



the standard in safety

Making the Most of UL PCB Recognition

Presented by Emma Hudson BEng (Hons)

ICT Arundel Evening Seminar – 1st March 2011

What we will cover this evening

PCB Recognition Categories

Material additions to existing boards

- CCIL Programme
- Permanent Coatings Programme
- How to tell if materials can be added to your boards through these programmes

Making the most of your UL Recognized boards

- Initial Recognition
- Materials Purchasing
- PCB Sales



PCB Recognition

Categories PCBs are Recognized in –

- **Single-Layer* Rigid**
- **Multi-Layer Rigid**
- **Mass-Laminate Multi-Layer**
- **Metal-Based**
- **High Density Interconnect (HDI)**

Section in UL796 dedicated to Embedding Components

- **Flex / Flex-Rigid**
 - Single or Multi-Layer
 - Flex, Flex-to-install, or Rigid
 - Construction and Application categorisation

* Single-layer boards = single-sided and PTH = no internal conductor layers, single layer of dielectric material



PCB Recognition

Two types of Recognition –

- Full-Recognition
 - 6 – 12 weeks to complete Certification from receiving samples
- Flame-Only Recognition
 - 6 weeks to complete Certification from receiving samples

End-product Standard will define which Recognition is required for PCB

Also, End-Product Specific Program

- Test production board
- Limited to that board design only



Making the Most of the Material Recognitions

Reduced / No-Test Programmes Available for Adding Materials to Recognized Boards –

- **MCIL / CCIL* Programme**

- For addition of laminate and laminate/prepreg packages to existing boards
- Metal-clad laminate parameters need to be equal or more severe than PCB being added to
- Can add single-layer materials without testing
- Can add multi-layer materials through delamination-only testing
- Can add multi-layer core materials to HDI boards through delamination-only testing

* MCIL – metal clad industrial laminate, CCIL – copper clad industrial laminate

CCIL Program – How to do a Comparison

| PCB Type • Laminate / Resist Mfr and Grade | UL/ ANSI | Min. Thk. (mm) | Dir Sup | Cu Thk. (μm) | SS/ DS/ ML | Mfrg. Proc. | Min. Width (mm) | Max. Diam. (mm) | Min Edge Width (mm) | Solder Limits (°C/sec) | MOT (°C) [RTI: E/M] | UL 94 Flame |
|--|-------------|----------------------|------------|--------------------|------------------|----------------|-----------------------|-----------------------|---------------------------|--|---------------------------|----------------|
| Single-layer PCB | | | | | | | | | | | | |
| PCB A | FR-4 | 0.38 | Y | E: 9 – 102 | DS | 1 | 0.075 | 127.0 | 0.075 | 288/20 | 130 | V-0 |
| Requested Laminate | | | | | | | | | | | | |
| Laminate A | FR-4 | 0.38 | Y | E: 5 – 102 | DS | — | — | 50.8 | — | 150/300, 200/60, 290/30 | 130 | V-0 |
| Laminate B | FR-4 | <u>0.63</u> | Y | E: 9 – 102 | DS | — | — | 50.8 | — | <u>150/300,</u> <u>200/60,</u> <u>290/10</u> | 130 | V-0 |

Recognized copper clad thickness of this laminate is thicker than that required (may still be able to add this material if unclad thickness is suitable)

Solder Limits do not have a maximum time AND maximum temperature equal to the solder limits of the PCB. Can still be added to PCB but full testing would be required

The largest maximum area diameter Recognized for a laminate is 50.8mm (2") – this is considered representative for larger maximum area diameters on the PCB

