



**THE DATASHEET OF**  
**521**





ISO 9001 Registered Quality System.  
Burlington, Ontario, Canada QMI File # 004008

# Copper Clad Boards

## 500 Series Technical Data Sheet

500 Series

### Description

The *500 Series Copper Clad Boards* are made of a laminate consisting of continuous woven glass cloth impregnated with epoxy resin. The boards are made of FR4 which is a flame retardant version of G-10 material.

The boards are ideal for prototyping and small production runs. It is used by PCB manufacturers, design engineers, hobbyists, and students.

### Benefits and Features

- **Complies with UL** (file number E214381) **and IPC-4101C/21**
- **DICY (dicyandiamide) Cured System**
- **Easy to cut with no specialized equipment required**
- **UV blocking**
- **Available in 1 oz (1.37 mil, 35 µm) and ½ oz (0.67 mil, 17 µm) copper cladding**
- **Comes in 1/16" (1.60 mm) and 1/32" (0.80 mm) laminate thicknesses**

### Properties

<i>Physical Properties</i>	<i>Method</i>	<i>Specification</i>	<i>Value</i>
Moisture Absorption	IPC-TM-650 2.6.2.1	<0.80%	0.25%
Flammability	UL-94	94V-0	V0
<i>Thermal Properties</i>	<i>Method</i>	<i>Specification</i>	<i>Value</i>
Glass Transition Temperature (T <sub>g</sub> )	IPC-TM-650 2.4.25	>110	140 °C
CTE prior T <sub>g</sub> , z-axis	IPC-TM-650 2.4.24	—	50 ppm/°C
CTE after T <sub>g</sub> , z-axis	"	—	250 ppm/°C
Total Expansion (50-260 °C), z-axis	"	—	3.75%
Time to Delamination T260	IPC-TM-650 2.4.24.1	—	20 min
Time to Delamination T288	"	—	2 min
Thermal Degradation via TGA	ASTM D 3850	—	310 °C
Thermal Stress @288 °C	IPC-TM-650 2.4.13.1	>10 s	300 s
Maximum Operating Temp. (MOT)	UL 94	—	130 °C

<i>Electrical Properties</i>	<i>Method</i>	<i>Specification</i>	<i>Value</i>
Volume Resistivity	IPC-TM-650 2.5.17.1	$>1 \times 10^6 \text{ m}\Omega\cdot\text{cm}$	$5 \times 10^8 \text{ m}\Omega\cdot\text{cm}$
After Moisture Resistance	"		
Surface Resistivity	"	$>1 \times 10^4 \text{ m}\Omega\cdot\text{cm}$	$5 \times 10^7 \text{ m}\Omega$
After Moisture Resistance	"		
Dielectric Constant @1 GHz	IPC-TM-650 2.5.5.9	$<5.4$	4.2
Dissipation Factor @1 GHz	"	$>0.035$	0.015
Dielectric Strength	IPC-TM-650 2.5.6.2	$>762 \text{ V/mil}$	1 200–1 400 V/mil
Dielectric Breakdown	IPC-TM-650 2.5.6	$>40 \text{ kV}$	60 kV
Comparative Tracking Index (CTI)	ASTM D 3638	—	Grade 3, 175–250 V
Arc Resistance	IPC-TM-650 2.5.1	$>60 \text{ s}$	240 s
<i>Mechanical Properties</i>	<i>Method</i>	<i>Specification</i>	<i>Value</i>
Peel Strength (1 oz)	IPC-TM-650 2.4.8	—	10-12 lb/in
As received	"		
After thermal stress	"	$>6 \text{ lb/in}$	9-12 lb/in
Flexural Strength	IPC-TM-650 2.4.4	$>415 \text{ MPa}$	600 MPa
Warp	"	$>345 \text{ MPa}$	500 MPa
Fill	"		

Note: Data shown are typical values for reference only.

## Storage

Store at around room temperature 18 to 27 °C [65 to 80 °F] and protect from direct heat or sunlight. Keep sealed in an air tight container, away from humidity.

## Health and Safety

Please see the **Safety Data Sheet** (SDS) for more details on transportation, storage, handling and other security guidelines.

## Packaging and Supporting Products

### 1 oz Copper Claddings

FR4 1/16" (1.60 mm), single sided

<i>Cat. No.</i>	<i>Metric</i>	<i>Imperial</i> <sup>a)</sup>
503	76 x 127 mm	3" x 5"
506	101 x 152 mm	4" x 6"
509	152 x 152 mm	6" x 6"
515	203 x 254 mm	8" x 10"
521	304 x 304 mm	12" x 12"
580	914 x 1219 mm	36" x 48"

FR4 1/16" (1.60 mm), double sided

<i>Cat. No.</i>	<i>Metric</i>	<i>Imperial</i> <sup>a)</sup>
540	76 x 127 mm	3" x 5"
550	152 x 152 mm	6" x 6"
555	304 x 304 mm	12" x 12"



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FR4 1/32" (0.80 mm), single sided

<i>Cat. No.</i>	<i>Metric</i>	<i>Imperial</i> <sup>a)</sup>
588	152 x 228 mm	6" x 9"

a) Sizes are approximate

## ½ oz Copper Claddings

FR4 1/16" (1.60 mm), single sided

<i>Cat. No.</i>	<i>Metric</i>	<i>Imperial</i> <sup>a)</sup>
510	152 x 152 mm	6" x 6"
516	203 x 254 mm	8" x 10"

b) Sizes are approximate

FR4 1/32" (0.80 mm), double sided

<i>Cat. No.</i>	<i>Metric</i>	<i>Imperial</i> <sup>a)</sup>
587	101 x 152 mm	3" x 5"
589	152 x mm	4" x 6"

FR4 1/16" (1.60 mm), double sided

<i>Cat. No.</i>	<i>Metric</i>	<i>Imperial</i> <sup>a)</sup>
551	152 x 152 mm	6" x 6"

## Technical Support

Contact us regarding any questions, improvement suggestions, or problems with this product. Application notes, instructions, and FAQs are located at [www.mgchemicals.com](http://www.mgchemicals.com).

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## Disclaimer

This information is believed to be accurate. It is intended for professional end users having the skills to evaluate and use the data properly. *M.G. Chemicals Ltd.* does not guarantee the accuracy of the data and assumes no liability in connection with damages incurred while using it.

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