

MILITARY SPECIFICATION  
PRINTED-WIRING, FLEXIBLE AND RIGID-FLEX

This amendment forms a part of MIL-P-50884C, dated 4 May 1984, and is approved for use by all Departments and Agencies of the Department of Defense.

PAGE 1

Box at bottom of page: Delete "Commander, Naval Electronic Systems Command, ATTN: ELEX 8111, Washington, DC 20363" and substitute "Commander, Electronic Support Division AFLC, 2750 ABW/ES, Gentile AF Station, Dayton, OH 45444-4500".

PAGE 2

2.1.1, SPECIFICATIONS, MILITARY, MIL-P-116: Delete "Preservation-Packaging, Methods of" and substitute "Preservation, Methods of".

PAGE 3

2.2: Delete "IPC-S-801" and substitute "IPC-S-804". Delete "IPC-B-29/50884 - Master Drawings for Flexible and Rigid-Flex Certification Boards."

2.2, add the following new publications:

- "IPC-A-41 - Single Sided Test Specimen."
- "IPC-A-42 - Double Sided Test Specimen."
- "IPC-A-43 - Multilayer Test Specimen."
- "IPC-A-44 - Four Layer Test Specimen."
- "IPC-100001 - Universal Drilling and Profile Master Drawing."
- "IPC-100041 - Single Sided Drawing."
- "IPC-100042 - Double Sided Drawing."
- "IPC-100043 - Multilayer Printed Board Drawings."
- "IPC-100044 - Four Layer Mass-Laminated Multilayer Printed Boards."

Also, delete "3451 Church Street, Evanston, IL 60203." and substitute "7380 North Lincoln Avenue, Lincolnwood, IL 60646."

3.2, delete and substitute the following:

"3.2 Qualification. Flexible and rigid-flex printed wiring furnished under this specification shall be products which are qualified for listing on the applicable Qualified Products List at the time set for opening of bids (see 4.5 and 6.5)."

PAGE 6

3.4.3a, delete and substitute: "a. Imperfection is translucent."

3.4.4, fourth sentence, delete and substitute the following:

"The marking shall be produced by the same process used in producing the conductor pattern; or by the use of a nonconductive, permanent fungistatic ink or paint (see 3.4.7) applied to the board or to a label which is applied to the board. The label shall be a polyamide film with acrylic pressure sensitive adhesive that shall withstand solder fluxes, cleaning solvents, molten solder, and conformal coating encountered in the manufacture of printed circuit boards. Electrical pencil marking on a metallic area provided for marking purposes may also be used."

TABLE V, delete in its entirety and substitute the following:

"TABLE V. Adhesion to printed-wiring boards.

| Material          | Maximum percentage of lifting                 |
|-------------------|---|
|                   | Melting and nonmelting metals nonscribed test |
| Bare copper       | 0   |
| Gold or nickel    | 5   |
| Tin-lead plating  | 10  |
| Reflowed tin-lead | 10  |
| Base laminate     | 0   |

3.6.5.1, title: Delete "(certification)" and substitute "(qualification)".

3.6.6.1, title: Delete "(certification)" and substitute "(qualification)". At end of paragraph, add the following: "The mandrel size shall be 0.250 inch diameter."

PAGE 12

3.7.1, line nine: Delete "exceed one and one-half times the foil" and substitute "exceed two times the foil".

PAGE 13

FIGURE 4, upper right: Delete "(see 3.7.9)" and substitute "SEE NOTE 3."

PAGE 19

3.7.12.2, title: Delete "(type 2, 3, 4, and 5)" and substitute "(types 2, 3, and 4)". First sentence: Delete "type 2, 3, 4, or 5" and substitute "types 2, 3, or 4". Line seven: Delete "(see figure 2)" and substitute "(see figure 4)".

PAGE 21

4.1.1, line six: Delete "Certified suppliers shall" and substitute "Suppliers shall". Line eight: Delete "certified manufacturer" and substitute "manufacturer".