CCIL Program – How to do a Comparison

| PCB Type • Laminate / Resist Mfr and Grade | UL/ ANSI | Min. Build- Up Thk. (mm) | Dir Sup | Cu Thk. (µm) | SS/ DS/ ML | Mfrg. Proc. | Min. Width (mm) | Max. Diam. (mm) | Min Edge Width (mm) | Solder Limits (°C/sec) | MOT (°C) [RTI: E/M] | UL 94 Flame |
|--|-------------|--------------------------------------|------------|-------------------------------------|------------------|----------------|-----------------------|-----------------------|---------------------------|--|---------------------------|----------------|
| Multi-layer PCB | | | | | | | | | | | | |
| PCB C [L: 0.05 / P: 0.05] [Ind. Thk mm] | GPY | 0.38 | ▲ | E: 12 - 135 I: 102 | ML | 2 | 0.050 | 127.0 | 0.150 | 150/300, 200/60, 290/20 | 140 | V-0 |
| Requested Laminate/Prepreg | | | | | | | | | | | | |
| Laminate X / Prepreg X1 [L: 0.05 / P: 0.05] [Ind. Thk mm] | GPY | 0.38 | Y | E: 9 - 135 I: 102 | ML | — | — | 50.8 | — | 150/300, 210/70, 290/20 | 140 | V-0 |
| Laminate Y / Prepreg Y1 [L: 0.05 / P: 0.05] [Ind. Thk mm] | FR-4 | 0.38 | Y | E: 9 - 210 I: 210 | ML | — | — | 50.8 | — | 160/300, 200/60, 300/30 | 130 | V-0 |

Can only use abbreviated test programs when ANSI grades are the same

MOT of metal clad Multi-layer material is less than PCB. Cannot use CCIL for addition.

If unclad material has min electrical / mechanical RTIs of 130 /130 then may conduct full testing to add – recommend against mixing different UL/ANSI materials under the same board type

How to Find the Data to do a CCIL Comparison

Use the UL iQ Database, a searchable version of the Listing Cards –

The screenshot shows the UL iQ for Printed Wiring Boards Database website. At the top left is the UL Underwriters Laboratories logo. The main title is "UL iQ for Printed Wiring Boards". Below the title is a navigation bar with "Home", "Help", and "Contact Us" links. A search bar is located below the navigation bar, with the text "SEARCH:" followed by buttons for "Company", "Parametric", "Type Dsg", "Tradename", and "File Number". The main content area is titled "Welcome to UL's iQ for Printed Wiring Boards Database". Below this is a section titled "UL's iQ for Printed Wiring Boards includes materials covered under the following categories". This section lists four categories: "Printed Wiring Boards" (Component - Printed Wiring Boards - (ZPMV2)), "Laminates" (Component - Laminates - (QMTS2)), "FMIC Flex PWB's" (Component - Flexible Printed Wiring Boards - (ZPXK2)), and "PWB Coatings" (Component - Coatings for use on Printed Wiring Boards - (QMJU2)). Each category has a brief description of the materials covered. At the bottom of the page is a "Notice of Disclaimer" and a copyright notice: "Copyright © 2009 Underwriters Laboratories Inc. All rights reserved."

UL Underwriters Laboratories

UL iQ for Printed Wiring Boards

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SEARCH: Company Parametric Type Dsg Tradename File Number

Welcome to UL's iQ for Printed Wiring Boards Database

UL's iQ for Printed Wiring Boards includes materials covered under the following categories

| | |
|-----------------------|--|
| Printed Wiring Boards | Component - Printed Wiring Boards - (ZPMV2) This category covers printed wiring boards for use as components in devices or appliances. The boards may use organic or inorganic base materials in a single or multilayer, rigid or flexible form. Circuitry construction may include etched, die stamped, precut, flush press, additive, and plated conductor techniques. Printed-component parts may be used. |
| Laminates | Component - Laminates - (QMTS2) This category covers materials that have been tested in accordance with established methods to define their properties in order to facilitate investigation of their use in end-product applications. These materials may consist of filament-wound tubing, industrial laminates, vulcanized fiber, and other materials for use in fabricating Recognized printed wiring boards. |
| FMIC Flex PWB's | Component - Flexible Printed Wiring Boards - (ZPXK2) This category covers printed wiring construction incorporating flexible materials for use as components in devices or appliances. Flexible materials are defined as films or materials exhibiting flexible properties. The constructions may use flexible materials in a single or multilayer build-up and in combination with additional flexible or rigid materials. Flexible material constructions may employ etched, die stamped, precut, flush-press, additive plated conductors, polymer thick film, dual access, cast and adhesiveless techniques. Printed-component parts may be used. |
| PWB Coatings | Component - Coatings for use on Printed Wiring Boards - (QMJU2) This category covers permanent coatings for use on Recognized printed wiring boards. These coatings may consist of solder resists (solder masks) or conformal coatings. |

The materials covered in this database are incomplete in certain constructional features or restricted in performance capabilities and are intended for use as components of complete equipment submitted for investigation rather than for direct separate installation in the field. THE FINAL ACCEPTANCE OF THE COMPONENT IS DEPENDENT UPON ITS INSTALLATION AND USE IN COMPLETE PRODUCTS SUBMITTED TO UNDERWRITERS LABORATORIES INC.

