

Automotive SPICE® & ISO/CD 26262

Their Mutual Relationship

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Automotive SPIN Italia, www.automotive-spin.it

ISO/IEC 15504 Processes

Automotive SPICE® & ISO/IEC 15504-5

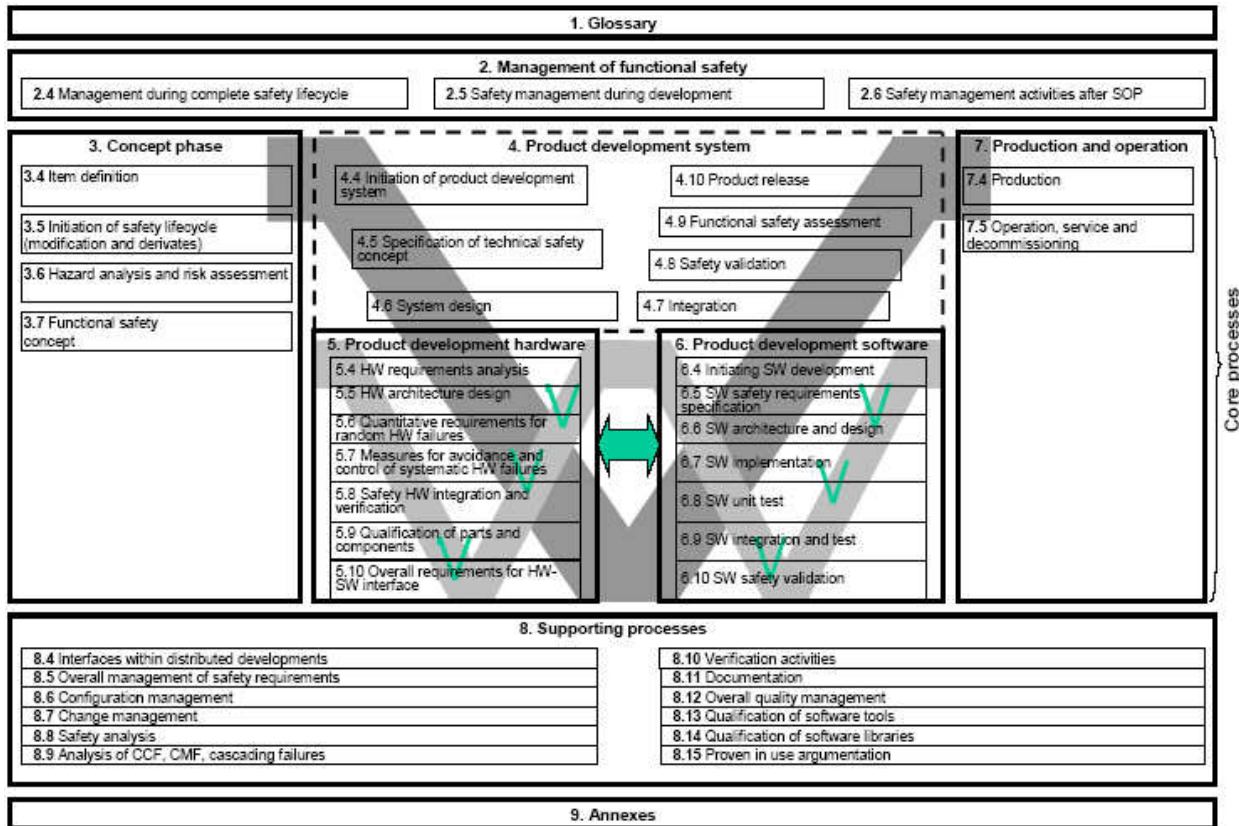
Engineering Process Group (ENG) A ENG.1 Requirements elicitation A ENG.2 System requirements analysis A ENG.3 System architectural design A ENG.4 Software requirements analysis A ENG.5 Software design A ENG.6 Software construction A ENG.7 Software integration A ENG.8 Software testing A ENG.9 System integration A ENG.10 System testing A ENG.11 Software installation A ENG.12 Software and system maintenance	Management Process Group (MAN) A MAN.1 Organizational alignment A MAN.2 Organization management A MAN.3 Project management A MAN.4 Quality management A MAN.5 Risk management A MAN.6 Measurement	Reuse Process Group (REU) A REU.1 Asset management A REU.2 Reuse program management A REU.3 Domain engineering
The Acquisition Process Group (ACQ) A ACQ.1 Acquisition preparation A ACQ.2 Supplier selection A ACQ.3 Contract agreement A ACQ.4 Supplier monitoring A ACQ.5 Customer acceptance A ACQ.11 Technical requirements A ACQ.12 Legal and administrative requirements A ACQ.13 Project requirements A ACQ.14 Request for proposals A ACQ.15 Supplier qualification	Supply Process Group (SPL) A SPL.1 Supplier tendering A SPL.2 Product release A SPL.3 Product acceptance support	Resource & Infrastructure Process Group (RIN) A RIN.1 Human resource management A RIN.2 Training A RIN.3 Knowledge management A RIN.4 Infrastructure
	Supporting Process Group (SUP) A SUP.1 Quality assurance A SUP.2 Verification A SUP.3 Validation A SUP.4 Joint review A SUP.5 Audit A SUP.6 Product evaluation A SUP.7 Documentation A SUP.8 Configuration management A SUP.9 Problem resolution management A SUP.10 Change request management	Operation Process Group (OPE) A OPE.1 Operational use A OPE.2 Customer support
		Process Improvement Process Group (PIM) A PIM.1 Process establishment A PIM.2 Process assessment A PIM.3 Process improvement