Add new paragraph 4.1.2 as follows:

"4.1.2 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, not does it commit the Government to acceptance of defective material."

4.2b, delete and substitute: "b. Qualification inspection (see 4.5)."

PAGE 22

4.5, first line: Delete "Supplier's certification inspection" and substitute "Qualification inspection" (2 places).

4.5.1, last sentence, delete and substitute the following:

"Sample test specimens shall conform to the following for the type shown:

- a. Type 1: Test specimens for this type shall meet the requirements specified in master drawing IPC-100041 and artwork IPC-A-41.
- b. Type 2: Test specimens for this type shall meet the requirements specified in master drawing IPC-100042 and artwork IPC-A-42.
- c. Types 3 and 4: Test specimens for this type shall meet the requirements specified in master drawing IPC-100043 and artwork IPC-A-43.
- d. Type 5: Test specimens for this type shall meet the requirements specified in master drawing IPC-100044 and artwork IPC-A-44, except no plated thru-holes. NOTE: IPC-100001 is the Universal Drilling and Profile Master Drawing."

4.5.1.1, line five: Delete "certification" and substitute "qualification".

4.5.2, first line: Delete "Certification" and substitute "Qualification" (2 places).

4.5.3, first line: Delete "certification" and substitute "qualification" (2 places). Also, delete "Certification" and substitute "Qualification" (6 places).

PAGE 23

4.5.3, NOTE first line: Delete "certifying" and substitute "qualifying". Line two: Delete "Certification" and substitute "Qualification". Line three: Delete "certification" and substitute "qualification".

4.5.4, first line: Delete "certification" and substitute "qualification".

TABLE VIII, title: Delete "Supplier certification" and substitute "Qualification". Column heading: Delete "Certification". Test coupon column: Delete "Supplier certification".

TABLE VIII, Inspection column, Thermal stress (type 1), test specimen number column: Add "1".

PAGE 24

TABLE VIII, title: Delete "Supplier certification" and substitute "Qualification". Column heading: Delete "Certification".

TABLE VIII, Inspection column, Adhesive on land, test specimen number: Add "1, 4"; Test coupon column, types 2, 3, and 4: Add "A-1" (3 places).

TABLE VIII, Inspection column, Coverlayer wrinkles, test specimen number column: Add "1, 2, 3, 4"; Whole specimen column: Add "X".

TABLE VIII, Inspection column, Coverlayer access holes, test specimen number column: Add "1, 2, 3, 4"; Whole specimen column: Add "X".

TABLE VIII, Inspection column, Conductor edge overhang, test specimen number column: Add "1, 4"; Test coupon column, type 1, 2, 3, 4, 5: Add "A-1 or A-5" (5 places).

TABLE VIII, Inspection column, Bond strength (type 1), test specimen number column: Add "1, 4".

TABLE VIII, Inspection column, Flexibility endurance, Test coupon column, type 2, 3, 4, 5: Add "H-1" (4 places).

TABLE VIII, Inspection column, Plated-through hole, test specimen number column: Delete "1" and substitute "1, 4"; Test coupon column, type 2, 3, 4: Delete "B-3" and substitute "A-1 or A-5" (3 places).

PAGE 25

TABLE VIII, title: Delete "Supplier certification" and substitute "Qualification". Column heading, delete "Certification".

TABLE VIII, Inspection column, Undercutting, test specimen number column: Add "1, 4"; test coupon column, type 2, 3, 4: Add "A-1 or A-5" (3 places).

TABLE VIII, Inspection column, Flexible material, test specimen number column: Add "1, 4"; Test coupon column, type 2, 3, 4: Add "A-1 or A-5" (3 places).

TABLE VIII, Inspection column, Laminate voids, test specimen number column: Add "1, 4"; Test coupon column, type 2, 3, 4, 5: Add "A-1 or A-5" (4 places).