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How to Find the Data to do a CCIL Comparison

The screenshot shows the UL iQ search interface for Printed Wiring Boards. The search term "Laminates" is entered in the search bar. The search results form is highlighted with a blue border and contains the following fields:

- Laminate category: Metal clad ratings
- Type: Industrial Laminates
- ANSI Type: n/a
- Minimum Build up (mm):
- Electrical RTI (C): n/a
- Mechanical RTI (C): n/a
- Flame Class: equal to \geq n/a
- Hot Wire Ignition (HWI): n/a
- High Arc Ignition (HAI): n/a
- High Voltage Tracking (HVTR): n/a
- Comparative Tracking Index (CTI): n/a
- Board Attributes: Max Operating Temp (C): n/a, Type: n/a
- Solder Limits: Max Temp (C):, Time (sec):
- Conductor Attributes: Max Area Diameter (mm):, Min External Thk (mic):, Max External Thk (mic):, Max Internal Thk (mic):
- Meets UL796 Direct Support Req
- additionally certified in accordance with Canadian National requirements

A "Search" button is located below the form.

How to Find the Data to do a CCIL Comparison



UL *iQ*™ for Printed Wiring Boards

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SEARCH: Company Parametric Type Dsg Tradename File Number

Search for:

Laminate category: Company Name:

Type: Country:

ANSI Type: Meets UL796 Direct Support Req

Minimum Build up (mm): Flame Class: equal to

Electrical RTI (C): Hot Wire Ignition (HWI): High Voltage Tracking (HVTR):

Mechanical RTI (C): High Arc Ignition (HAI): Comparative Tracking Index (CTI):

Board Attributes **Solder Limits** **Conductor Attributes**

Max Operating Temp (C): Max Temp (C): Max Area Diameter (mm):

Type: Time (sec): Min External Thk (mic):

single sided double or single sided show multiple solder limit types only Max External Thk (mic):

additionally certified in accordance with Canadian National requirements Max Internal Thk (mic):

Search

181 products met the selected criteria [\(click on a product to see the complete listing\)](#)

| Mfr Dsg | ANSI Type | Buildup (mm) | Cond Ext | | | Cond Int | | | Flame Class | Max Oper Temp (C) | Solder Temp (C) | Solder Time (sec) | iQ Link |
|---|-----------|--------------|-----------|-----------|-----------|-----------|----------|----------|-------------|-------------------|-----------------|-------------------|---------|
| | | | Min (mic) | Max (mic) | Int (mic) | Max (mic) | Max (mm) | Max (mm) | | | | | |
| ADVANCE MATERIALS CORP (E201676) Taiwan AMC-800 | FR-4 | 0.38 | 17 | 102 | 102 | 50.8 | V-0 | 130 | 288 | 60 | | | |
| AISMALIBAR S A (E47820) Spain IGAV FR95ML HTR.2 | FR-4 | 0.38 | 15 | 102 | 65 | 50.8 | V-0 | 130 | 288 | 20 | | | |
| CHANG CHUN PLASTICS CO LTD (E108591) Taiwan CCP-606/CCP-606P | FR-4 | 0.38 | 12 | 102 | 70 | 50.8 | V-0 | 130 | 288 | 30 | | | |
| CCP-607/CCP-607P | FR-4 | 0.38 | 12 | 102 | 70 | 50.8 | V-0 | 130 | 288 | 30 | | | |
| CCP-608/CCP-608P | FR-4 | 0.38 | 17 | 102 | 70 | 50.8 | V-0 | 130 | 288 | 30 | | | |
| CCP-618/CCP-618P | FR-4 | 0.38 | 12 | 102 | 102 | 50.8 | V-0 | 130 | 288 | 30 | | | |

181 products met the selected criteria [\(click on a product to see the complete listing\)](#)

