



## EN 50271 and IEC 61508 SIL 1 Certification for IR Gas Sensors

### *Success Story - June 2019*

### Client

Our client is a major manufacturer of infrared sensors used in the Original Equipment Manufacturing (OEM). They supply these sensors to over 400 customers in 40 countries including all of the worldwide leading gas detection OEMs. The sensors manufactured have the most advanced technology with patents in most of the regions of the world.

### Problem Statement and Challenges

The problem statement presented by our client was that the sensors were already in use in the market but without the EN 50271 and SIL 1 certifications. We were given the task of helping them achieve EN 50271 certification for the software first and then IEC 61508 SIL 1 safety certification for the entire sensor from Sira by preparing the necessary documentation.

The main challenge here was that there was no exhaustive list of documents specified by the certification agency assessor that would ensure certification. Also, documents were to be prepared based on the minimal set of documents that was available. Moreover, it was one of the requirements from the certification agency to present detailed test reports to show that extensive testing was carried out on the sensors.

### Solution Strategy

We started off by going for EN 50271 certification for software first.

After thoroughly reading the standard text and utilizing our past experience, we penned down a minimal set of documentation required for assessment submission. At this stage we carefully extracted the software requirements from EN 50271 standard that were applicable to the sensors. Also at this point, we referred back to the parent standard IEC 61508 to make sure that we understood what was required in terms of software integrity. Furthermore, we filtered out the techniques and measures that were deemed 'highly recommended' for SIL 1 certification.

To direct the software development activities, we prepared plan documents that included the Software Quality Assurance Plan including all the processes and procedures to be followed as per requirements of the certification standard. Verification and Validation plans were prepared next following the applicable safety and certification requirements of EN 50271. Following these plans, the safety and certification requirements got implemented into the sensor software on top of the sensors' past requirements developed over time. Special caution was taken to ensure that sensor performance was not affected while incorporating the changes.

Once the standard requirements were implemented into sensor's software, we entered into the testing phase. We performed rigorous functional and performance testing as per functional and performance test cases we had written.

These test cases were carefully written to meet the criteria of safety standards. This activity resulted in the generation of software test reports that included step by step details of the test cases execution. We analyzed the details and prepared a comprehensive Software Validation Report showing complete validation of the sensor and safety requirements. At this point, our documentation package was ready to be evaluated for EN 50271 certification. We submitted the documentation compendium to Sira Test and Certification, and within a single iteration, our client got the EN 50271 compliance for software certificate.

Now the next step was to achieve IEC 61508 SIL 1 certification. We planned our strategy for the SIL 1 certification in the Functional Safety Management plan. At this stage, we took special care to incorporate the existing Quality Management System based on ISO 9001 implemented at our client's end. We merged the functional safety procedures within the client's quality processes and prepared another set of documents as per requirements of IEC 61508 Functional Safety Management system. This certification bundle was assessed by Sira again and they awarded our client the SIL 1 compliance certificate without any further iteration.

## Highlights

To summarize, these were the key highlights for this project:

- » Establishing and preparing the minimal set of documents required for getting EN 50271 software certification
- » Formulating the Software Quality Assurance Plan as per requirements of EN 50271 and IEC 61508
- » Finalizing the V&V plans meeting EN 50271 criteria
- » Executing test cases and documenting corresponding test reports verifying the functional behavior of the sensor
- » Compiling Validation Report for the safety requirements
- » Getting EN 50271 certification in single iteration
- » Drafting the Functional Safety Management Plan following IEC 61508
- » Merging Functional Safety procedures into Quality Management System
- » Achieving SIL 1 certification in single iteration

## Outcomes

Once this project closed, we were approached by another client who is a major player in Gas Detectors OEM. This company was stuck in a similar problem of lacking documentation for EN 50271 certification. We are currently working in similar fashion as described above to achieve EN 50271 accreditation for the gas detectors of this client.

## Contact Us

Explore ways to use our expertise in growing your business while establishing a valuable partnership with us.

Contact our consultants at:

Phone: +1.412.533.1700 (Ext: 585)

E-mail: [info@sqaconsultant.com](mailto:info@sqaconsultant.com)

Website: [www.sqaconsultant.com](http://www.sqaconsultant.com)