TABLE VIII, Inspection column, Lifted lands (as received), test specimen number column: Add "1, 4"; Test coupon column, type 2, 3, 4: Add "A-1" (3 places).

TABLE VIII, Inspection column, Lifted lands, test specimen number column: Add "1, 4"; Test coupon column, 1, 2, 3, 4: Add "B-3, A-2, A-2, A-2".

PAGE 26

TABLE VIII, title: Delete "Supplier certification" and substitute "Qualification". Column heading: Delete "Certification".

TABLE VIII, Inspection column, Moisture and insulation resistance, Test coupon column, type 1, 2, 3, 4, 5: Delete "E-5" and substitute "E-3" (5 places).

TABLE VIII, Inspection column, Dielectric withstanding voltage, Test coupon column, type 1, 2, 3, 4, 5: Delete "E-5" and substitute "E-3".

TABLE VIII, Inspection column, Continuity, test specimen number column: Add "2".

TABLE VIII, Inspection column, Insulation resistance, test specimen number column: Add "2"; Test coupon column, type 2, 3, 4, 5: Add "E-1" (4 places).

TABLE VIII, Inspection column: Delete "Adhesive on land" and all applicable information.

TABLE VIII, Inspection column: Delete "Coverlayer wrinkles" and all applicable information.

TABLE VIII, Inspection column: Delete "Coverlayer access" and all applicable information.

TABLE VIII, Inspection column: Delete "Flexible material" and all applicable information.

TABLE VIII, Inspection column: Delete "Laminate voids" and all applicable information.

TABLE VIII, Inspection column: Delete "Lifted lands" and all applicable information.

TABLE VIII: Footnote 3/, after "submitted": Add "and used for flexibility endurance."

TABLE VIII: Footnote 4/, delete and substitute: "4/ See MIL-STD-2118."

TABLE VIII: 4.5.5: Delete "certification" and substitute "qualification" (4 places).

PAGE 27

4.5.5b, last line: Delete "certification" and substitute "qualification".

4.5.5c: Delete "certification" and substitute "qualification" (2 places). Line six: Delete "30 days" and substitute "60 days"; also, delete "interval shall" and substitute "interval may". Line eight: Delete "certifying" and substitute "qualifying". Line twelve: Delete "recertify" and substitute "requalify".

4.5.5d: Delete "certification" and substitute "qualification".

Add new subparagraph 4.5.5e as follows:

"e. The manufacturer shall requalify every 36 months. The extent of qualification specified in 4.5.3 shall apply."

PAGE 28

TABLE XI, Inspection column: Delete "Surface imperfection 3.4.3" and substitute "Subsurface imperfections 3.4.3".

TABLE XI, Inspection column: Delete "Marking (missing and legibility)" and substitute "Marking".

Requirement paragraph column: Delete "3.4.4" and substitute "3.3.14". Method paragraph column: Delete "4.8.2.4" and substitute "4.8.4.8".

PAGE 31

TABLE XI, Inspection column, Continuity, Production board column: Delete "7/" and substitute "X".

TABLE XI, Inspection column, Insulation resistance, Production board column: Delete "10/" and substitute "X 9/".

TABLE XI, footnote 8/, second sentence: Delete in its entirety.

TABLE XI, footnote 8/, third sentence: Delete "Type 2" and substitute "Types 1, 2, and 5".

TABLE XI, footnote 9/: After "and 2" add "an AQL of 2.5 percent defective".

TABLE XI, footnote 11/, delete and substitute: "11/ See MIL-STD-2118".

TABLE XII, Inspection column: Delete "Marking ink" and all applicable information.

PAGE 32

TABLE XII, footnote 3/, delete and substitute: "3/ See MIL-STD-2118".

TABLE XIII, Inspection column, Flexibility endurance: After "2/" add "4/".

TABLE XIII, footnote 3/, delete and substitute: "3/ See MIL-STD-2118."

TABLE XIII, add footnote 4/ as follows: "4/ A type 1 specimen or board shall be used for flexibility endurance."