How to Find the Data to do a CCIL Comparison

| Mtl Dsg | ANSI Type | Min Buildup (mm) | Cond Min Ext (mic) | Cond Max Ext (mic) | Cond Max Int (mic) | Cond Max Diam (mm) | Flame Class | Max Oper Temp (C) | Solder Temp (C) | Solder Time (sec) | iQ Link |
|---|-----------|------------------|--------------------|--------------------|--------------------|--------------------|-------------|-------------------|-----------------|-------------------|---------|
| ADVANCE MATERIALS CORP (E201676) Taiwan | | | | | | | | | | | |
| AMC-800 | FR-4 | 0.38 | 17 | 102 | 102 | 50.8 | V-0 | 130 | 288 | 60 | |
| AISMALIBAR S A (E47820) Spain | | | | | | | | | | | |
| IGAV FR95ML HTR.2 | FR-4 | 0.38 | 15 | 102 | 65 | 50.8 | V-0 | 130 | 288 | 20 | |
| CHANG CHUN PLASTICS CO LTD (E108591) Taiwan | | | | | | | | | | | |
| CCP-606/CCP-606P | FR-4 | 0.38 | 12 | 102 | 70 | 50.8 | V-0 | 130 | 288 | 30 | |
| CCP-607/CCP-607P | FR-4 | 0.38 | 12 | 102 | 70 | 50.8 | V-0 | 130 | 288 | 30 | |
| CCP-608/CCP-608P | FR-4 | 0.38 | 17 | 102 | 70 | 50.8 | V-0 | 130 | 288 | 30 | |
| CCP-618/CCP-618P | FR-4 | 0.38 | 12 | 102 | 102 | 50.8 | V-0 | 130 | 288 | 30 | |
| CHANGZHOU ZHONGYING SCIENCE & TECHNOLOGY CO LTD (E311392) China | | | | | | | | | | | |
| ZY140 | FR-4 | 0.38 | 17 | 102 | 68 | 50.8 | V-0 | 130 | 288 | 20 | |
| CHIN-SHI ELECTRONIC MATERIALS LTD (E206580) Taiwan | | | | | | | | | | | |
| CS-8800 | FR-4 | 0.38 | 17 | 102 | 70 | 50.8 | V-0 | 130 | 288 | 30 | |
| DOOSAN CORPORATION ELECTRO-MATERIALS BG (E103670) Korea | | | | | | | | | | | |
| DS-7402, DS-7402M | FR-4 | 0.38 | 17.5 | 102 | 68 | 50.8 | V-0 | 130 | 288 | 60 | |
| DS-7402H | FR-4 | 0.38 | 17.5 | 102 | 68 | 50.8 | V-0 | 130 | 288 | 60 | |
| DS-7408 | FR-4 | 0.38 | 5 | 102 | 107 | 50.8 | V-0 | 130 | 288 | 30 | |
| DS-7409, DS-7409D, DS-7409HG | FR-4 | 0.38 | 5 | 102 | 136 | 50.8 | V-0 | 130 | 288 | 30 | |
| DS-7409H | FR-4 | 0.38 | 5 | 102 | 136 | 50.8 | V-0 | 130 | 288 | 30 | |
| DS-7409HF | FR-4 | 0.38 | 5 | 102 | 136 | 50.8 | V-0 | 130 | 288 | 30 | |
| DS-7409S | FR-4 | 0.38 | 5 | 102 | 400 | 50.8 | V-0 | 130 | 288 | 30 | |
| ELITE MATERIAL CO LTD (E150504) Taiwan | | | | | | | | | | | |
| EM-120/EM-12B, EM-220/EM-22B, EM-220(5)/EM-22B(5) | FR-4 | 0.38 | 9 | 102 | 68 | 50.8 | V-0 | 130 | 288 | 20 | |
| EM-275/EM-275B | FR-4 | 0.38 | 9 | 102 | 68 | 50.8 | V-0 | 130 | 288 | 30 | |
| EM-310, EM-320, EM-320(5)/EM-32B, EM-32B(5) | FR-4 | 0.38 | 9 | 204 | 204 | 50.8 | V-0 | 130 | 288 | 60 | |
| EM-350,EM-360/EM-36B | FR-4 | 0.38 | 17 | 102 | 68 | 50.8 | V-0 | 130 | 288 | 60 | |
| EM-370/EM-37B | FR-4 | 0.38 | 9 | 102 | 68 | 50.8 | V-0 | 130 | 288 | 30 | |
| EM-375/EM-375B | FR-4 | 0.38 | 9 | 102 | 68 | 50.8 | V-0 | 130 | 288 | 30 | |
| EM-825/EM-825B | FR-4 | 0.38 | 8.5 | 204 | 204 | 50.8 | V-0 | 130 | 288 | 30 | |
| EM-827/EM-827B | FR-4 | 0.38 | 8.5 | 204 | 204 | 50.8 | V-0 | 130 | 288 | 30 | |
| EM-828/EM-828B | FR-4 | 0.38 | 9 | 102 | 68 | 50.8 | V-0 | 130 | 288 | 30 | |
| ENDICOTT INTERCONNECT TECHNOLOGIES IIC (E232112) United States | | | | | | | | | | | |
| 19-700/@-C | FR-4 | 0.23 | 17 | 102 | 99 | 88.9 | V-0 | 130 | 288 | 20 | |
| 19-700/@-CC | FR-4 | 0.15 | 17 | 102 | 66 | 88.9 | V-0 | 130 | 288 | 20 | |
| GOLDENMAX INTERNATIONAL TECHNOLOGY (ZHUHAI) LTD (E330731) China | | | | | | | | | | | |
| GF432 | FR-4 | 0.38 | 17 | 102 | 68 | 50.8 | V-0 | 130 | 288 | 20 | |
| GOLDENMAX INTERNATIONAL TECHNOLOGY LTD (E224772) China | | | | | | | | | | | |
| GF432 | FR-4 | 0.38 | 17 | 102 | 68 | 50.8 | V-0 | 130 | 288 | 20 | |
| GF532 | FR-4 | 0.38 | 17 | 102 | 68 | 50.8 | V-0 | 130 | 288 | 20 | |
| GRACE ELECTRON CORP (E186152) Taiwan | | | | | | | | | | | |
| GA-140-LL/GA-140B-LL | FR-4 | 0.38 | 12 | 204 | 204 | 50.8 | V-0 | 130 | 288 | 30 | |
| GA-150 | FR-4 | 0.38 | 17 | 102 | 102 | 50.8 | V-0 | 130 | 288 | 30 | |

