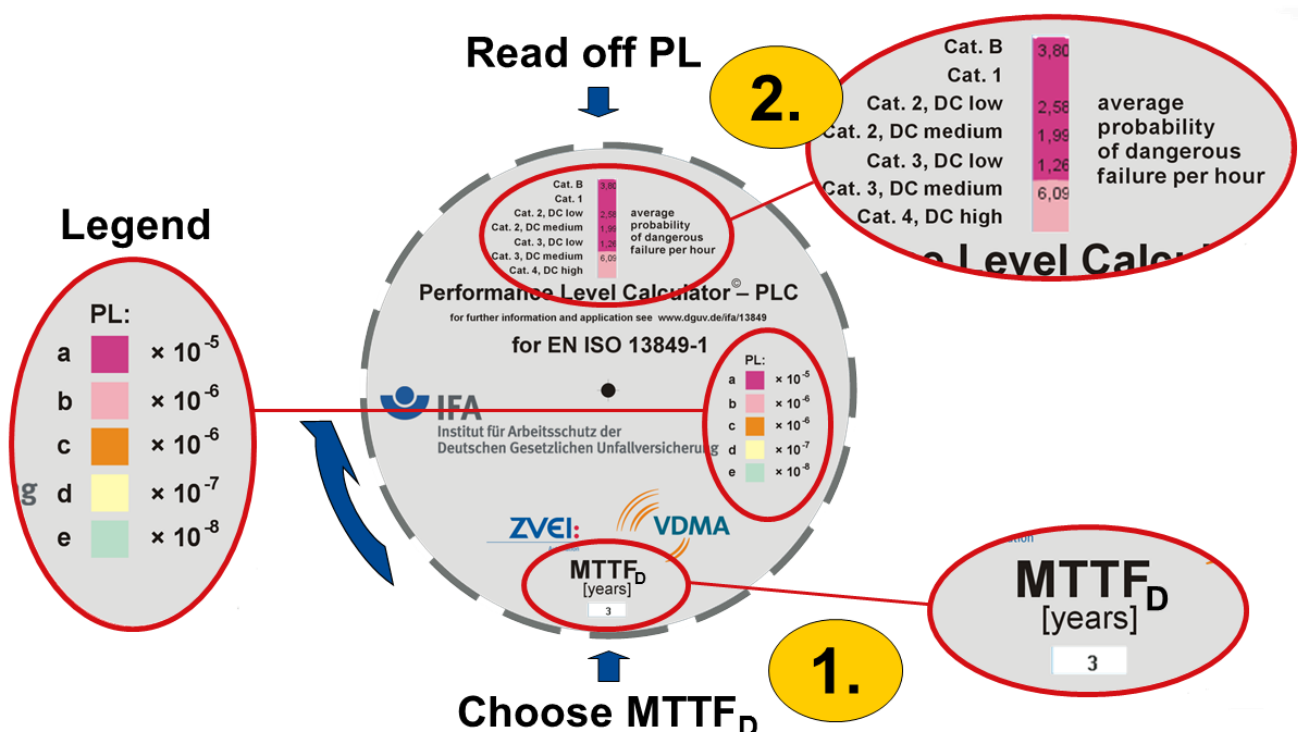


Performance Level Calculator – PLC

A handy disc to determine the performance level according to EN ISO 13849-1 (including Amendment 1)

Do you need practical help in developing safety-related control systems?

The EN ISO 13849 series of standards describes simple methods for evaluating safety-related control systems. The PLC disc supports you in estimating the probability of dangerous failure as described in the standard.



How is the disc used?

To determine the probability of dangerous failure (PFH_D) and the associated Performance Level (PL), simply (1.) rotate the top disc with respect to the bottom disc until the desired mean time to dangerous failure of each channel (MTTF_D) appears in the bottom window. In the top window, you can then (2.) read off the corresponding PFH_D value for fault detection according to the desired Category and desired average diagnostic coverage DC. For this purpose, the displayed value must be multiplied by a factor (order of magnitude) according to the colour code. The colour also indicates the PL that can be attained by the safety-related control system. In Category 4, you can use the scale printed on the reverse to determine the PFH_D for MTTF_D values greater than 100 years.

Background

EN ISO 13849-1, including its Amendment 1, formulates requirements with the aid of which safety-related controls of machinery can easily be developed, validated and certified. The standard combines deterministic and probabilistic requirements in a manner suitable for practical application: the Category, representing the structure of a control system (e.g. with redundancy and testing), and its probabilistic properties (lifetime of components: $MTTF_D$, diagnostic coverage: DC) are incorporated into determination of the "Performance Level" (PL). In order to determine the "average probability of a dangerous failure per hour" (PFH_D) from the numerous input variables, Markov models have been used as a mathematical method. The resulting relationships between the input variables of the Category, DC and $MTTF_D$ are presented in the standard in simplified form as a bar chart and as table values. The disc simplifies use of these values and makes them comparable.

Additional information and ordering

IFA's internet site: <http://www.dguv.de/ifa/13849e>

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Note:

The IFA supports the German Statutory Accident Insurance Institutions and their organisations particularly in solving scientific and technical problems relating to safety and health protection at work; the IFA does so by means of

- research, development and investigations
- testing of products and material samples
- workplace measurements and advice
- participation in standardisation and regulation-setting bodies
- technical information and expertise

In addition, the IFA works on behalf of manufacturers and companies within the framework of

- product testing and certification
- certification of quality management systems