



TÜV Functional Safety Program Training – “SAFETY INSTRUMENTED SYSTEM” – TÜV FS Engineer

Ref : SIL FS

ORG. DE FORMATION N°1 92 15806 92

DURATION : 4 days (28 hours)

- The course will provide **three days** of classroom tuition and practical guidance for understanding and mastering the application, principles and requirements of IEC 61508 / IEC 61511. Practical exercises will be performed throughout the course which will be based on **real life examples**.
- The **last** day consists of a four hour two-part examination with:
 - * 70 multiple choice questions (1 mark each question),
 - * 10 multiple part questions (3 available marks per question).

PARTICIPANTS : Maximum of 12 people**PLACE** : On site / TÜV Rheinland office
62 bis avenue Henri Ginoux 92120 Montrouge**OBJECTIVES :**

- *To know & interpret the application of the IEC 61508 and the IEC 61511 standards.*

PROGRAMME :**DAY 1:**

- IEC 61508 and IEC 61511 background,
- Hazards,
- Risk and ALARP principles,
- Risk Reduction,
- Safety Instrumented System (SIS) and Safety Instrumented Functions (SIF),
- Types of SIF,
- Integrity specification of a SIF,
- Fault Tree Analysis (FTA),
- SIL determination by FTA,
- SIL determination by Qualitative Methods,
- SIL determination exercises,
- Layers of Protection Analysis (LOPA) and LOPA exercises,
- Case of Studies with typical findings and issues.
- Analyse des Couches de Protection (Layers of Protection Analysis - LOPA) et exercices sur LOPA,
- Etudes de cas avec solutions typiques.

DAY 2:

- Integrity Specification of a SIF,
- SIS Safety Requirement Specification,
- Selection of Components and Subsystems,
- Proven in use, Not proven in use,
- Field devices,
- Failures, Failure and Reliability,
- Demand Modes, Probability of Failure on Demand (PFD), PFD Exercises,
- SIF Implementation (Low demand mode),
- Importance of Testing and Maintenance,
- Fractional Dead Times,
- Safe Failure Fraction and Hardware Fault Tolerance, SFF Exercises,
- Partial Closure Testing,
- Measurement Validation and Comparison,
- Reliability Data.

DAY 3:

- Software requirements,
- Relationships between Hardware and Software Architecture,
- Application Software Requirements Specification,
- Application Software Validation Planning,
- Requirements for Application Software Architecture,
- Requirements for Support Tools, User Manuals and Application Language,
- Requirements for Application Software Development,
- Requirements for Application Module Testing,
- Integration of Application Software with SIS Subsystems,
- FPL and LVL Software Modification Procedures,
- Application Software Verification,
- SIF Interaction with Others Technologies,
- Multiple Functions, Primary Functions, Exercises,
- Intermediate Trips,
- Risk Graph Calibration,
- SIL determination for Fire and Gas,
- Further Lifecycle Considerations,
- Methods for Solving Complex Functions,
- Summary of 3-Day Training.

DAY 4:

- A 4 hour proficiency examination consisting of 70 multiple choice, and 10 multiple part questions. Overall pass criteria is 75%.

TARGETED AUDIENCE:

Instruments Engineers, Process Engineers and Safety Engineers as well as Operating and Maintenance personnel who are involved in any of the lifecycle phases for safety instrumented systems from hazard and risk assessment, shutdown system/fire and gas systems from design to testing and maintenance.

PARTICIPANTS ELIGIBILITY REQUIREMENT:

In accordance with the TÜV Functional Safety Program. A minimum of 3 to 5 years experience in the field of functional safety. University degree or equivalent engineering experience and responsibilities as certified by employer or engineering institution (*see document "Eligibility Requirements"*).

The training is held in English language.

COURSE PROVIDER & TRAINER :

Mr. Clive Timms, TÜV FS Expert ID-No.: 124/07. Director of C&C Technical Support Ltd, United Kingdom and accepted course provider of the TÜV FS Program of TÜV Rheinland.

LEARNING AID:

- PowerPoint presentation
- Feedback from the lead tutor,
- Practical exercises.

DOCUMENT DELIVERED: Participants who fulfil the necessary requirements and pass the exam successfully will receive a TÜV FS Engineer certificate with Identity Number (ID number), delivered by TÜV Rheinland. The certificate is valid for 5 years.

Course approval criteria? Pass score is 75%

FEES & DATE : April 4th to April 7th, 2011 in Montrouge.

2250 € VAT with exam or **1980 € VAT without exam** / participant (including course material, registration fees and FS TÜV Rheinland certificate, lunches for 4 days).

Pour plus d'information concernant le TÜV FS Program, veuillez consulter notre site : www.tuvasi.com