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Handling Guidelines for Flexible Circuits

Bend radius:

It is important to remain within the acceptable bend radius of the flexible circuit. To calculate the bend radius of a flex board multiply the total thickness by 10. Example a .012 thick flexible circuit will have a .120 bend radius.

If the bend radius rule is not followed the flexible circuit can fail due to copper trace cracking or separation from dielectric material. This is usually found in dynamic applications when the flexible circuit is in constant movement.

Creasing:

Although some flexible circuits are designed with creases for certain applications, it is only acceptable in static (non movement) applications. The creasing should be done at the fabrication house because of the problems that can result from incorrect processes. The results could be cracking and separation of circuit traces, hole wall cracking, tearing of dielectric material.

Also, if creasing is an objective for a particular design the fabrication house should be contacted during the design stage to help with manufacturability and reliability issues.

ZIF connectors:

ZIF stands for Zero Insertion Force, but that is not always adhered to. Some connector manufacturers recommend nickel and gold finish on the finger connectors of the flexible circuits. This is because of the flat surface finish and limited problems with tarnish. The most common problem that arises with flexible circuits that are inserted into ZIF connectors is that too much force is used and that cracking can occur on the finger connectors. Other ways that cracking can occur is if the flexible circuit is bent too far and too much pressure is exerted on the connector fingers, this could be a problem that arises over time that would not be noticed until board failure occurs.

Storage:

Although storage is not a typically a handling issue, we though we would mention it. Polyamide absorbs moisture and all precautions should me made to reduce the moisture absorption of the flexible circuit board. Entrapped moisture can outgas during the reflow process and causing a multitude of problems. It is recommended that all boards be baked in an oven for ample time to remove moisture from the material. (recommended bake cycle is 1hr @ 250F).