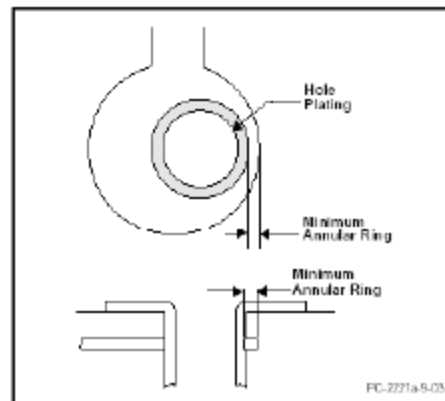


Figure 2012b Internal Annular Ring

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2.10.3 External Annular Ring

2.10.3 External Annular Ring – Supported Holes

A supported hole is a hole within a PB that has its inside surfaces plated or otherwise reinforced.



Figure 2103a

Target Condition - Class 1, 2, 3

- Holes are centered in the lands.

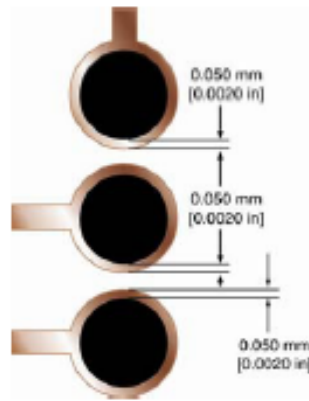


Figure 2103b

Acceptable - Class 3

- Holes are not centered in the lands, but the annular ring measures 0.050 mm [0.0020 in] or more.
- The minimum external annular ring may have 20% reduction of the minimum annular at the measurement area due to defects such as pits, dents, nicks, pinholes, or splay.



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3.3.9 Copper Wrap Plating

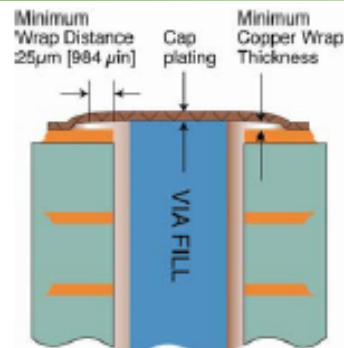


Figure 339a Surface Copper Wrap Measurement (Applicable to all filled PTHs)

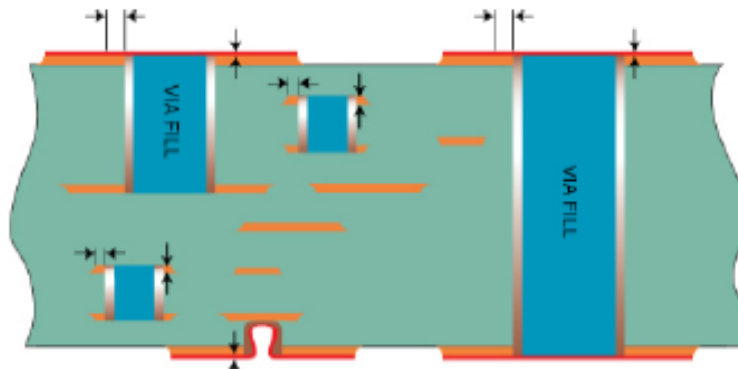


Figure 339b Wrap Copper Removed by Excessive Sanding/Planarization (Not Acceptable)
Note: Dimension lines and arrows indicate where wrap copper has been removed.

