

# SIL/PL-Compliant Signaling Technology

With the new Machinery Directive, which will apply Europe-wide from 2010 onwards, there will be a change in the requirements for machine safety. More than ever before, certification and market opportunities depend on safety-related products. The new SIL/PL-conform alarm devices from Pfannenberg give machine and plant manufacturers more planning safety; the acceptance process is simplified and accelerated.






The goal of the new standards is risk minimization in the operation of machines to avoid harm to persons. Naturally, the availability of the machine and plant is also increased as a result, which on the other hand has a positive effect on the TCO-evaluation, with immediate effect, probability considerations will henceforth also play a role in the determination of component safety. **SIL** (Safety Integrity Level) and **PL** (Performance Level) have become central terms in the categorisation of risks and safety.

In many cases, purely constructional measures on the machines don't go far enough to minimize risk. **In order to keep the existing residual risk of a machine or a plant low, reliable alarms are required, which draw attention to hazards through visual or acoustic warning signals.** For example, as a start-up warning or in muting operation, while protective functions have been disabled. Alerting of personnel in case of gas or chemical leaks requires 100% operational reliability of the signaling devices.



## Causes of work accidents at machines

The statistics on the cause of work accidents show a clear picture: Human error is responsible for half of all accidents. These have to be reduced further by means of secure alarm raising.

-  Human behavior
-  Organisational reasons
-  Technical reasons
-  Workplace
-  Psychological causes

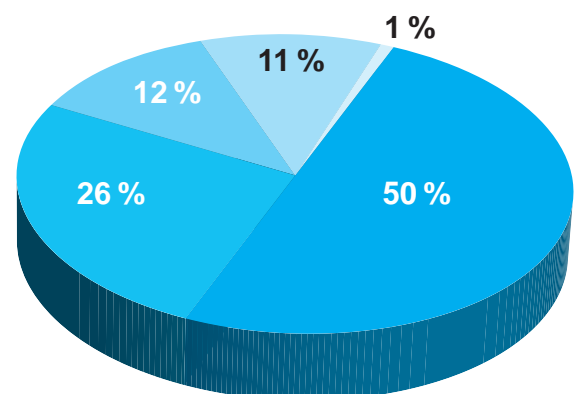


Diagram from safety-network.de

Further information can be found in the download area under „Academy“ at [www.pfannenberg.com](http://www.pfannenberg.com)!

### The New Machinery Directive 2006/42/EC

The transition period for the new Machinery Directive 2006/42/EC ends on 1 January 2010. It has already been signed on 17 May 2006 and published on 9 June 2006 in the official gazette of the European Union (Abl. L 157).

Two new safety standards are coming into effect with the Machinery Directive. Firstly, DIN EN ISO 13849-1, which replaces the standard DIN EN 954-1 of the old Machinery Directive 98/37/EG. The other is DIN EN 62061.

The goal of these new safety standards is risk minimization in the operation of machines. Therefore, the requirements with regard to certification of products for manufacturers of plants and machines were made more stringent. Now, probability considerations are also taken as inputs in determining the safety of components.

Planning security and market opportunities of manufacturers of machines and plants are thus supported by a safety-related visual and acoustic alarm system from Pfannenberg.

### SIL/PL Gradation

Allocation of the level after a risk analysis. What is calculated here is the probability of failure of the system.

Average probability of a dangerous failure per hour.

PFH <sub>b</sub>	Performance Level DIN EN ISO 13849-1	Safety Integrity Level DIN EN 62061
10 <sup>-4</sup>	PL a	---
10 <sup>-5</sup>	PL b	SIL 1
3·10 <sup>-5</sup>	PL c	
10 <sup>-6</sup>	PL d	SIL 2
10 <sup>-7</sup>	PL e	SIL 3
10 <sup>-8</sup>	---	SIL 4
10 <sup>-9</sup>	---	

## Safety from the beginning: SIL/PL-conform signaling by Pfannenberg

**As with all chains, the safety chain is only as strong as its weakest link!**

This integral view of safety functions is the foundation of the respective norms from process and systems engineering, as well as mechanical engineering.

Visual and audible warning devices are, as the definition clearly states, devices, which warn people about acute dangers. Therefore, these need to be implemented into safety chains of many applications. This is the link of the change that reaches people!

The integration of visual and audible warning devices in the safety chain is required by norm in many applications. For example, machines that are hard to view as a whole must be equipped with start-up alarms according to SIL 1 and respectively, PLc. Machines are defined as hard to view when they have a length of 7m or more.

Further applications for SIL-capable signaling devices are, amongst others

- muting indication (i.e. during safety function bypassed by the safety-related controller)
- excess rotation speed warning
- machine stop delay warning

Applications in process and plant safety (Control Technology/PCS), e.g. in case of

- leaks / gas warning
- high-pressure / overfilling



Functional safety in process automation normally based on the statutory order of hazardous incidents. The statutory order refers to the design of safety-relevant devices in EN 61508 and EN 61511 respectively. They define the safety steps which describe the measures to control risks of equipment.

Among others, the VDMA (German Association of Machinery Manufacturers) and the ZVEI (German Electrical and Electronics Industry Association) inform intensively about the implementation of safety standards.

SIL compliant signaling devices by Pfannenberg can be found on pages 114, 116 and 144.