How to Find the Data to do a CCIL Comparison

Materials for Use in Fabricating Recognized Printed Wiring Boards

E186152

GRACE ELECTRON CORP

12TH FL 69 SEC 3 MINSHENG E RD, ZHONGSHAN DISTRICT, TAIPEI 104 TW

GA-150-LL

Metal clad industrial laminates for use in multilayer printed wiring boards with copper on one or both sides furnished as sheets

| Unclad Dsg | Prepreg Dsg | ANSI Type | Build Up Min Thk (mm) | Cond Min Ext (mic) | Cond Max Ext (mic) | Cond Max Int (mic) | Max Area Diam (mm) | Max Oper Temp (C) | Flame Class | Solder Temp (C) | Solder Time (sec) |
|------------|-------------|-----------|-----------------------|--------------------|--------------------|--------------------|--------------------|-------------------|-------------|-----------------|-------------------|
| GA-150-LL | GA-150B-LL | FR-4 | 0.38 | 17 | 102 | 102 | 50.8 | 130 | V-0 | 288 | 30 |

Report Date: 1997-07-24
Last Revised: 2010-07-07

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IEC and ISO Test Methods

| Test Name | Test Method | Units | Thickness Tested (mm) | Value |
|--------------|-----------------|---------------|-----------------------|-------|
| Flammability | IEC 60695-11-10 | Class (color) | 0.38 | V-0 |

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How to Make the Most of the Material Recognitions

Reduced / No-Test Programmes Available for Recognized Boards –

- **Permanent Coatings Program**

- Solder resist additions to existing boards
- Recognized solder resist to have equal or more severe parameters than PCB being added to
- No testing to add to single or multi-layer boards



Permanent Coatings Program – How to do a Comparison

| PCB Type | UL/ANSI | Min. Thk. (mm) | Dir Sup | Cu Thk. (µm) | SS/DS/ML | Mfg Proc | Min. Width (mm) | Max. Diam. (mm) | Min Edge Width (mm) | Solder Limits (°C/sec) | MOT (°C) [RTI: E/M] | UL 94 Flame |
|--------------------------|---------|----------------|-------------|--------------|----------|----------|-----------------|-----------------|---------------------|------------------------|---------------------|-------------|
| Single-layer PCB | | | | | | | | | | | | |
| PCB A | FR-4 | 0.38 | Y | E: 9 – 102 | DS | 1 | 0.075 | 127.0 | 0.075 | 288/20 | 130 | V-0 |
| Requested Solder Resist: | UL/ANSI | Min. Thk. (mm) | Coating Thk | | | Colours | | | | Solder Limits (°C/sec) | UL 94 Flame | |
| Resist X | FR-4 | <u>0.63</u> | 15 - 50µm | | | GN | | | | <u>277/30</u> | V-0 | |
| Resist Y | FR-4 | 0.38 | 10 - 60µm | | | ALL | | | | 290/20 | V-0 | |