A modified in Automotive SPICE®

not included in ISO /IEC 15504-5

HIS-Scope

ISO WD 26262 Overview (BL4)

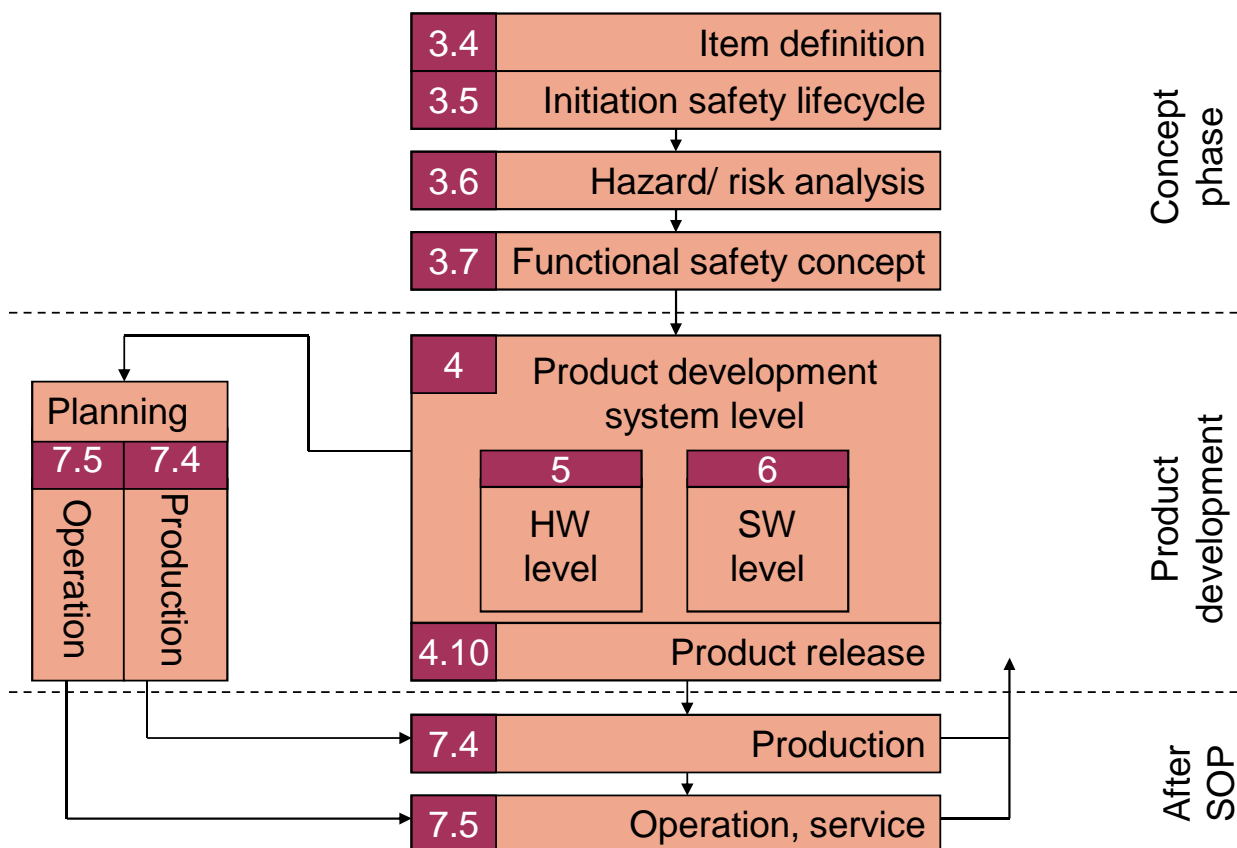


Source: ISO TC22 SC3 WG16 Functional Safety, Convenor Ch. Jung, Introduction in ISO WD 26262, 6.12.2006, Page 19, (EUROFORM-Seminar April 2007)

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Page 3 Automotive SPICE and ISO/CD 26262



