Issued by The CASS Scheme Ltd.   Company Registration  Number 03921817.    www.cass.uk.net

# Introduction

The purpose of the CASS Scheme is to provide confidence that safety systems, system components (elements), organisations and personnel conform to the relevant requirements of IEC 61508 and related standards. A key feature of CASS is that assessments of conformity are carried out by people who meet the competence requirements specified by the Scheme. This document sets out a series of competence requirements for those engaged in the assessment of products – system components and sub-systems (collectively referred to in the draft 2nd Edition of IEC 61508 as "elements") – with Parts 2 and 3 of IEC 61508.

The competence requirements set out in this document are based on the criteria given in the IEE/BCS Competency Guidelines sections titled "Independent Safety Assessment" and "Safety Validation" (Table 1) and "Safety-related system hardware and software realisation" (Table 2). The intention is for the organisation responsible for assessing conformity with the standard to be able to identify the set of competencies required for each project. It is not necessary for every competence element contained in these tables to be required for a particular project. Each case must be judged against its technical and organisational scope and context. The reasons for the selection of the particular elements chosen for each project should be recorded in the project file. The use of this document will assist in achieving consistent and transparent assessments within and between conformity assessment bodies, thus enhancing the confidence of the functional safety stakeholders in the results of the assessments.

The information contained in the completed tables is intended to be used by the organisation responsible for the assessment to identify a person or a team of people with the required set of competencies. The IEE/BCS Guidelines provide a further level of detail relating to the three competence levels indicated – competent under direct supervision, competent and expert. It is expected that the organisation will use the appropriate details when setting out the evidence of competence. This document is intended to be used as part of a competence management system, guidance on which is available from HSE and The 61508 Association.

## Table 1. Safety Assessment and Validation

| Independent Safety Assessment | Safety Validation | Evidence | Date Competent under direct supervision | Date Competent | Date Expert |
|---|---|---|---|---|---|
| Summary<br>Independent Safety Assessment is the formation of a judgement, separate from any system design, development or operations personnel, that the safety requirements for the system are appropriate and adequate for the planned application and that the system satisfies those safety requirements. | Summary<br>Safety Validation involves responsibilities for ensuring that a safety-related system meets its safety requirements, that there is sufficient validation evidence to support claims that a safety-related system has met its safety requirements and that the hazard analysis assumptions are true. | | | | |
| **Task-related Competencies** | | | | | |
| ISA1 Scope and context appreciation<br>Acquires an appreciation of the context of a system and establishes the scope and objectives of an assessment, such that all necessary requirements of a safety assessment are capable of being satisfied. | SV1 Defining a safety validation plan<br>Contributes to the definition and documentation of a Safety Validation Plan by identifying sources of safety validation evidence (e.g. testing, analysis, historical usage data) appropriate to the application and its required safety integrity level. | | | | |

| Independent Safety Assessment | Safety Validation | Evidence | Date Competent under direct supervision | Date Competent | Date Expert |
|---|---|---|---|---|---|
| ISA2 Assessment strategy selection<br>Selects an assessment strategy involving a range of techniques and measures which are capable of yielding sufficient evidence in a cost-effective manner to enable a robust judgement to be made regarding the safety of a system. | | | | | |
| ISA3 Planning<br>Originates and maintains a plan which encapsulates an agreed set of activities, including their interrelationship, scheduling and responsibilities which, if conformed with, results in the objectives for the plan being satisfied in a cost-effective manner. | SV2 Specifying tests<br>Produces practical test specifications and procedures which are consistent with the Safety Validation Plan and which have a high probability of detecting faults in the safety-related system. | | | | |
| ISA4 Safety auditing<br>Can perform an audit to arrive at a conclusion (based on evidence) regarding conformance to planned arrangements, using a non-confrontational but tenacious style for soliciting evidence. | SV3 Witnessing and executing tests<br>Ensures that Safety Validation test are executed accurately and reliably such that anomalies are identified and that results are reported in a form that aids subsequent analysis. | | | | |