Solder resist X has only been tested on a minimum dielectric thickness of 0.63mm when the PCB we are adding it to has a minimum thickness of 0.38mm. Cannot add through Permanent Coatings Program – Flame testing required

Solder resist X has only been tested using solder limits of 277°C for 30 seconds. Although time meets requirements maximum temperature does not, targeting 288 °C. Cannot add through Permanent Coatings Program – Flame testing required

How to Find the Data to do a Permanent Coatings Comparison



ULiQ™ for Printed Wiring Boards

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SEARCH: Company Parametric Type Dsg Tradename File Number

Search for: Coatings for Printed Wiring Boards

Coating Type: Resist Company Name: Max. Electrical Temp. Index (C):

Flame Class equal to >= V-0 Country: n/a Env. Cond: indoor only indoor and outdoor

Min Laminate thick (mm): 0.38 Max Solder Temp (C): 288 Min Coating Thick (mic): Min. Spacing (mm):

ANSI Type:* FR-4 Solder Time (sec): 20 Max Coating Thick (mic): show only coatings with multiple solder limits

* Coatings Recognized for use with FR-4 ANSI materials are considered suitable for use with CEM-1 and CEM-3 materials.

979 products met the selected criteria (click on a product to see the complete listing)

| Coating Dsg | Min Thk (mic) | Max Thk (mic) | Flame Class | ANSI Type | Lam Min (mm) | Solder Temp (C) | Solder Time (sec) | iQ Link |
|---|---------------|---------------|-------------|-----------|--------------|-----------------|-------------------|---------|
| ADVANCE MATERIALS CORP (E210858) Taiwan | | | | | | | | |
| LSW-735/S-700 | 8 | 50 | V-0 | FR-4 | 0.38 | 288 | 20 | |
| PSR-200B/L S-20B | 8 | 50 | V-0 | FR-4 | 0.38 | 288 | 20 | |
| PSR-550B/L S-55B | 15 | 35 | V-0 | FR-4 | 0.38 | 288 | 20 | |
| SR-6000/CA-60 | 8 | 50 | V-0 | FR-4 | 0.38 | 288 | 20 | |
| AJINOMOTO FINE-TECHNO CO INC (E166114) Japan | | | | | | | | |
| KMK-200/H-718 | 8 | 50 | V-0 | FR-4 | 0.20 | 290 | 20 | |
| KT-3A/KH-3A | 8 | 50 | V-0 | FR-4 | 0.38 | 290 | 20 | |
| KT-3C/KH-3C | 8 | 50 | V-0 | FR-4 | 0.38 | 290 | 20 | |
| KT-3P/KH-3P | 8 | 60 | V-0 | FR-4 | 0.38 | 290 | 20 | |
| ANRAN SHENG ELECTRONIC MATERIAL CO LTD (E234155) China | | | | | | | | |
| APS-800/APS-800H | 10 | 35 | V-0 | FR-4 | 0.38 | 288 | 60 | |
| ASAHI CHEMICAL RESEARCH LABORATORY (E68009) Japan | | | | | | | | |
| BM-350/BM-350 Additive | 8 | 50 | V-0 | FR-4 | 0.20 | 290 | 20 | |
| CCR-232GF No. 6/CCR-232 Additive | 8 | 50 | V-0 | FR-4 | 0.20 | 290 | 20 | |
| DPR-805B/DPR-805B Additive | 8 | 50 | V-0 | FR-4 | 0.20 | 290 | 20 | |
| DPR-805CV | 8 | 50 | V-0 | FR-4 | 0.20 | 290 | 20 | |
| FP-R130 | 25 | 70 | V-0 | FR-4 | 0.20 | 290 | 20 | |
| ATOTECH DEUTSCHLAND GMBH ZWEIGNIEDERLASSUNG BASEL (F&E BASEL) (E329753) Switzerland | | | | | | | | |