ISO CD 26262 Safety Lifecycle

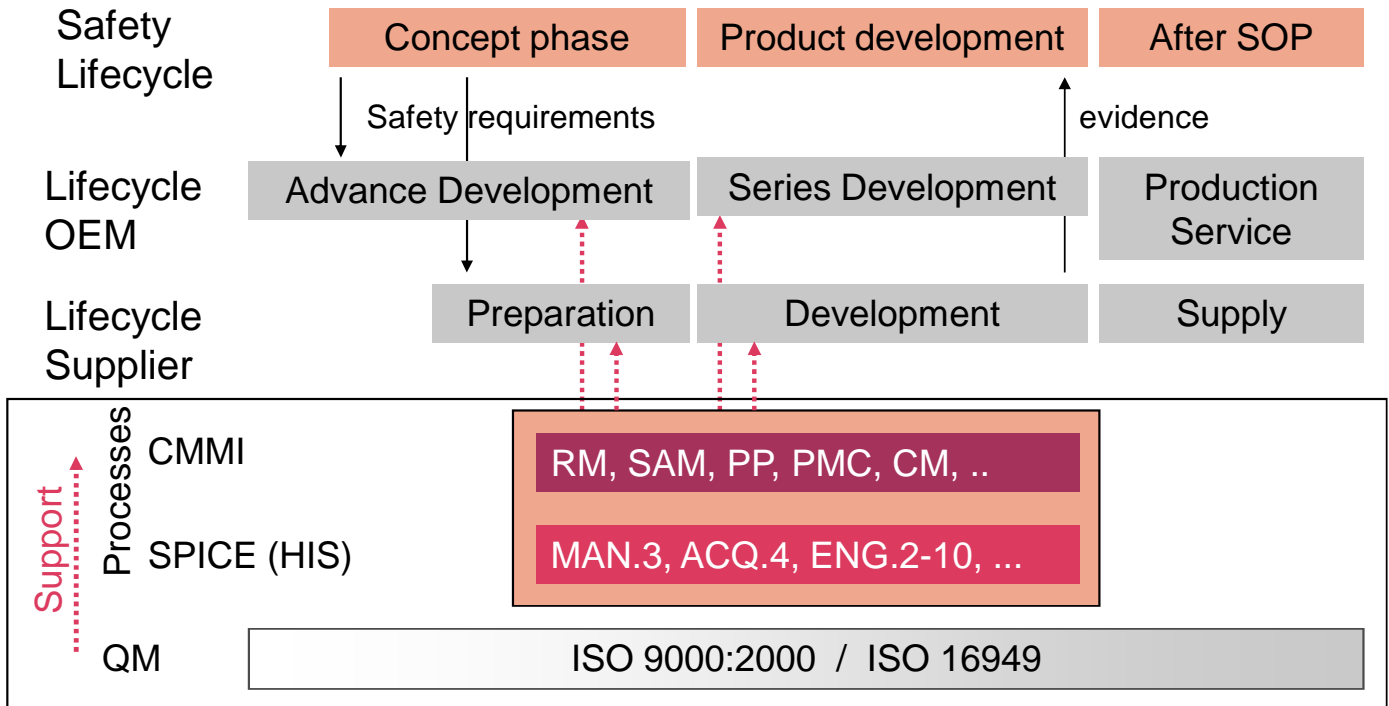


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Page 4 Automotive SPICE and ISO/CD 26262



Comparison Lifecycle - Processes - QM

CMMI / SPICE processes support the implementation



Maturity Models & Functional Safety Standards

How they differ

Maturity Models

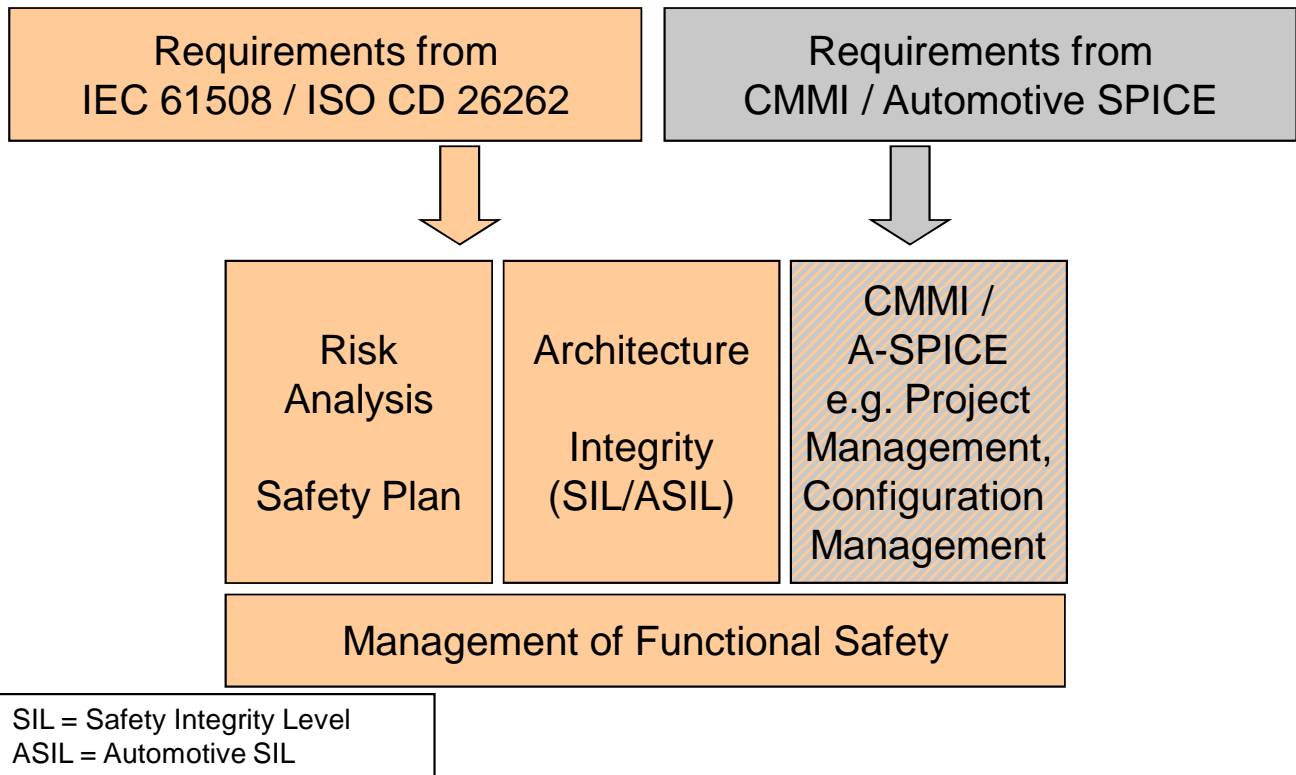
- Focus on software development, including systems
- Change management approach (capability levels)
- Approach to harmonize rating criteria, assessment method and to achieve comparability
- Result is a certificate for process maturity
- Objective is efficient and repeatable development of any product or service
- Motivation for compliance is benefit
- Target level depends on business goals
- Give notation, requirements, guidance, best practice
- Do not require certain methods ("what")