| Independent Safety Assessment | Safety Validation | Evidence | Date Competent under direct supervision | Date Competent | Date Expert |
|---|---|---|---|---|---|
| ISA5 Reviewing safety documentation<br>Accurately and systematically reviews documents, supported by discussions to clarify ambiguities and understanding where necessary, to obtain evidence to support a judgement on whether a system has satisfied its functional safety requirements. | | | | | |
| ISA6 Assessing safety analysis<br>Identifies, where necessary, the requirements for further safety analyses and facilitates the completion of such analyses, to obtain evidence to support a judgement on whether a system has satisfied its functional safety objectives. | SV4 Analysing test results<br>Analyses and categorises test and other observations such that failures with an impact on safety are clearly highlighted and an objective decision can be taken as to whether a safety-related system is fit for service. | | | | |
| ISA7 Forming a judgement<br>Makes an unambiguous judgement, through reasoned and documented argument, on whether a system has satisfied its safety objectives, including the systematic aggregation of evidence obtained through a combination of audits, reviews and analyses. | SV5 Performing analysis<br>Ensures that adequate analysis is carried out, in accordance with the Safety Validation Plan, to complement the evidence obtained through functional testing. | | | | |

| Independent Safety Assessment | Safety Validation | Evidence | Date Competent under direct supervision | Date Competent | Date Expert |
|---|---|---|---|---|---|
| ISA8 Producing assessment reports<br>Produces technical reports, etc, incorporating a logical document structure with the content grammatically correct using a non-verbose style. | SV6 Documenting safety validation results<br>Summarises the results of the Safety Validation activities in a form suitable for inclusion in a safety argument to indicate how it has been demonstrated that the safety requirements have been achieved. | | | | |
| ISA9 Managing outcomes<br>Contributes as required to the management of the results of a safety assessment, such that any necessary actions are addressed and appropriately resolved. | | | | | |
| | | | | | |
| **Function-related Competencies** | | | | | |
| ISA10 Methodical approach<br>Applies a methodical approach to assignments, incorporating analytical and systematic techniques. | SV10 Attention to accuracy and detail<br>Recognises incomplete, inaccurate and misleading test specifications and reports and can devise tests which expose such deficiencies. | | | | |
| ISA11 Eliciting information<br>Proactively seeks all necessary information from relevant personnel at whatever level (e.g. stakeholders, peers, etc.) such that the tasks associated with the function can be properly scoped and undertaken. | SV9 Test analysis methods and techniques<br>Has knowledge of a range of suitable test and analysis methods, techniques and tools for incorporation into a safety validation activity and is aware of their practical implementation. | | | | |

| Independent Safety Assessment | Safety Validation | Evidence | Date Competent under direct supervision | Date Competent | Date Expert |
|---|---|---|---|---|---|
| ISA12 Effective communication Communicates effectively, both orally, in writing and electronically, at all levels in an organisation, with people of varying skill and groups of varying size, such that objectives for the communication are achieved. | | | | | |
| ISA13 Functional safety practices Quickly acquires a knowledge and understanding of functional safety practices, including application and technology appropriate to the organisation and the industry sector, necessary for the successful execution of the role. | SV7 Application domain knowledge Addresses the overall process, equipment, operating environment, human interactions, EMC and environmental aspects etc. associated with a safety-related system (including constraints, safe and unsafe modes of operation, etc) | | | | |
| ISA14 Principles of functional safety assurance Has a knowledge and understanding of the principles of functional safety assurance (including: hazards, risks, tolerability, ALARP, safety requirements, safety realisation, etc.) and can relate them to a typical lifecycle model. | SV8 Principles of functional safety assurance Contributes to the demonstration that a safety-related system meets its safety requirements through an understanding of the principles of functional safety assurance, especially the hazard analysis and risk assessment process, ALARP, Safety Integrity Levels (SILs) and safety requirements. | | | | |

**The CASS Scheme Ltd.**
**Competence Requirements for CASS Assessors**
**Product Certification to IEC 61508**

| Independent Safety Assessment | Safety Validation | Evidence | Date Competent under direct supervision | Date Competent | Date Expert |
|---|---|---|---|---|---|
| ISA15 Professional standing and personal integrity<br>Has the professional standing to provide credible judgements that are generally acknowledged as authoritative, coupled with sufficient strength of character not to compromise sincerely held beliefs when under pressure. | | | | | |

