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Subject : IEEE 802.3 Backplane Ethernet Study Group

Abstract : This presentation examines the definition of FR-4 material.

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- **Flame retardant type 4 woven glass reinforced epoxy resin system¹.**
- ¹Electronics Manufacture and Test Online.
WWW.emtonthenet.net/glossary/fr4laminat.html.

- FR-4 'generic' material, FR402/4000-2, and FR406/4000-6. Typical Dk of 4.3 and higher.
 - Reference Nationwide Circuits, Inc., Materials Specification.
www.nciproto.com/info/Base%20/mat.htm
 - Reference Electronics Manufacture and Test Online.
WWW.emtonthenet.net/glossary/fr4laminat.html.
- GETEK. Typical Dk of 3.6 to 4.2.
 - Reference Nationwide Circuits, Inc., Materials Specification.
www.nciproto.com/info/Base%20/mat.htm

- 4000-13 and 4000-13SI. Typical Dk of 3.5 to 3.7.
 - Reference Park Nelco. www.parknelco.com
- FR408. Typical Dk of 3.7
 - Reference Isola Laminate Systems. www.isola-usa.com/products/productdetail.shtml?16
- Isola620. Typical Dk of 3.7 but low Df. Similar to Nelco SI glass.
 - Reference Isola Laminate Systems. www.isola-usa.com

- BT/Epoxy (Isola G200 or N5000-30/32). Typical Dk of 4.1 to 4.4.
 - Reference Park Nelco. www.parknelco.com or www.isola-usa.com
- Polyimide (Isola P95 or N7000). Typical Dk of 3.8 to 3.9.
 - Reference Park Nelco. www.parknelco.com or www.isola-usa.com
- PTFE (Taconic TLT or N9000-13/N9000-13RF). Typical Dk of 3.0 to 3.5 but very low Df.
 - Reference Park Nelco. www.parknelco.com or www.isola-usa.com
- CE (N8000). Typical Dk 3.5 to 3.7.
 - Reference Park Nelco. www.parknelco.com
- GIL (MC3D)

- BEND/flex (Rogers BEND/flex 2400)
 - Reference www.rogerscorporation.com
- Kapton (Dupont Pyralux LF)
- Rogers non-PTFE 4003/4350. Typical Dk of 3.38 to 3.48 but very low Df
 - Reference www.rogerscorporation.com/mwu/pdf/ro4000ds_4.pdf