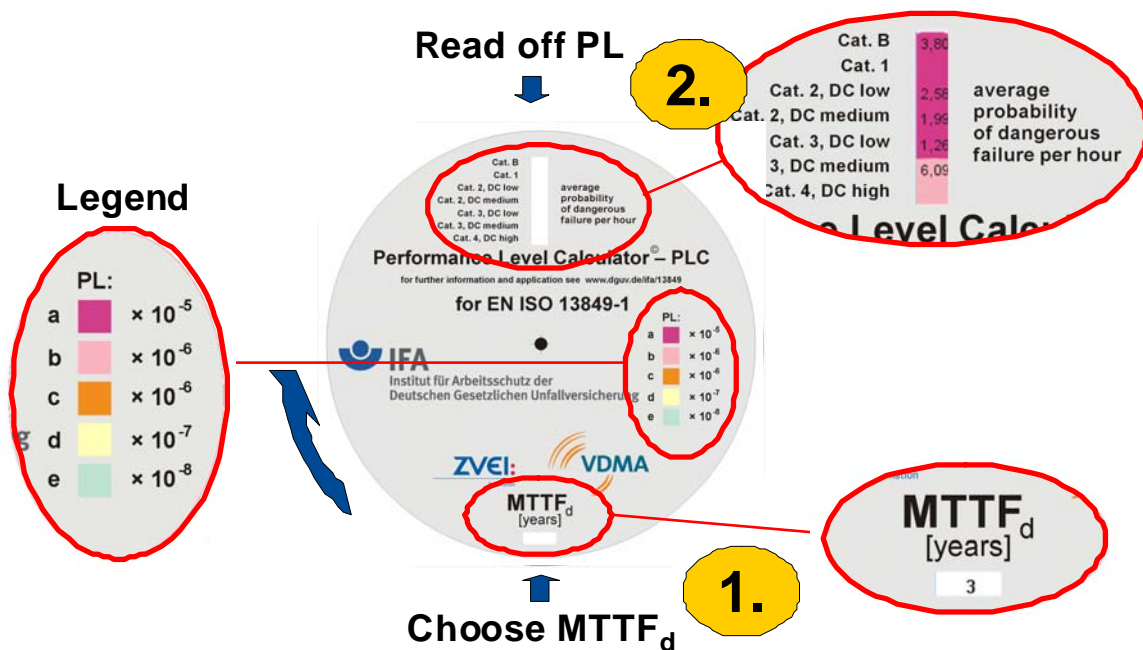


Performance Level Calculator – PLC

A handy disc to determine the performance level according to EN ISO 13849

You want practical help for developing safety-related control systems?

EN ISO 13849 describes simple methods (addition, subtraction, multiplication, division) to evaluate your safety design of control systems.



How to use the disc

The PLC disc consists of two movable layers which are fixed in the centre. The performance level (PL) can be easily determined by first turning the upper disc until the desired MTTF_d of one channel appears in the lower window. After that choose the desired category and DC besides the upper window and read the respective figures. The displayed value has then to be multiplied by a factor (order of magnitude) according to the legend; thus you will get the average probability of a dangerous failure per hour of the safety-related control system. The colour code indicates which order of magnitude has to be chosen and which PL is achieved.

Background

The revision of ISO 13849-1, formerly known as EN 954-1, gives guidelines how to develop, validate and certify in a simple way safety-related control systems in the field of machinery. Deterministic and probabilistic requirements are combined in a practicable manner: The category of the control system (e.g. redundancy and testing) and its probabilistic properties (failure rates of components called $MTTF_d$, diagnostic coverage of tests called DC, common cause failure rates) underlie the determination of the so-called "Performance Level" (PL). Markov-models are used to determine the average probability of a dangerous failure per hour for designated architectures. The relation is shown in figure 5 and in table K.1 of EN ISO 13849-1.

Additional information and ordering

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

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Note:

The IFA supports the German Berufsgenossenschaften (institutions for statutory accident insurance and prevention) 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