

## **ABLE Instruments & Controls Limited**

### **Safety Instrumented Systems - Design, Analysis and Justification Course EC50: Three day; Instructor-Led**

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### **Advanced Safety Integrity Level (SIL) Selection Course EC52: Two day; Instructor-Led**

***Courses offered in association with:***



***ABLE Training Services***

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## Safety Instrumented Systems - Design, Analysis and Justification (EC50)



Length: 3 days

Course Hours: 8:00 a.m. - 4:00 p.m

Course Date: 10<sup>th</sup> – 12<sup>th</sup> August 2009

Venue: ABLE Training Centre, Dyce, Aberdeen

### Description:

This course focuses on the engineering requirements for the specification, design, analysis, and justification of safety instrumented systems for the process industries. Delegates will learn how to determine safety integrity levels and evaluate whether proposed or existing systems meet the performance requirements.

This course is required for the ISA84 Safety Instrumented Systems Certificate Programs. You can register for the course only or for the certificate program, which includes both the course and exam. Further information is available here [www.isa.org/isa84certificate](http://www.isa.org/isa84certificate)

Those who successfully complete this course and pass the exam receive the designation of ISA84 SIS Fundamentals Specialist (ISA84 SFS).

### You will be able to:

- Differentiate between process control and safety control
- Understand and implement the ISA84 standard
- Evaluate process risk levels
- Determine Safety Integrity Levels (SILs) using a variety of techniques
- Analyze the performance of different logic system technologies
- Analyze the performance of various sensor, logic, and final element configurations, as well as the impact of diagnostics, test intervals, common cause, system size, and more
- Determine optimum system test intervals
- Specify and select safety instrumented systems
- Satisfy the documentation requirements for process safety management, regulations, and industry standards

### You will cover:

- Introduction: Danger of Overconfidence and Complacency | Lessons Learned from Past Accidents
- Guidelines and Standards: ANSI/ISA | AIChE | IEC | API | NFPA | HSE | IEEE | OSHA
- General SIS Design Considerations: Design Life Cycle | Separation of Control and Safety | Independent Safety Layers
- Hazard and Risk Assessment: Hazard Identification | Risk Assessment | Determining Safety Integrity Levels | Layer of Protection Analysis
- Failure Rates and Modes: Safe vs. Dangerous | Failure Mode vs. Technology | Failure Rates | Test Intervals
- System Technologies: Pneumatic | Relays | Microprocessors | Field Devices | Certification | Prior Use
- Operations and Maintenance: Installation | Bypassing | Testing | Management of Change
- Class Example: Putting it all together

### Classroom/Laboratory Exercises:

- Calculate device failure rates and determine safe vs. dangerous performance
- Model system performance for relay and software based logic systems
- Model the impact of field devices, automatic diagnostics, manual test intervals, common cause etc
- Determine the SIL (safety integrity level) of a sample process and design a SIS to meet the performance requirements

**A hand-held/scientific calculator should be brought to class.**

Course Includes:

ISA Text: Safety Instrumented Systems-Design, Analysis and Justification 2nd Edition

ISA Standards: ANSI/ISA84.00.01-2004, Parts 1-3 and ANSI/ISA91.01-1995



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## Advanced Safety Integrity Level (SIL) Selection (EC52)

Length: 2 days

Course Hours: 8:00 a.m. - 4:00 p.m

Course Date: 13<sup>th</sup> – 14<sup>th</sup> August 2009

Venue: ABLE Training Centre, Dyce, Aberdeen

This course is required for the ISA84 SIL Selection Specialist Certificate Program

### Description:

This course is a follow on to EC50 (Safety Instrumented Systems—Design, Analysis, and Justification). It focuses on further hands-on examples of Safety Integrity Level (SIL) Selection using a variety of different techniques. Delegates will be able to save their companies time and money through the optimization of system performance requirements. This course is required for the ISA84 Safety Instrumented Systems Certificate Program 2. You can register for the course only or for the certificate program, which includes course and exam. If you are registering for the certificate program, you should complete an application and document eligibility criteria to sit for the certificate exam prior to taking the course. ISA Course Safety Instrumented Systems—Design, Analysis, and Justification (EC50) or Understanding & Implementing ANSI/ISA84 (EC50E) is a prerequisite for this course. Further information is available here [www.isa.org/isa84certificate](http://www.isa.org/isa84certificate)

Those who successfully complete this course and pass the exam receive the designation of ISA84 SIL Selection Specialist (ISA84 SSS)

### You will be able to:

Develop and implement different SIL selection techniques within your organisation, including the risk matrix, risk graph, and LOPA (Layer Of Protection Analysis), in order to determine the appropriate level of performance needed of your safety systems. This will prevent you from over or under designing the system requirements and will save your organisation time and money.

### You will cover:

Prevention of system requirements over or under design  
Determination of the appropriate level of performance needed for your safety systems  
Safety Integrity Level (SIL) selection hands-on examples: 3-Dimensional Risk Matrix | Risk Graph | LOPA (Layer of Protection Analysis) | Modified (implicit) LOPA

### Classroom/Laboratory Exercises:

The course consists of multiple application exercises of safety integrity level determination. Students should be prepared to bring real-world problem-solving examples for end of course discussion.

### Course Prerequisites:

ISA Course Safety Instrumented Systems—Design, Analysis, and Justification (EC50) or Understanding & Implementing ANSI/ISA84 (EC50E)

Meets eligibility criteria for ISA84 Certificate 2: Safety Integrity Level Selection Specialist if applying for this certificate program