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3.3.9 Copper Wrap Plating

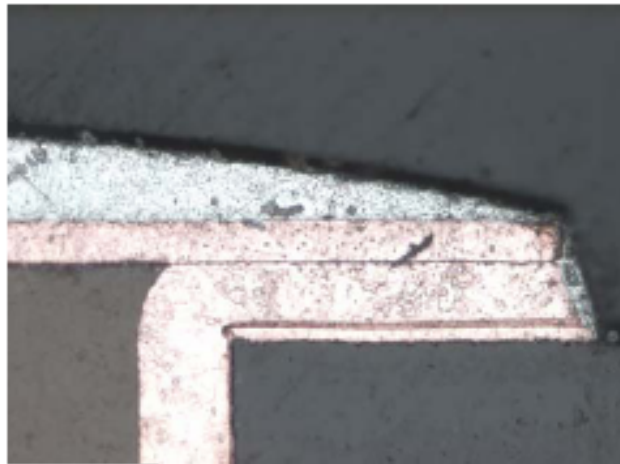


Figure 339c

Target Condition - Class 1, 2, 3

Acceptable - Class 3

- Wrap plating is continuous from the filled plated hole onto the external surface and extends by a minimum of 25 μm [984 μin] where an annular ring is required.
- Wrap thickness is not less than 12 μm [472 μin] for through, blind and buried vias.
- Wrap thickness is not less than 6 μm [236 μin] for blind and buried microvias.
- Wrap thickness is not less than 7 μm [276 μin] for buried via cores (> two layers).
- Reduction of surface wrap copper plating by processing (sanding, etching, planarization, etc.) does not result in insufficient wrap plating.

Note: Cap plating, if required, over filled holes is not considered in wrap copper thickness measurements.

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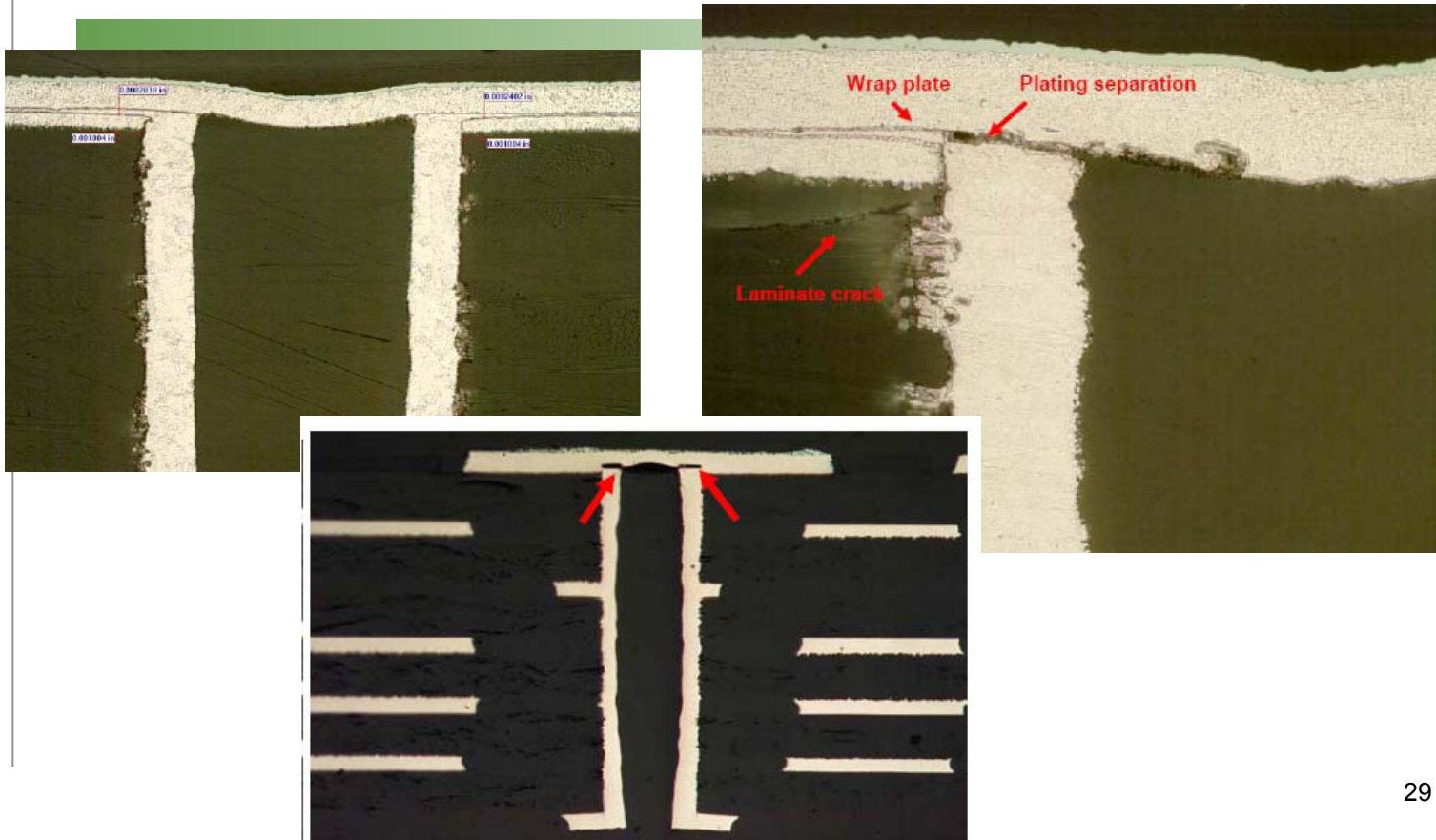


