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A.3 ASSUMPTIONS

A.3.1 Environmental effects. The underlying assumption is that the environments are the primary precipitators of the manufacturing defects independent of the inherent life characteristic of the device to be screened. That is, for a constant number of defects incorporated in the device due to improper manufacturing and processing techniques, these defects will appear in the first "T" hours of the pre defect-free (T_{PDF}) screening at a rate which will be constant, independent of the MTBF of the device.

A.3.2 Defect-free verification. The time on screening after an environmental fixed duration exposure, is the defect free portion of the screening (T_{DF}). This test is designed to verify the assumption of A.3.1, and any defects thereafter become inconsequential since they become part of the random life process.

A.4 ANALYSIS

A.4.1 Setting duration for pre defect-free (PDF) screening. A minimum number of hours or cycles are defined by the environmental profile for the screening, and should be a given value independent of the complexity or inherent life of the device.

A.4.2 Cycles vs. dwell time. Although the number of PDF hours are constant, the dwell time in each cycle is a function of the stress loading on the device. Therefore the cycles on one device may represent t_1 hours of dwell time, while it would represent t_2 hours on another device. In all cases during PDF and defect-free screening, the time dimension will always be in hours of cycling.

A.4.3 Time on screening derivation. Assuming that environmental factors are adequate and the production units are of known design integrity, the ESS duration can be described by the classical failure rate ("bathtub") curve shown in figure A-1, where:

- λ_0 (Initial value) is the failure rate due to early manufacturing defects
- λ_M (Minimum acceptable) is the failure rate to be achieved, as a minimum, to verify that early defect failures have been eliminated.
- λ_S (Specified value) is the failure rate operationally achievable.