Functional Safety Standards

- Focus on development of safety-related systems, especially hardware characteristics
- Capability for development of safety-related systems
- Context dependent assessment method and criteria are dominating
- Result is an expertise for a product
- Objective is capability to develop certain products with calculable risk
- Motivation is product liability
- Target level depends on hazard analysis
- Give notation, requirements and some examples
- Require certain methods ("how") and characteristics (e.g. SFF)

Functional Safety and Maturity Models

They support each other






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Page 7 Automotive SPICE and ISO/CD 26262

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Notation

Within the following slides the processes of Automotive SPICE are marked as follows:




-  **Strong necessity** of this process for safety-related E/E/PE developments
-  **Medium necessity** of this process for safety-related E/E/PE developments
-  No or very **weak necessity** of this process for safety-related E/E/PE developments

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Page 8 Automotive SPICE and ISO/CD 26262

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Automotive SPICE Necessity for Functional Safety

Engineering Process Group (ENG) A ENG.1 Requirements elicitation A ENG.2 System requirements analysis A ENG.3 System architectural design A ENG.4 Software requirements analysis A ENG.5 Software design A ENG.6 Software construction A ENG.7 Software integration A ENG.8 Software testing A ENG.9 System integration A ENG.10 System testing ENG.11 Software installation ENG.12 Software and system maintenance	Management Process Group (MAN) MAN.1 Organizational alignment MAN.2 Organization management A MAN.3 Project management MAN.4 Quality management A MAN.5 Risk management A MAN.6 Measurement	Reuse Process Group (REU) REU.1 Asset management A REU.2 Reuse program management REU.3 Domain engineering
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-  Strong necessity
-  Medium necessity
-  Weak necessity

