



# SIL INERIS Safety Integrity Level Designers and manufacturers of Electrical / Electronic / Programmable Electronic (E/E/PE) systems

**SIL INERIS is a voluntary certification scheme developed by INERIS for designers and manufacturers of electrical, electronic, or programmable electronic safety systems which are intended to perform safety functions.**

## A quality warranty for manufacturers, of reliability and safety for users

The IEC 61508 and IEC 61511 standards cover the system safety life-cycle, from hazard evaluation to safety function performance. Requirements deal with organisational, documentary, hardware and software aspects. Systems concerned by the application of this standard are in general Safety Instrumented Systems (SIS) composed with sensors and programmable controlled actuators (embedded software and programmable logic control software). **SIL INERIS** voluntary certification scheme is based on the standard's requirements.

### Qualitative requirements of a safety system

They define a non-dangerous failure rate and system failure tolerance for each SIL level considered.

Two types of components are taken into account:

- **Type A components for which:**
  - failure modes are all defined,
  - diagnostic coverage is 100 %,
  - a knowledge database exists (for technology made of electro mechanical and discrete electronic components).
- **Type B components for which:**
  - failure modes are not all defined,
  - diagnostic coverage isn't 100 %,
  - uncertainty about failure mode in particular for programmable systems.

### Quantitative requirements

Quantitative requirements define probability of dangerous failure (PFD) depending on SIL level.

Two functioning modes are specified: on demand mode and continuous mode.

### Objectives of certification

The objectives of voluntary **SIL INERIS** certification scheme are to reduce risks by:

- **Decreasing systematic failures** (functional characteristics of system and company organisation) using deterministic methods.
- **Decreasing random failure** (architecture, reliability) using probabilistic methods.

**SIL INERIS scheme offers to manufacturers a quality design approach for the target SIL level of their systems.**



This scheme defines the requirements to IEC 61508 and IEC 61511 standards for companies and safety systems certification



controlling risks |  
 for sustainable development

## How to obtain certification ?

### 1 Application for certification

**INERIS** validates the application to ensure acceptability. A preliminary stage could be necessary in order to define which level is conceivable for the considered equipment.

### 2 Company evaluation

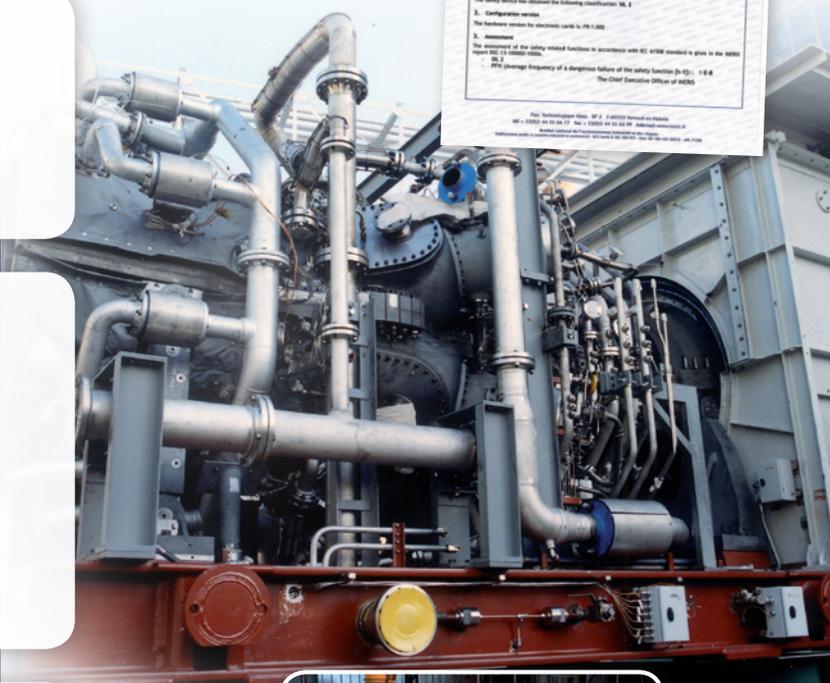
**INERIS** ensures that the company organisation complies with the IEC 61508 or IEC 61511 standard requirements. To do this, **INERIS** evaluates the company organisation and their procedures. If this evaluation is positive, **INERIS** delivers a development method **conformity certificate** to IEC 61508 or IEC 61511 standard requirements for **all E/E/PE systems** designed by the company.

### 3 Product evaluation

**INERIS** evaluates product characteristics by examining the architecture, reliability and safety functions to ensure that the product meets the targeted SIL level. This assessment complies with qualitative and quantitative standard requirements (probability, failure rate).

### 4 Certification

At the end of this assessment, **INERIS** delivers certificate conformity to the IEC 61508 or IEC 61511 standard for the considered systems.



**Contact :**  
[contact.dsc@ineris.fr](mailto:contact.dsc@ineris.fr)