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3.3.9 Copper Wrap Plating Criteria



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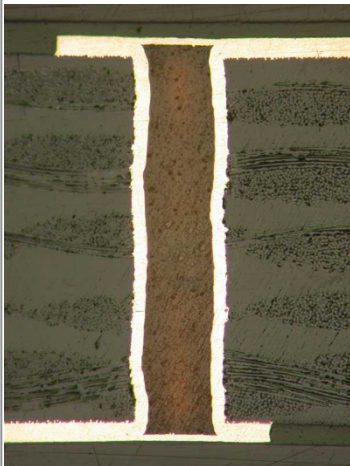


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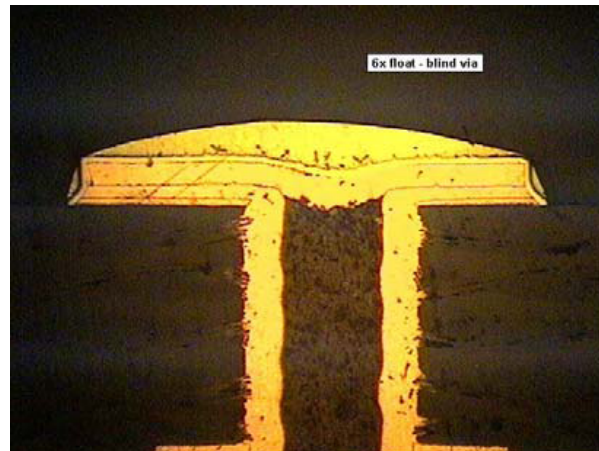


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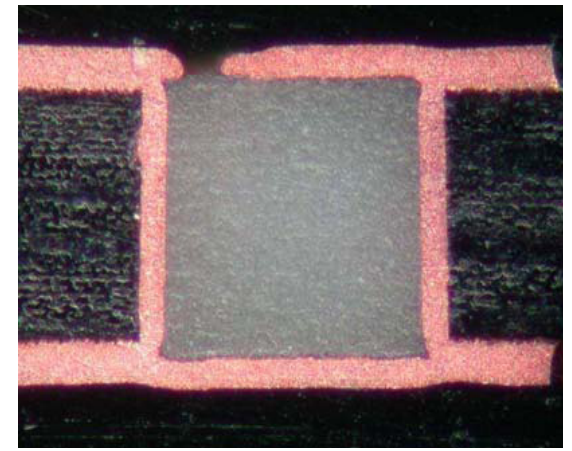
3.3.17 Cap Plating of Filled Holes



Target



Acceptable



Nonconforming

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When Is Training Coming?

- Documents for 001 should be out by June 2010
- Documents for 610 should be by July
- Documents for 600 should be by July/August timeframe

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Changes in Specifications Program

- Keep watching our web site www.eptac.com and EPTAC solder tips for the coming events on the total review of the documents and their changes.

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