



**IPC-2152**

# **Standard for Determining Current Carrying Capacity in Printed Board Design**

Developed by the Current Carrying Capacity Task Group (1-10b) of the Printed Board Design Committee (1-10) of IPC

Users of this standard are encouraged to participate in the development of future revisions.

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# Standard for Determining Current Carrying Capacity in Printed Board Design

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## 1 SCOPE

This document is intended as a general guide to understanding the relationship between current, conductor size, and temperature, and can be used more specifically in the design and evaluation of copper conductors in printed boards (PBs).

**1.1 Purpose** The purpose of this document is to provide guidance on determining the appropriate conductor sizes on the finished PB as a function of the current carrying capacity required and the acceptable conductor temperature rise.

**1.2 Presentation** All dimensions and tolerances in this standard are expressed in hard SI (metric) units and parenthetical soft imperial (inch) units. Users of this standard are expected to use metric dimensions.

**1.3 Interpretation** “Shall,” the imperative form of the verb, is used throughout this standard whenever a requirement is intended to express a provision that is mandatory. Deviation from a “shall” requirement may be considered if sufficient data is supplied to justify the exception.

The words “should” and “may” are used whenever it is necessary to express non-mandatory provisions.

“Will” is used to express a declaration of purpose.

To assist the reader, the word “**shall**” is presented in bold characters.

**1.4 Definition of Terms** The definition of all terms used herein **shall** be in accordance with IPC-T-50 and as defined in 1.4.1 through 1.4.13.

**1.4.1 Ambient** The surrounding environment coming into contact with the system or component in question.

**1.4.2 Base Material** The insulating material upon which a conductive pattern may be formed (The base material may be rigid or flexible or both. It may be a dielectric or insulated metal sheet).

**1.4.3 Circuitry Layer** A layer of PB containing conductors, including ground and voltage planes.

**1.4.4 Conductive Pattern** The configuration or design of the conductive material on a base material. (This includes conductors, lands, vias, planes, and passive components when these are an integral part of the PB manufacturing process.)

**1.4.5 Conductor Spacing** The observable distance between adjacent edges (not center-to-center spacing) of isolated conductive patterns in a conductor layer.

**1.4.6 Conductor Thickness** Thickness of a conductor including additional metallic coatings but excluding non-conductive coatings.

**1.4.7 Conductor Width** The observable width of a conductor at any point chosen at random on a PB as viewed from directly above unless otherwise specified.

**1.4.8 Convection** Heat transfer that occurs at the interface of a solid and a fluid or gas that is due to their differences in temperature.

**1.4.9 Copper Weight** The mass of copper per unit area for a foil, typically expressed in ounces per square foot or grams per square centimeter (these units are not equivalent).

**1.4.10 Current-Carrying Capacity** The maximum electrical current that can be carried continuously by a conductor, without causing an objectionable degradation of electrical or mechanical properties of the product.