Necessary Automotive SPICE Capability Levels vary from 1 to 3




A more specific in Automotive SPICE

not included in ISO /IEC 15504-5

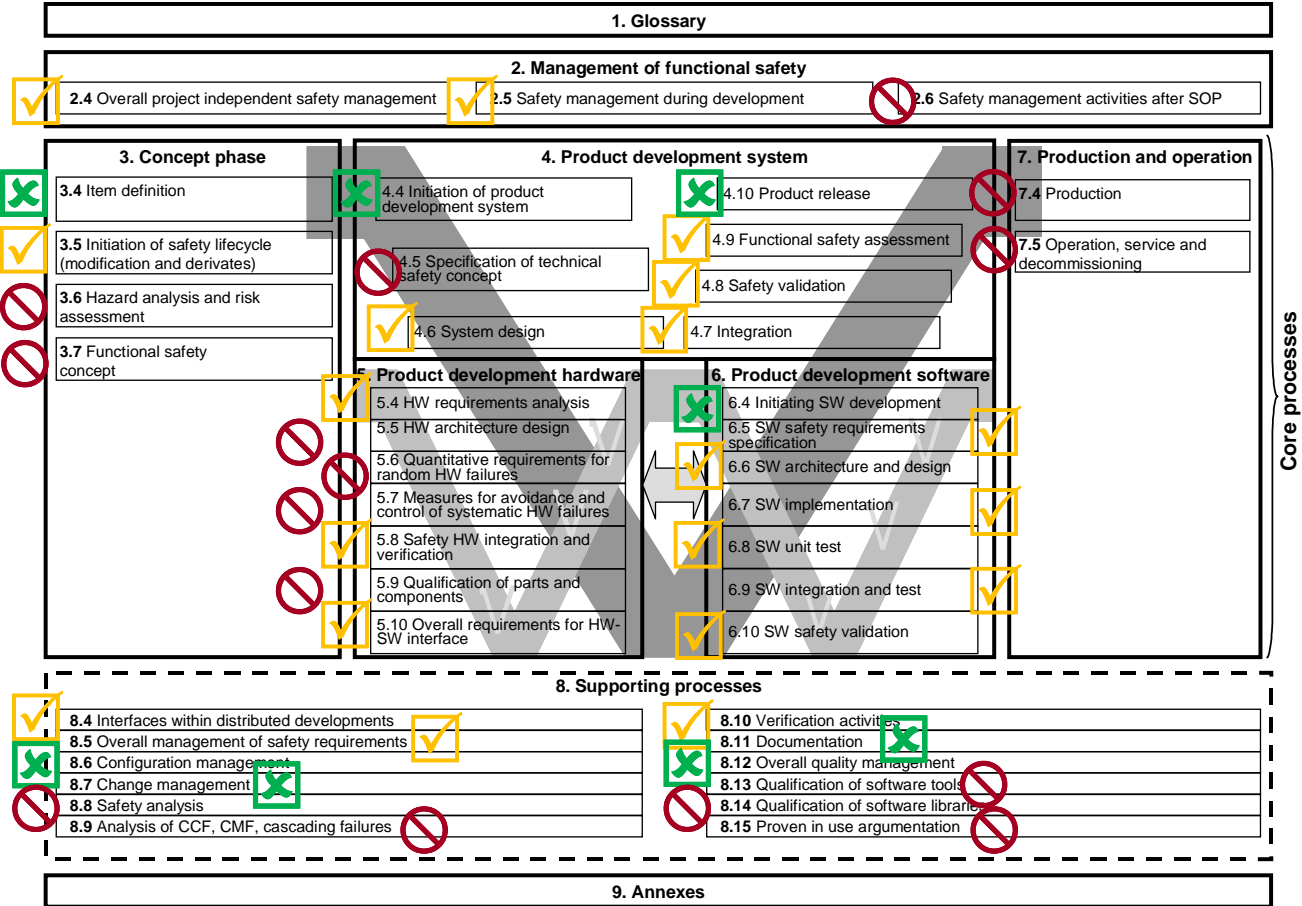
HIS-Scope

Notation

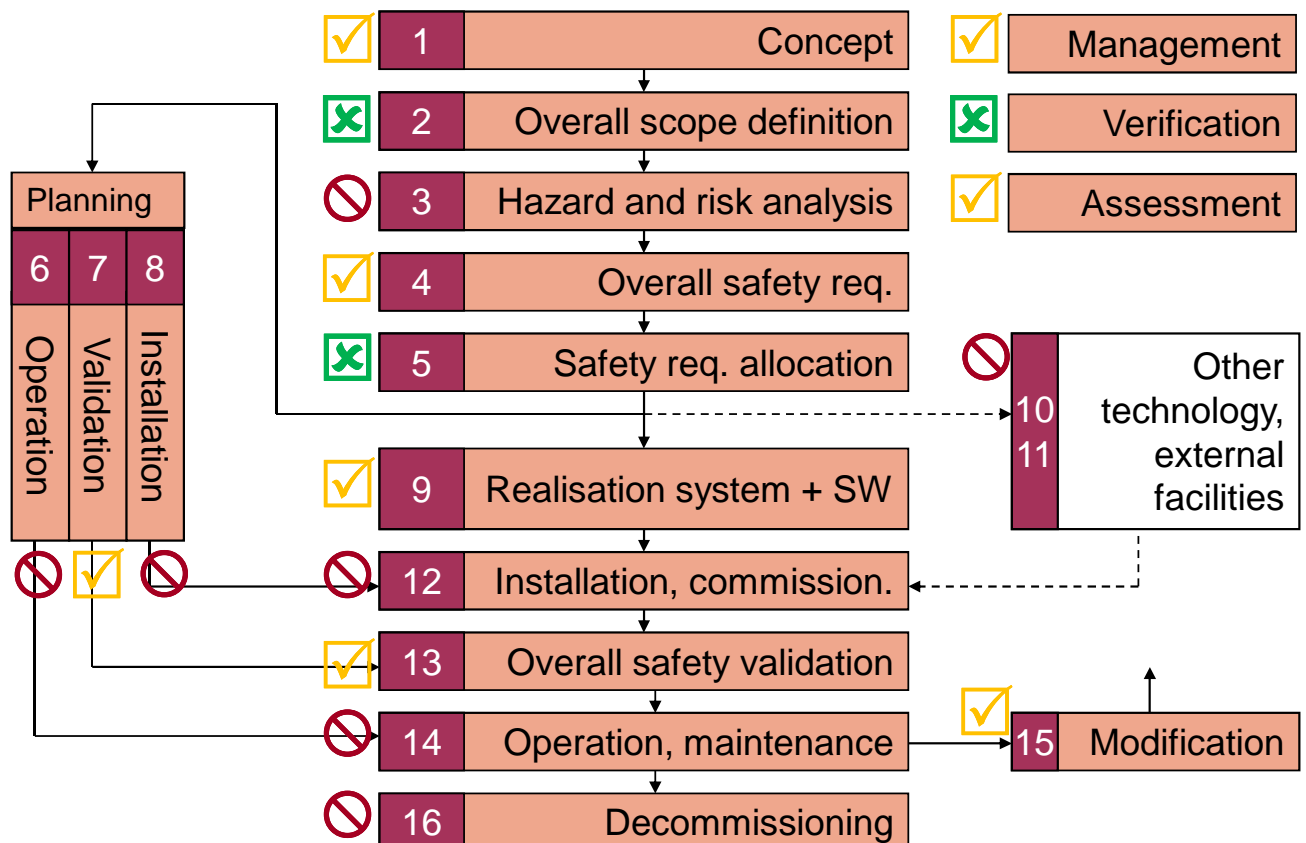
Within the following slides the phases and requirements of IEC 61508 resp. ISO WD 26262 are marked as follows:

