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## MACHINE CONTROL

**EN ISO 13849-1 specifies the general control technology requirements of the EC Machinery Directive in the area of the machinery industry and provides safety requirements as well as a guideline for the principles of design and integration of safety-related parts of control systems.**

**Within the framework of risk assessment, the standard makes an important contribution to risk reduction in the process of realising safe machines.**

### **Determination of the safety functions**

Since 1 January 1995, all machines placed on the market within the European Economic Area must comply with the fundamental health and safety requirements of the EC Machinery Directive 2006/42/EC. The control technology requirements are specified by EN ISO 13849-1. The Machinery Directive requires the manufacturer of machinery to prepare technical documentation as evidence for the market surveillance authority. An elementary component of this documentation is the risk assessment. The risk assessment procedure includes the identification of hazards as well as risk assessment and risk evaluation. In this process, the respective safety functions are identified and defined by the specialists of the weyer group.

### **Risk assessment and determination of the required performance level (PLr)**

After the identification and definition of the safety functions within the framework of the risk assessment, the required performance level (PLr) for the respective functional chain - consisting of sensor/logic/actuator - is determined by a risk assessment. Subsequently, the respective

safety function must be evaluated and verified, taking into account the device- and component-specific characteristics used. The achieved performance level (PL) is mathematically verified by the engineers of the weyer group.

### Our offer

**Determination of the safety functions**

**Risk assessment and Determination of the PLr**

**Assessment of the safety functions**

**Verification of the safety functions**

**Seminars and in-house training**



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### Evaluation of the safety functions

The performance level of a safety function performed by safety-related parts of a control system is evaluated by determining the category, the probability of a dangerous failure per hour and the diagnostic coverage level.

The component suppliers either directly provide the data on the probability of failure and/or the performance level of their subsystems or provide information on the number of operations until a dangerous failure occurs. For proven components without supplier information, default values from tables of the above standard can be used.

The individual subsystems are linked together to determine the performance level of the overall system. According to the EN ISO 13849-1 standard, the failure probability and the diagnostic coverage of the overall system are calculated from the parameters of the subsystems and assigned to a performance level for the overall system of the safety function.

To calculate and document the performance level, the engineers of the weyer gruppe use the „Sistema“ programme of the Institute for Occupational Safety and Health (IFA), which was developed on the basis of EN ISO 13849-1.

If the performance level is already evaluated in the planning or design phase, conceptual weaknesses can be avoided before realisation. Costs for retrofitting and modifications are eliminated.

### Verification of the safety functions

The design of a safety-related control function must be verified. Verification is completed when, according to EN ISO 13849-1, the achieved performance level is greater than or equal to the required performance level.

### Seminars and in-house training

The requirements of EN ISO 13849-1 oblige manufacturers, suppliers of control technology as well as operators from the mechanical and plant engineering sector to deal intensively with the topic. For this reason, the weyer group offers competent support and know-how in the form of seminars or in-house training courses, adapted to the specific needs of the customers.

#### Your benefit

**Compliance with legal requirements and requirements and standard specifications**

**Increased occupational safety**

**Cost reduction already in the planning phase**

**Increased availability of the plant in terms of safety**

**Competent further training of your specialist personnel**





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### References (excerpt):

- Aucos Elektronische Geräte GmbH (Aachen, GER): Proof of the performance level for safety functions
- CemeCon AG (Würselen, GER): Proof of the performance level for safety functions
- Eppendorf Liquid Handling GmbH (Hamburg, GER): Workshop to prove the PL for safety functions
- FEV Europe GmbH (Aachen, GER): Training to prove the performance level for safety functions
- GNS Gesellschaft für Nuklear-Service mbH (Essen, GER): Consultancy services on safety integrity level and performance level
- Hochwald Foods GmbH (Erftstadt, GER): Proof of the performance level for safety functions
- Konzept GmbH (Düren, GER): Calculation of the performance level for safety functions
- Spenner GmbH & Co. KG (Erwitte, GER): Calculation of the performance level for safety functions

The weyer group is an independent group of engineering and consulting companies in Germany, Austria, Switzerland and Poland.

Always based on the expectations and wishes of our customers, the weyer group has developed a wide range of competences since 1976.

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