How to Find the Data to do a Permanent Coatings Comparison

Coatings for Use on Recognized Printed Wiring Boards - Component

E83564

SUN CHEMICAL CIRCUITS

NORTON HILL, MIDSOMER NORTON, BATH SOMERSET BA3 4RT GB

XV501T-4 Series A

Resist coatings for use on Recognized printed wiring boards, furnished as: two component liquid

| Color | Coating Min Thk (mic) | Coating Max Thk (mic) | Coating Flame Class | Laminate ANSI Type | Laminate Min Thk (mm) | Solder Temp (C) | Solder Time (sec) |
|-------|-----------------------------|-----------------------------|---------------------------|--------------------------|-----------------------------|-----------------------|-------------------------|
| GN | 15 | 50 | V-0 | FR-4 | 0.30 | 288 | 30 |
| ALL | 15 | 55 | V-0 | FR-4 | 0.63 | 288 | 30 |

Report Date: 1983-08-11
Last Revised: 2007-11-28

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Tradenames/Trademarks for File E83564:



IEC and ISO Test Methods

| Test Name | Test Method | Units | Laminate/Coating Thickness(mm/mic) | Value |
|--------------|-----------------|---------------|---------------------------------------|-----------------------|
| Flammability | IEC 60695-11-10 | Class (color) | 0.30/15 0.63/15 | V-0 (GN) V-0 (ALL) |

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How to Make the Most of the Material Recognitions

Reduced / No-Test Programmes Available for Recognized Flex Boards –

- **Polyimide ANSI-Like Program**

- PI films used with same adhesive already evaluated for construction in combination with a PI film and used within PI Recognition limits
 - For addition to flame-only Recognized boards = no testing
 - For addition to full Recognition boards = reduced testing



Additional Ways to Minimise Testing

Multi-layer boards can be considered representative for Single-Layer boards providing –

- Multi-layer board has more severe or equal parameters than the single-layer board (inc. UL/ANSI grade)
- Multi-layer board manufacturing process is equal or more severe than single-layer board manufacturing process (post lamination)

Can reduce sample numbers / test programme

How to make the most of UL Recognition

From the Perspective of –

- **PCB Manufacturer**
 - Initial Recognition
 - Materials purchasing
 - PCB Sales

How to make the most of UL Recognition

PCB Manufacturer – Initial Recognition Process

- **Create boards that cover your customer needs and are competitive with the competition**
- **Consider creating boards where testing can be minimised in the future**
 - Can single and multi-layer boards employ same key parameters and process?
 - Do the parameters of the board permit the reduced / no-test programmes to be used?

How to Check the Competition's Recognition

The screenshot shows the UL iQ for Printed Wiring Boards search interface. At the top left is the UL Underwriters Laboratories logo. The main title is "UL iQ for Printed Wiring Boards". Below the title is a navigation bar with "Home", "Help", and "Contact Us" links. A search bar is located below the navigation bar, with "SEARCH:" and a dropdown menu showing "Printed Wiring Boards". The search bar is divided into sections for "Company", "Parametric", "Type Dsg", "Tradename", and "File Number".

The search criteria form includes the following fields:

- Construction Type: n/a
- Company Name: [text input]
- Country: n/a
- Flame Class: equal to \geq n/a
- Max Operating Temperature (C): n/a
- Comparative Tracking Index (CTI): n/a
- Meets UL796 DSR*: n/a
- additionally certified in accordance with Canadian National requirements
- single sided double or single sided
- Max Solder Temp (C): [text input]
- Solder Time (sec): [text input]
- show multiple solder limit tvoes only
- Conductor Attributes:
 - Min Width: [text input] mm
 - Min Edge: [text input] mm
 - Max Area Diam: [text input] mm
 - Min Ext Thk: [text input] mic
 - Max Int Thk: [text input] mic
 - Max Ext Thk: [text input] mic

*A triangle symbol is marked on those products within a given type designation that comply with direct support of current-carrying parts performance level requirements of UL 796. "All" is used to indicate that all base materials under that type designation comply with direct support of current-carrying parts performance level requirements of UL 796.