-  **Strong support** of this requirement by using processes designed to fulfill Automotive SPICE Level 2/3 requirements
-  **Medium support** by Automotive SPICE Level 2/3 processes
-  **No or very weak support** by Automotive SPICE Level 2/3 processes

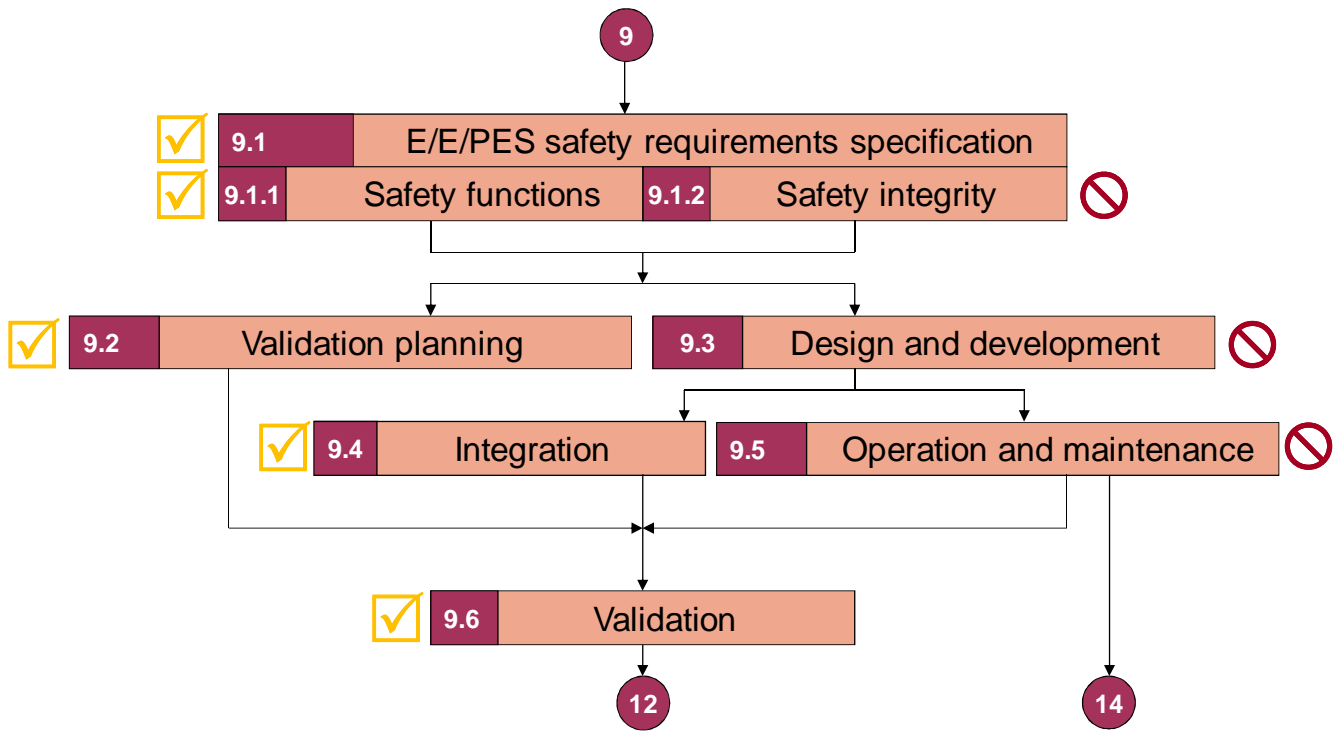
Automotive SPICE Support for ISO WD 26262 (BL 4)



