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Talk:FR-4



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Start

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Start

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Low

This article has been rated as **Low-importance** on the project's [importance scale](#).

Specifications of FR-4 vary from manufacturer to manufacturer and from batch to batch. Perhaps some information should be added regarding the frequency-dependant behaviour of FR-4 material?

This data is highly subjective and is hardly a complete listing of the properties of FR-4

Even if the data is incomplete, I disagree that this article reads as an advertisement. FR-4 is a family of materials, not a brand. [49giantssharks \(talk\)](#) 17:28, 18 January 2010 (UTC)

I agree. This is not an advertisement. FR4 is widely used. This page and the subjective specifications are moderately useful. This would be a great resource if FR4 was fully specified with typical ranges. —Preceding unsigned comment added by [75.144.158.121 \(talk\)](#) 12:46, 1 February 2010 (UTC) I have removed a space before "I agree." to make text wrap at right margin.
--[220.101.28.25 \(talk\)](#) 07:35, 14 April 2010 (UTC)

I agree FR-4 is a material. I also agree that this is not an advertisement. However, I disagree that "typical property values" are subjective since they represent "typical" test results. NEMA, the National Electrical Manufacturing Association publishes only the "minimum property values" in their standards. Minimum property values are therefore less accurate & less useful than "typical properties" based on real test values. — Preceding unsigned comment added by [Micangchr \(talk • contribs\)](#) 12:59, 25 May 2011 (UTC)

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Table of specifications

Most of the specifications of the table are not cited. Specs do vary considerably from manufacturer to manufacturer, and for the subtype of FR-4. There should be a paragraph on the subtypes. Perhaps a table of typical values from a single manufacturer should be provided, augmented with more specific or complete data where available (as I have inserted for thermal conductivity data).--[Paul K Clifford \(talk\)](#) 01:03, 14 August 2013 (UTC)

The typical specifications definitely need updating. The 3 inch upper limit for typical thickness must me a typo, I have never seen a PCB thicker than 0.2 inch. Even those thicknesses are usually pressed from thinner laminates. Copper thicknesses of half ounce is much more common than 2 or 3 ounce, due to multilayer and fine pitch this seems to be the dominant thickness today. PCBs with 2+ layers usually have 1/2 ounce copper on the outside onto which more copper is deposited

when manufacturing the through hole vias. --Bonf (talk) 08:14, 16 December 2013 (UTC)

Thermal conductivity

Manufacturers do not specify the thermal conductivity in their datasheets, owing to the difficulty in measuring it. It is nevertheless an important value for understanding heat dissipation on PCBs. Most papers/discussions on thermal management of PCBs use a thermal conductivity value of 0.25 W/(m-K), but do not cite their source. I added thermal conductivity values to the table from actual measurements that are often cited by other papers about precise thermal management. I included two values, for in-plane and through-plane directions as the thermal conductivity is highly anisotropic. For each value I included two sources, showing the variation from one manufacturer's FR-4 board to another.--Paul K Clifford (talk) 01:03, 14 August 2013 (UTC)

Units in FR4 specs

Regarding the thermal conductivity of FR4, listed in the specification table, note that the units of measure should be W/(m*K) and NOT w/(m/K) – Preceding unsigned comment added by 70.164.104.130 (talk) 15:20, 11 July 2013 (UTC)

I have changed the units for thermal conductivity to the correct MKS units of W/(m-K).--Paul K Clifford (talk) 00:55, 14 August 2013 (UTC)

Origin of name FR-4

The french and dutch pages both say that FR-4 stands for "Flame Resistant". If this is correct, it should be part of the page. 79.224.69.174 (talk) 21:07, 3 October 2013 (UTC)

Copper

There should be information, that copper on FR4 could be rolled or electrodeposited. – Preceding unsigned comment added by 77.91.169.186 (talk) 15:12, 19 October 2016 (UTC)

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