## Table 2 Safety-related hardware and software realisation

Note: People employed by certification bodies are not permitted to be involved in the design and manufacture of the products which they are assessing, although they need to have the relevant experience from past employment. Where reference is made in this table to competencies in the present tense, this should be taken to mean that the person has carried out the tasks in the past and maintains the capability to do so through appropriate professional development activities. The evidence column should record the past experience and the measures taken to maintain competence. Reference can be made to the organisation's competence management system for details of how this requirement is met.

| Safety-related System Hardware Realisation | Safety-related System Software Realisation | Evidence | Date Competent under direct supervision | Date Competent | Date Expert |
|---|---|---|---|---|---|
| Summary<br>Safety-related hardware realisation involves responsibilities for ensuring that the realisation of the hardware components of a safety-related system is carried out in accordance with best engineering practice and that sufficient evidence is collected to demonstrate that the related system will be safe. | Summary<br>Safety-related software realisation involves responsibility for ensuring that the realisation of the software components of a safety-related system is carried out in accordance with best practice and that sufficient evidence is collected to demonstrate that the resulting system will be safe. | | | | |

**Task-related Competencies**

| | | | | | |
|---|---|---|---|---|---|
| <u>SHR 2 Transposing from requirements into design</u><br>Transposes the requirements into an easily understood, testable, hardware design specification through the correct use of appropriate notations and adequate consideration of relevant constraints (e.g. process, physical dimensions, etc.) | <u>SSR 2 Transposing from requirements into design</u><br>Transposes requirements into an easily understood, testable, software design specification through the correct interpretation and use of appropriate notations and appropriate consideration of relevant constraints (e.g. process, hardware design, hardware reliability. | | | | |
| | <u>SSR 4 Coding</u><br>Translates the specified software functional and design requirements into easily understood, analysable source code through the correct use of an appropriate programming language. Pays due heed to the requirements of a relevant coding standard (with particular regard to the safety implications of different constructs and the environment in which the code is to operate. | | | | |

**The CASS Scheme Ltd.**
**Competence Requirements for CASS Assessors**
**Product Certification to IEC 61508**

| | | | | |
|---|---|---|---|---|
| SHR 4 Analysing the hardware design<br>Demonstrates, through the appropriate use of circuit analysis techniques, that constraint limitations will not adversely affect the safe operation of the system and that the hardware realisation is consistent with the requirements. | SSR 3 Analysing the design<br>Can demonstrate, through the use of appropriate software safety analysis techniques, that a design meets the given safety requirements (e.g. that sufficient storage space is available for any stack.) | | | |
| | SSR 5 Analysing the code<br>Demonstrates, through the appropriate use of static and dynamic software analysis techniques, that constraint limitations will not adversely affect the safe operation of the system and that the software realisation is consistent with the software requirements and the specified integrity level. | | | |

**The CASS Scheme Ltd.**
**Competence Requirements for CASS Assessors**
**Product Certification to IEC 61508**

| | | | | | |
|---|---|---|---|---|---|
| SHR 5 Specifying tests<br>Produces hardware test specifications that are consistent with the planned safety validation strategy and contain rigorous test cases that have a high probability of detecting faults in the realisation of a safety-related system through the practical and creative use of proven test methods and techniques. | SSR 6 Specifying software tests<br>Produces software test specifications, employing a complementary set of approaches to software testing, that are consistent with the planned safety validation strategy, that contain rigorous test cases, which take account of the environment, that have a high probability of detecting faults in the realisation of a safety-related system through the practical and creative use of proven test methods and techniques. | | | | |
| SHR 6 Executing tests<br>Executes test procedures precisely, accurately and reliably such that items of importance are not overlooked during the execution of tests. | SSR 7 Executing tests<br>Executes test procedures precisely, accurately and reliably such that items of importance are not overlooked during the execution of tests. | | | | |
| **Function-related Competencies** | | | | | |
| SHR 8 Application domain knowledge<br>Considers the process, equipment, operating environment, human interactions, etc. associated with a safety-related system (including constraints, safe and unsafe modes of operation, etc.) throughout the performance of safety-related system hardware realisation activities. | SSR 9 Application domain knowledge<br>Considers the process, equipment, operating environment, human interactions, etc. associated with a safety-related system (including constraints, safe and unsafe modes of operation, etc.) throughout the performance of safety-related system software realisation activities. | | | | |

No further competency criteria defined.