

## Reliability Prediction

### What is a Reliability Prediction?

A reliability prediction is simply the analysis of parts and components in an effort to predict and calculate the rate at which an item will fail. A reliability prediction is one of the most common forms of reliability analyses for calculating failure rate and MTBF.

A reliability prediction is usually based on an established model. One common model for electronic components is MIL-HDBK-217. This model provides procedures for calculating failure rates for components.

Calculate MTBFs and failure rates by gathering information regarding components and calculating based on standard equations. The equations take into account various stress parameters of the components, and may include data such as device temperature, operating voltage, rated voltage, and power stress ratios.

### MTBF - Mean Time Between Failures

There are many forms of the MTBF definition. In general, MTBF (Mean Time Between Failures) is the mean value of the lengths of time between consecutive failures, under stated conditions, for a stated period in the life of a functional unit. A more simplified MTBF definition for Reliability Predictions can be stated as the average time (usually expressed in hours) that a component works without failure.

### FRT - Failure Rate

The failure rate is the number of failures per million hours of operation. (MIL-HDBK-217 calculations are based on failures per million hours).

### Why do I need to perform a reliability prediction?

MTBF (Mean Time Between Failures) for an existing product can be found by studying field failure data. For a new product however, or if significant changes are made to the design, it may be required to estimate or calculate MTBF before any field data is available. In some cases failure rates for previous products can be used if changes to a design are unlikely to affect reliability.

**Head Office**  
Beijer Electronics Products AB  
Box 426  
SE-201 24 Malmö, Sweden  
Tel: +46 40 35 86 00  
Fax: +46 40 93 23 01

**Subsidiary**  
Beijer Electronics GmbH  
Zettachring 2A  
705 67 Stuttgart, Germany  
Tel: +49 711 327 599-0  
Fax: +46 711 327 599-10

**Subsidiary**  
Beijer Electronics Inc.  
939 N. Plum Grove Road, Suite F  
Schaumburg, IL 601 73, USA  
Tel: +1 847 619 6068  
Fax: +1 847 619 6674

**Subsidiary**  
Hitech Electronics Corp.  
4F, No. 501-15 Chung-Cheng Road  
Shin-Tien, Taipei Shien, Taiwan, R.O.C.  
Tel: +886-2-2218-3600  
Fax: +886-2-2218-9547