

# Deutsche Akkreditierungsstelle GmbH

## Anlage zur Akkreditierungsurkunde D-PL-17438-01-04 nach DIN EN ISO/IEC 17025:2018

**Gültig ab:** 28.02.2022

Ausstellungsdatum: 28.02.2022

Urkundeninhaber:

**DEKRA Testing and Certification GmbH  
Handwerkstraße 15, 70565 Stuttgart**

Standort:

**Handwerkstraße 15, 70565 Stuttgart**

Prüfungen in den Bereichen:

- **Funktionale Sicherheit gemäß der nachfolgend genannten Prüfverfahren für konforme Objekte, Komponenten, Geräte und Systeme**
  - **der Maschinen- und Anlagensicherheit**
  - **in Automotive-Anwendungen**
  - **in leittechnischen Systemen für Energieanlagen**
  - **in Haushaltsgeräten und Verbraucherprodukten**
  - **in Bahnanwendungen**

*Die Anforderungen an das Managementsystem in der DIN EN ISO/IEC 17025 sind in einer für Prüflaboratorien relevanten Sprache verfasst und stehen insgesamt in Übereinstimmung mit den Prinzipien der DIN EN ISO 9001.*

*Die Urkunde samt Urkundenanlage gibt den Stand zum Zeitpunkt des Ausstellungsdatums wieder. Der jeweils aktuelle Stand des Geltungsbereiches der Akkreditierung ist der Datenbank akkreditierter Stellen der Deutschen Akkreditierungsstelle GmbH (DAkKS) zu entnehmen. <https://www.dakks.de/content/datenbank-akkreditierter-stellen>*

**Anlage zur Akkreditierungsurkunde D-PL-17438-01-04**

**Funktionale Sicherheit**

Grundsätzlich orientieren sich die Prüfungen am Lebenszyklus der Prüfgegenstände und gliedern sich in folgende Phasen:

- Konzept
- Sicherheitsarchitektur
- Design
- Implementierung von Hardware und Software
- Integration von Hardware und Software
- Validierung
- Benutzerdokumentation

Im Einzelnen werden folgende Prüfverfahren für die Funktionale Sicherheit von konformen Objekten, Komponenten, Geräten und Systemen angewendet:

|   |   |
|---|---|
| Q-PB-25-FuSi Prüfung der funktionalen Sicherheit 16.11.2021 Rev 01  | Verfahrensanweisung - Prüfung der funktionalen Sicherheit |
| Q-PB-25 Prüfung der funktionalen Sicherheit-FMEDA_22.11.2021 Rev 00 | FMEDA   |

## Anlage zur Akkreditierungsurkunde D-PL-17438-01-04

Die vorgenannten Prüfverfahren finden Anwendung bei den nachfolgend genannten Komponenten, Geräten und Einrichtungen:

- Sensoren, Sensorsysteme, Transmitter für sicherheitsrelevante Funktionen
- Elektromechanische, pneumatische und hydraulische Aktuatoren, Ventile
- Relais mit zwangsgeführten Kontakten
- Sicherheitsbauteile nach der Maschinenrichtlinie (allgemein und Anhang IV)
- Drehzahl veränderbare elektrischen Antrieben und Antriebssystemen
- Sicherheitsrelevante Steuer- und Schutzeinrichtungen an Maschinen, z. B. Not-Aus/Halt, Muting, Zweihandschaltung
- Speicherprogrammierbare und -konfigurierbare Steuerungen
- Komponenten für sichere Kommunikation, Kommunikationsprotokolle
- Elektrische Einrichtungen zur Steuerung und Überwachung von Feuerungsanlagen
- Systeme der Gebäudeautomation, Brandmeldeanlagen, Entrauchungssysteme
- Gasmess- und -warngeräte
- Automatische elektrische Mess-, Steuer- und Regeleinrichtungen mit Wächter- und
- Elektrische Mess-, Steuer-, Regel- und Laborgeräte
- Traktoren, Maschinen und Fahrzeuge für die Land- und Forstwirtschaft
- Messwertgeber und Messumformer der Sicherheitsleittechnik
- Integrierte Schaltungen (ICs)
- Sicherheitsrelevante Software (Embedded, Application, Configuration)
- Softwarewerkzeuge
- Bahnanwendungen: Ortsfeste Anlagen und Fahrzeuge
- Straßenverkehrs-Signalanlagen
- Einrichtungen der Informationstechnik
- Industriesteuerungen
- Maschinen und Werkzeugmaschinen
- Flurförderfahrzeugen
- Automatisierte Fertigungssysteme
- Elektrische Ausrüstung von Feuerungsanlagen
- Bahnanwendungen - Telekommunikationstechnik, Signaltechnik und Datenverarbeitungssysteme
- Elektrische Baugruppen der Sicherheitstechnik
- Steuerungen von Windenergieanlagen
- Automotive inkl. Straßenfahrzeuge und andere Fahrzeuge
- Telematiksysteme, Onboard Diagnostik, Remote Diagnostik, Emergency Notification Devices, Crash Recognition Systeme, Head-Up Displays
- Control Units – Motor Control Units, Brake Control Units, Powertrain Control Units, Engine Control Units, Batterie- Management-Systeme, Seat Control Units, Light Control, Electronic Stability Control
- ADAS – Cruise Control Systems, Blind Spot Detection, Autonomous Emergency Braking, Tire pressure monitoring, Forward collision mitigation systems
- Software – sicherheitsrelevante Betriebssysteme, SW Libraries, SW Driver, SW-Tools, Compiler, Code Generatoren