Search

How to make the most of UL Recognition

PCB Manufacturer – Materials Purchasing

- **Find materials that can be added with reduced or no-testing**
 - Less / no samples to make, so less line-time taken-up
 - Project costs reduced for CCIL / Permanent Coating Programme additions
 - Quicker to add when no testing is involved


- **If the material you want to use does not have parameters that permit addition through these programmes let your supplier know**
 - By highlighting the benefits of these programmes to your material suppliers they know the value they bring to you

How to make the most of UL Recognition

PCB Manufacturer – PCB Sales Team

- **UL Recognition is a selling point – not all PCB manufacturers have this and many end-product manufacturers need it**
- **Understand what the UL Recognition is, so you can highlight the safety aspect and the benefits this Certification brings**
- **Add a link to your UL Listing Card on your company website to highlight your Safety Certification**
- **Use the UL Listing Cards to find potential customers.**
 - The majority of UL Listed products will need Recognized PCBs

How to Find UL Listed Products

 **ONLINE CERTIFICATIONS DIRECTORY** [Quick Guide](#) [Contact Us](#) [UL.com](#)

BEGIN A BASIC SEARCH

To begin a search, please enter one or more search criteria in the parameters below.

Company Name [\(options\)](#)

City

US State

US Zip Code

Country

Region

Postal Code (non-US)

UL Category Code [\(options\)](#)

UL File Number [\(help\)](#)

Keyword

TIPS FOR EFFECTIVE SEARCHES

Select a search method

ABOUT THE ONLINE CERTIFICATIONS DIRECTORY

You can use the UL Online Certification Directory to:



- Verify a UL Listing, Classification, or Recognition
- Verify a UL Listed product use
- Verify a UL Recognized component use
- Verify a product safety standard

Learn more with the [Quick Guide to the Online Certifications Directory](#)

SPECIFIC SEARCHES

Select a specific search:

FEATURED LINKS

LINKS OF INTEREST

[iQ Family of Databases](#)
[ULC Online Directories](#)
[Code Correlation Database](#)
[UL Product Manual Guide](#)

How to make the most of UL Recognition

PCB Purchaser / User –

- **Understand what the end-product requirements are for the PCB**
 - This information allows you to find which companies have the appropriate Recognition
- **Use UL Recognized boards for non-US products**
 - You know the UL mark means independent Safety evaluation and continuous monitoring of your supplier
- **If concerned about “airmiles” of components, can identify Recognized PCB manufacturers local to you**
 - UL files can contain multiple manufacturing locations, all will be treated the same under our Safety evaluation and continuous monitoring programmes, but if location is important then ask the supplier



How to Find the Recognized PCB you Need

The screenshot shows the UL iQ search interface for Printed Wiring Boards. At the top left is the UL Underwriters Laboratories logo. The main title is "UL iQ for Printed Wiring Boards". Below this is a navigation bar with "Home", "Help", and "Contact Us" links. A search bar contains the text "Printed Wiring Boards" and a dropdown menu. Below the search bar is a form with various search criteria:

- Construction Type: n/a
- Company Name: [text input]
- Country: n/a
- Flame Class: equal to \geq n/a
- Max Operating Temperature (C): n/a
- Comparative Tracking Index (CTI): n/a
- Meets UL796 DSR*: n/a
- additionally certified in accordance with Canadian National requirements
- single sided double or single sided
- Max Solder Temp (C): [text input]
- Solder Time (sec): [text input]
- show multiple solder limit tvoes only
- Conductor Attributes:
 - Min Width: [text input] mm
 - Min Edge: [text input] mm
 - Max Area Diam: [text input] mm
 - Min Ext Thk: [text input] mic
 - Max Int Thk: [text input] mic
 - Max Ext Thk: [text input] mic

A "Search" button is located at the bottom of the form.

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Summary

- **Make the most of the CCIL & Permanent Coatings programmes for making material additions = less work, lower cost!**
- **Make the most of the UL iQ database for –**
 - Finding materials that can be added through the reduced / no-test programmes
 - Checking your competitors Recognition
 - Sourcing PCBs with the parameters you need
- **Make the most of the UL Listing Cards for finding companies who need UL Recognized PCBs**



Useful Web Addresses

UL iQ Database

<http://www.ul.com/iq>

UL Listing Cards

<http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm>

UL Pre-Certification Projects

<http://www.ul.com/global/eng/pages/offerings/industries/hightech/printedwiringboards/precert/>



Thank-you!

