



RELIABILITY CALCULATION SERVICES

RELIABILITY CALCULATION SERVICES PROVIDED BY SGS

Reliability plays an important role in many respects in the development and marketing of electronic and electromechanical products. Some examples of the impact reliability can have on key business goals are listed below

- **Safety-critical devices** must be designed to comply with product-specific safety regulations and their reliability must be approved according to regulation.
- Many **customers require** their suppliers to provide dependable information on the expected reliability of the product.
- Your **company's reputation** is directly associated with the reliability of your products.
- Reliability calculations, carried out by an independent provider at an early stage of design, are comparatively inexpensive and demonstrate your commitment to **customer satisfaction**.

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- Published metrics regarding the projected or measured reliability of a product can be used to your advantage in order to **differentiate your products** from those of your competitors.
- Reliable products reduce your **warranty costs**.
- Information on the reliability of a specific product helps to ascertain the product's total **cost of ownership**.
- Reliability projections provide the necessary input to calculate the **system's availability**.

Therefore, creating reliable products is an essential part of ensuring customer satisfaction, maintaining an excellent reputation as a company, and securing repeat business for years to come.

MTBF CALCULATION

If you are designing or marketing an electronic device or module

- which must fully **satisfy your customers' needs** well into the future
- which is **safety-critical** and thus must fulfil product-specific safety standards
- which must assure **low warranty costs**

then you should consider a failure rate analysis or Mean Time Between Failure (MTBF) calculation, preferably at an early stage of your development process.

The predicted MTBF value is the inverse of the Failure Rate (FR) and is typically expressed in hours or years. This means that if the failure rate is 4 failures per one million hours, the MTBF is equal to 1,000,000/4, or 250,000 hours.

SGS and its experts in reliability analysis provide the full range of reliability analysis services that the market requires. All calculations encompass the many years of extensive experience (since 1980) of our mathematicians and engineers. This experience has also been incorporated into our own MTBF calculation software application called EXAR®. The SGS reliability experts are further involved in reliability-related standardisation work (e.g. EN/IEC 61709 and SN 29500).

OUR SERVICES

- Failure rate and **MTBF calculations** for electronic and electromechanical devices and modules are based on EN/IEC 61709, SN 29500, MIL-HDBK-217F and Telcordia SR-332
- Parts count and part stress MTBF calculations are available
- Spare parts calculation
- Meaningful and detailed reports of calculation results
- Consultation and support in the area of reliability studies

SYSTEM AVAILABILITY CALCULATION

If you are designing, planning, or marketing a system or network comprising several independent sub-systems, modules or devices

- which must **satisfy your customers' needs** fully and well into the future
- which is **safety-critical** and thus must fulfil product-specific safety standards
- which has to meet certain **availability requirements** a certain maximum **level of downtime**
- which must ensure **low maintenance costs**

then you have to think about an availability calculation for your total system – preferably at an early stage of your planning process.

Availability as well as a probability value, indicate the likelihood that a system will be operating at a particular point in time. It thus answers the question: 'How likely is it that my system will be operating in X hours/days?'

SGS and its experts in system availability calculation, provide a wide range of calculation methods and services.

OUR SERVICES

- Calculation of expected **system availability** with approved and established methods
 - RBD (reliability block diagrams)
 - FTA (Failure Tree Analysis)
 - Markov Method
 - PFH/PFD calculation (IEC 61508-2, IEC 62061)
 - FMEA (Failure Mode and Effect Analysis)
- RAM analysis and reports for systems
- Meaningful and detailed reports of calculation results
- Consultation and support in the area of system availability studies

TESTING WITH TEAM SPIRIT

Interested? Still have questions?

Give us a call, or send us an email or a fax.

In addition to our extensive experience in reliability calculations, we offer

- Environmental simulations
- Materials analysis
- Component qualifications
- Product safety testing
- EMC tests

When it comes to quality engineering, testing & certification, we work hand-in-hand with you.

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WHEN YOU NEED TO BE SURE

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