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Die Prüfungen erfolgen basierend auf den im Folgenden genannten Normen:

|   |   |
|---|---|
| IEC 61508-1<br>2010                         | Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 1: General requirements  |
| IEC 61508-2<br>2010                         | Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems                 |
| IEC 61508-3<br>2010                         | Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 3: Software requirements   |
| IEC 62061<br>2005 +<br>A1:2012 +<br>A2:2015 | Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems  |
| IEC 61508-3-1<br>2010                       | Functional safety of electrical/electronic/programmable electronic safety-related systems - Software requirements – Reuse of pre-existing software elements to implement all or part of a safety function |
| ISO 13849-1<br>2015                         | Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design   |
| ISO 13849-2<br>2012                         | Safety of machinery - Safety-related parts of control systems - Part 2: Validation  |
| ISO 22737:2021                              | Intelligent transport systems – Low-speed automated driving (LSAD) systems for predefined routes – Performance requirements, system requirements and performance test procedures                          |
| ISO 25119-1<br>2010                         | Tractors and machinery for agriculture and forestry - Safety-related parts of control systems - Part 1: General principles for design and development   |
| ISO 25119-2<br>2010                         | Tractors and machinery for agriculture and forestry - Safety-related parts of control systems - Part 2: Concept phase   |
| ISO 25119-3<br>2010                         | Tractors and machinery for agriculture and forestry - Safety-related parts of control systems - Part 3: Series development, hardware and software   |
| ISO 25119-4<br>2010                         | Tractors and machinery for agriculture and forestry - Safety-related parts of control systems - Part 4: Production, operation, modification and supporting processes                                      |
| ISO 26262-1<br>2011                         | Road vehicles - Functional safety - Part 1: Vocabulary  |
| ISO 26262-2<br>2011                         | Road vehicles - Functional safety - Part 2: Management of functional safety   |

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|----------------------|---|
| ISO 26262-3<br>2011  | Road vehicles - Functional safety - Part 3: Concept phase   |
| ISO 26262-4<br>2011  | Road vehicles - Functional safety - Part 4: Product development at the system level   |
| ISO 26262-5<br>2011  | Road vehicles - Functional safety - Part 5: Product development at the hardware level   |
| ISO 26262-6<br>2011  | Road vehicles - Functional safety - Part 6: Product development at the software level   |
| ISO 26262-7<br>2011  | Road vehicles - Functional safety - Part 7: Production and operation  |
| ISO 26262-8<br>2011  | Road vehicles - Functional safety - Part 8: Supporting processes  |
| ISO 26262-9<br>2011  | Road vehicles - Functional safety - Part 9: Automotive Safety Integrity Level (ASIL)-oriented and safety-oriented analyses    |
| ISO 26262-1<br>2018  | Road vehicles - Functional safety - Part 1: Vocabulary  |
| ISO 26262-2<br>2018  | Road vehicles - Functional safety - Part 2: Management of functional safety   |
| ISO 26262-3<br>2018  | Road vehicles - Functional safety - Part 3: Concept phase   |
| ISO 26262-4<br>2018  | Road vehicles - Functional safety - Part 4: Product development at the system level   |
| ISO 26262-5<br>2018  | Road vehicles - Functional safety - Part 5: Product development at the hardware level   |
| ISO 26262-6<br>2018  | Road vehicles - Functional safety - Part 6: Product development at the software level   |
| ISO 26262-7<br>2018  | Road vehicles - Functional safety - Part 7: Production and operation  |
| ISO 26262-8<br>2018  | Road vehicles - Functional safety - Part 8: Supporting processes  |
| ISO 26262-9<br>2018  | Road vehicles - Functional safety - Part 9: Automotive Safety Integrity Level (ASIL)-oriented and safety-oriented analyses    |
| ISO 26262-11<br>2018 | Road vehicles - Functional safety - Part 11: Guidelines on application of ISO 26262 to semiconductors                         |
| ISO 26262-12<br>2018 | Road vehicles - Functional safety - Part 12: Adaptation of ISO 26262 for motorcycles  |
| IEC 61784-3<br>2016  | Industrial communication networks - Profiles - Part 3: Functional safety fieldbuses - General rules and profile definitions   |
| IEC 61784-3<br>2021  | Industrial communication networks - Profiles - Part 3: Functional safety fieldbuses - General rules and profile definitions   |
| EN 50128<br>2011     | Railway applications - Communication, signalling and processing systems - Software for railway control and protection systems |