Automotive SPICE Support for IEC 61508

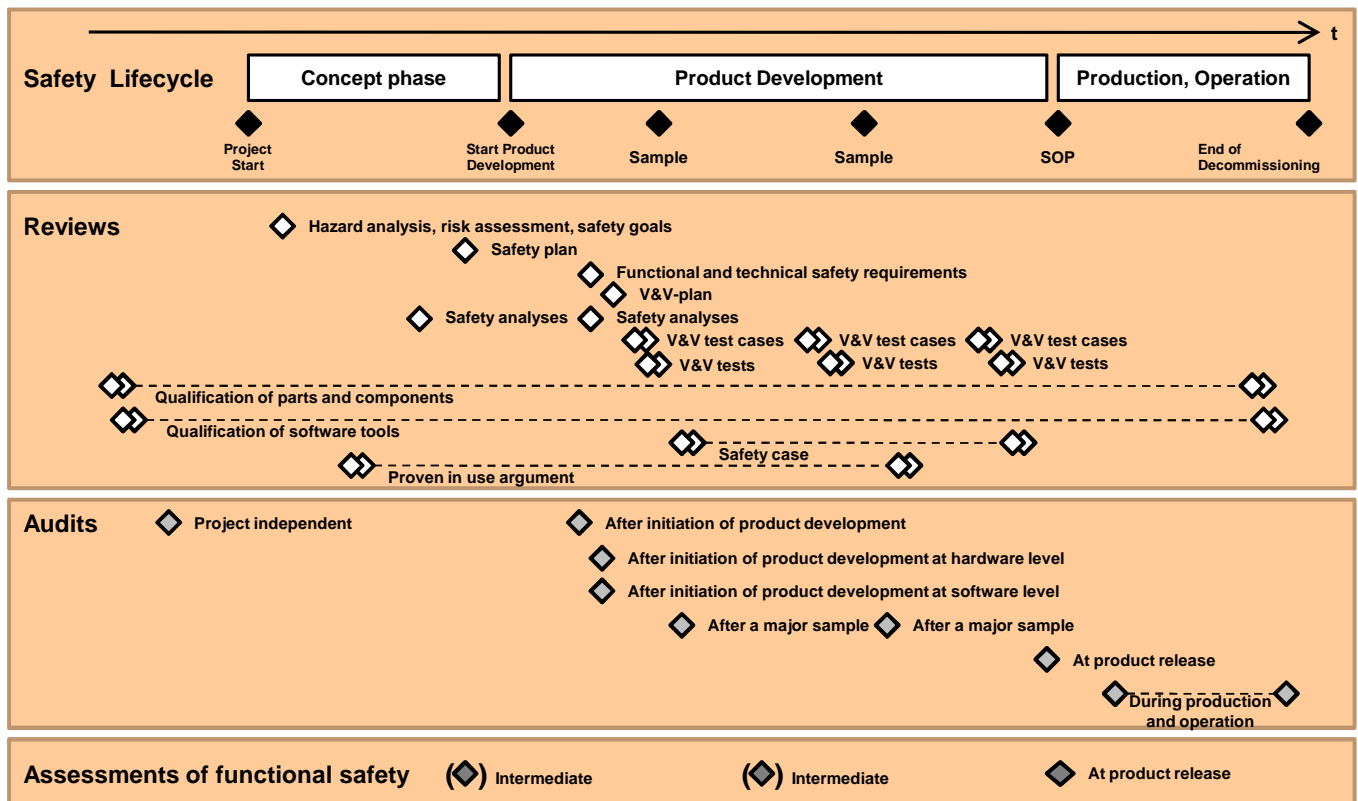


Automotive SPICE Support for IEC 61508 E/E/PES Realization Phase



Confirmation Measures

Reviews, Audits and Assessments in the Lifecycle



Backup






**Automotive SPICE support for
functional safety in more detail**

Example:

Management of Functional Safety






Management of Functional Safety

Requirements from IEC 61508 (1)

- Ensure a culture of safe working 
 - Definition of policies and strategies for achieving functional safety, communication of policies and strategies
- Identification of persons, departments, organisations responsible for 
 - Carrying out the measures
 - Reviewing the results of the measures
- Definition of the safety lifecycle phases to be applied 

 - System/ Hardware development
 - Software development
- Describe documentation rules considering 
 - Structure of the documentation
 - Level of detail
 - Archiving of data and documents






Management of Functional Safety

Requirements from IEC 61508 (2)

- Definition of the measures to be performed and the related methods to be applied during implementation 



 - Hazard and risk analysis
 - Functional safety assessment
 - Verification and validation activities
 - Organization specific interpretation of the requirements described in tables of the IEC 61508 part 2, part3 and part 6
- Ensure involved parties are competent to carry out activities 
 - Training of designers
 - Training of maintenance staff
 - Retraining at periodic intervals





Management of Functional Safety

Requirements from IEC 61508 (3)

- Definition of procedures for the analysis of hazardous incidents 
- Definition of procedures and rules to ensure functional safety during the maintenance phase 
- Specification of requirements for periodic functional safety audits 
- Definition of procedures for initiating modifications to the safety related system 
- Configuration Management rules 

Management of Functional Safety

Requirements from IEC 61508 (4)

- All measures are to be planned and monitored 
- Requirements necessary for the management of functional safety shall be formally reviewed and agreed 
- All those identified as responsible for management of functional safety activities shall be informed of the responsibilities assigned to them 
- Suppliers providing products or services to an organisation shall 
 - deliver as specified by the organization
 - have an appropriate quality management system