PAGE 33

Add new paragraph 4.7.2 as follows:

"4.7.2 Inspection of packaging. The sampling and inspection of the preservation and interior pack marking shall be in accordance with the group A and B quality conformance inspection requirements of MIL-P-116. The sampling and inspection of the packing shall be in accordance with the quality assurance provisions of the applicable container specification. Inspection of marking for shipment and storage shall be in accordance with the marking requirements of MIL-STD-129."

4.8.1, line six: Delete "3 diopters (approximately 3/4X)" and substitute "4X".

4.8.2.6: Delete "IPC-S-801" and substitute "IPC-S-804".

PAGE 34

4.8.3.3: Delete "and 4.8.5.1".

PAGE 39

4.8.4.8: Delete "Method 215A" and substitute "Method 215".

PAGE 40

4.8.6.1, line three, after Method 2.6.3: Add ",class 3".

PAGE 41

4.8.6.4, third sentence: Delete in its entirety.

PAGE 44

6.1.1h.: Delete "preservation-packaging" and substitute "preservation".

PAGE 45

6.3.1, lines 10 and 11: Delete "Commander, Naval Avionics Center, Indianapolis, IN 46218" and substitute "Commander, Electronic Support Division AFLC, 2750 ABW/ES, Gentile AF Station, Dayton, OH 45444-4500".

PAGE 46

TABLE XIV, delete in its entirety and substitute:

"TABLE XIV. Equivalence factors.

| Method                              | Ohm-cm<br>(X10 <sup>6</sup> ) | Equivalence<br>factors | Equivalents of<br>sodium chloride |                                  |
|-------------------------------------|-------------------------------|------------------------|-----------------------------------|----------------------------------|
|                                     |                               |                        | Micrograms<br>per square<br>inch  | Micrograms<br>per square<br>inch |
| Resistivity of<br>solvent extract   | 2                             | 1                      | 10.06                             | 1.56                             |
| Omega meter <sup>TM</sup> <u>1/</u> | 2                             | 1.39                   | 14.00                             | 2.20                             |
| Ionograph <sup>TM</sup>             | 2                             | 2.01                   | 20.00                             | 3.10                             |
| Ion chaser <sup>TM</sup>            | 2                             | 3.25                   | 33.00                             | 5.10                             |

1/ Model 200, 300, 400, 500, or 600."

MIL-P-50884C  
AMENDMENT 1

PAGE 46

Concluding material, under preparing activity: Delete "Navy - EC" and substitute "AF - 85".

6.5, delete and substitute the following:

"6.5 Qualification. With respect to products requiring qualification, awards will be made only for products which are at the time set for opening of bids, qualified for inclusion in the applicable qualified products list whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. The activity responsible for the qualified products list is Commander, Electronic Support Division AFLC, 2750 ABW/ES, Gentile AF Station, Dayton, OH 45444-4500; however, information pertaining to qualification of products may be obtained from the Defense Electronics Supply Center (DESC-E), Dayton, Ohio 45444."

6.5.1: Delete in its entirety.

Add new paragraph 6.6.2 as follows:

"6.6.2 MIL-P-50884 printed-wiring board. A MIL-P-50884 printed-wiring board is a flexible or rigid-flex printed-wiring board produced by a manufacturer listed on the Qualified Products List (QPL) and comes from a lot which has been subjected to, and passed all quality conformance inspections."

PAGES 47 THROUGH 100

APPENDIX: Delete in its entirety.

CONCLUDING MATERIAL

Custodians:

Army - ER  
Navy - EC  
Air Force - 85

Preparing activity:

AF - 85

Agent:

DLA - ES

Review activities:

Army - AR, MI  
Navy - OS, SH  
Air Force - 11, 16, 99  
DLA - ES  
NSA/S2

(Project 5999-0240)

User activities:

Navy - AS, CG, MC  
Air Force - 19