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|   |   |
|---|---|
| EN 50129<br>2003-02 +<br>COR<br>2010-05 | Railway applications - Communication, signalling and processing systems - Safety related electronic systems for signalling  |
| EN 50159<br>2018                        | Railway applications - Communication, signalling and processing systems - Safety related electronic systems for signalling  |
| EN 50159<br>2010-09                     | Railway applications - Communication, signalling and processing systems - Safety related electronic systems for signalling  |
| IEC 61511-1<br>2016                     | Functional safety - Safety instrumented systems for the process industry sector - Part 1: Framework, definitions, system, hardware and application programming requirements                 |
| IEC 61511-2<br>2016                     | Functional safety - Safety instrumented systems for the process industry sector - Part 2: Guidelines for the application of IEC 61511-1:2016  |
| IEC 61511-3<br>2016                     | Functional safety - Safety instrumented systems for the process industry sector - Part 3: Guidance for the determination of the required safety integrity levels                            |
| ISO 19014-1<br>2018                     | Earth moving machinery – functional safety  |
| EN 12321<br>A1<br>2009-04               | Underground mining machinery - Specification for the safety requirements of armoured face conveyors   |
| ISO 13850<br>2015                       | Safety of machinery - Emergency stop function - Principles for design   |
| ISO 10218-1<br>2011                     | Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots   |
| ISO 10218-2<br>2011                     | Robots and robotic devices - Safety requirements for industrial robots - Part 2: Robot systems and integration  |
| ISO 11161<br>2007 +<br>A1:2010          | Safety of machinery - Integrated manufacturing systems - Basic requirements   |
| ISO 11553-1<br>2005                     | Safety of machinery - Laser processing machines - Part 1: General safety requirements   |
| IEC 61496-1<br>2012 +<br>Cor.:2015      | Safety of machinery - Electro-sensitive protective equipment - Part 1: General requirements and tests   |
| IEC 61496-2<br>2013                     | Safety of machinery - Electro-sensitive protective equipment - Part 2: Particular requirements for equipment using active opto-electronic protective devices (AOPDs)                        |
| IEC 60947-5-3<br>2013                   | Low-voltage switchgear and controlgear - Part 5-3: Control circuit devices and switching elements - Requirements for proximity devices with defined behaviour under fault conditions (PDDb) |

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|-------------------------------------|---|
| IEC 61131-6<br>2012                 | Programmable controllers - Part 6: Functional safety  |
| EN 50402<br>2005-08 +<br>A1:2008-05 | Electrical apparatus for the detection and measurement of combustible or toxic gases or vapours or of oxygen - Requirements on the functional safety of gas detection systems |
| EN 50402<br>2017                    | Electrical apparatus for the detection and measurement of combustible or toxic gases or vapours or of oxygen - Requirements on the functional safety of gas detection systems |
| IEC 61800-5-2<br>2016               | Adjustable speed electrical power drive systems - Part 5-2: Safety requirements - Functional  |
| IEC 61800-5-3<br>2021               | Adjustable speed electrical power drive systems – Part 5-3: Safety requirements – Functional, electrical and environmental requirements for encoders                          |
| EN 50657<br>2017                    | Railways Applications - Rolling stock applications - Software on Board Rolling Stock  |
| ISO/PAS 21448<br>2019               | Road vehicles — Safety of the intended functionality  |
| ISO/TR 4804                         | Road vehicles – Safety and cybersecurity for automated driving systems – Design, verification and validation  |

**verwendete Abkürzungen:**

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|-----|---|
| DIN | Deutsches Institut für Normung e. V.  |
| EN  | Europäische Norm  |
| IEC | International Electrotechnical Commission   |
| ISO | International Organization for Standardization  |
| PAS | Publicly Available Specification  |
| VDE | Verband Deutscher Elektrotechniker<br>(heutige Bezeichnung: Verband der Elektrotechnik, Elektronik und Informationstechnik e. V.) |