Management of Functional Safety

IEC 61508 requirements regarding competence of those involved

Experience and qualification of all persons involved should be assessed and documented. Factors to be considered are

- engineering knowledge appropriate to the application area
- safety engineering knowledge appropriate to the technology (e.g. electronic, software engineering)
- knowledge of the legal and safety regulatory framework

The required competence level depends on

- the consequences in the event of failure of the E/E/PE safety-related systems
- the safety integrity level (SIL)
- the novelty of the design, design procedures or application

Competencies should be developed from previous experience

- the greater the required competence levels, the closer the fit with the previous experience

KUGLER MAAG CIE is a service company with acknowledged expertise in process improvement

Facts

- Founded in 2004, today more than 75 acknowledged experts (average age 44)
- Specialized on process improvement
- Expertise in CMMI®, SPICE / ISO 15504, Functional Safety / IEC 61508, Project-, Quality-, Requirements-Mgmt., Change Management ...

Industries

- Automotive Industry,
- Financial Services, ICT,
- Health, Telco and Railways

Customers

- Global players, culturally diverse, operating in
 - Europe,
 - North America and
 - Asia

Partners & Networks



KUGLER MAAG CIE Service Areas

Improvement Services

- Managing change for the purpose of lasting quality and productivity improvement
- Evaluating performance improvement potential

Process Application

- “Off-the-shelf” processes tailored for an accelerated and sustained process performance improvement
- Operational process execution

Change Engine Services

- Organizational change control
- Agile process management
- Strategy implementation

Appraisal Services

- Improvement “Readiness Check”
- Improvement “Health Check”
- CMMI® appraisals
- ISO/IEC 15504 / Automotive SPICE™ assessments

Knowledge Services

- Training and qualification of practitioners, EPG, quality group, assessors and (executive) management
- Training in relevant standards and their usage, including qualifying for customers’ or 3rd party assessments
- Public training as well as customized in-house training

KUGLER MAAG CIE Expert Areas

CMMI ®

- CMMI for Development
- CMMI for Acquisition
- CMMI for Services (Initial Draft)
- SEI Partner 

SPICE

- Automotive SPICE™, ISO 15504
- Co-founder of iNTACS 

Functional Safety

- IEC 61508
- ISO CD 26262

Project Management

- PMI, PMBoK
- Prince 2, OPM 3

Performance Driven Improvement

Quality Management

- Quality Management, Assurance & Control
- TS 16949, ISO 9001, VDA 6.3, ...
- CMMI/PPQA, SPICE/SUP.1, ...

Requirements Engineering

- Management, analysis and elicitation of requirements

Mastering Change

- Ensure successful and sustainable organizational change

Performance-off-the-Shelf

- Accelerated and sustainable process performance improvement
- Project / Requirements / Quality Management Service Centre

We already work predominantly for international big companies in different industries, including



KUGLER MAAG CIE is a Key Player in the Automotive Industry, Acting in Different Roles

Customers

- OEMs like Daimler, Audi, BMW, Ford, GME, Porsche, Volkswagen and the majority of their suppliers of electronics and software

Standardization

- Supported the HIS in the definition and enhancement of assessment and process related standards
- Support of the VDA's working group for software quality process and product standardization
- Active deployment of functional safety standards (IEC 61508, based on ISO CD 26262) together with customers
- Enhanced and extended the Automotive SPICE™ and Test Process Improvement approach for Automotive purposes

SPINs and Working Groups

- Initiator of conferences, SPINs, working groups and research activities like Lero Ireland & METI study, Japan

Typical Functional Safety Consultancy by KUGLER MAAG CIE

- **On an organizational level**
 - Definition and implementation of the company's functional safety process
 - Optimization of company's development processes, taking into account all requirements from IEC 61508, ISO CD 26262, CMMI and (Automotive) SPICE
 - Support in establishing a culture for functional safety
 - Performing trainings for the management of functional safety
 - Functional safety of software determined systems
 - Functional safety from the manager's point of view
- **On a per project level**
 - Analysis of the suitability of the development process in order to support and enforce the achievement of the safety goals efficiently
 - Planning and implementation of appropriate measures
 - Coaching and operative support in implementing the project's safety lifecycle. E.g.
 - Functional and Technical Safety Concept
 - Safety analyses
 - Preparation of the functional safety assessment

Functional Safety - KUGLER MAAG CIE ...

- ...has specific experiences with safety related projects and systems within the automotive industry
- ...has implemented the functional safety processes for first tier automotive suppliers delivering safety related equipment up to SIL3 / ASIL D. This included definition, training, coaching and rollout support for development projects.
- ...employees act as Functional Safety Managers
- ...has performed gap analysis regarding the implementation of functional safety requirements according to IEC 61508 and ISO CD 26262.
- The safety related coaching and supporting activities cover hazard and risk analysis, hardware and software architecture design and analysis (e.g. by FMEDA) and safety management with focus on the software safety lifecycle. The projects supported apply the IEC 61508 and/or the ISO CD 26262.

Thank you for your participation!

Should you have any questions please do not hesitate to contact us ...

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