

The requirements for safety components in the process safety are diverse and grow continuously. Different requirements hinder a standard-conforming safeguard for systems, which is reflected in a significant increase in expenses and expenditure of time. Safety components, which specifically include all required type approvals, simplify the planning process.

After a short overview over the normative framework, the safety logic units from Zander Aachen, developed specifically according to the standards in the process engineering, will be presented.

Legislative and normative framework.

The machinery directive 2006/43/EG establishes the fundamental basis of machine safety. It aims for a globally unified level of protection for bringing machines to the market in the European Economic Area.

Based on the machinery directive, standards were defined in 2007, to assess the safety of machines. These standards can be classified in A, B and C norms. For the general, application- and technology independent A basic-norm in mechanical engineering, the IEC 61508-1 has to be mentioned. It describes the functional safety of safety-oriented systems. This includes unique field and application-oriented machinery standards ISO 13849-1 (Safety of machinery – safety-related parts of control systems) and IEC 62061 (Safety of machinery – functional safety of safety-related electrical, electronic and programmable electronic control systems).

One level below the application-specific norms the so called C-norms are located: Here, for instance, the industrial EN 746-2, particularly for the safety of thermoprocessing plants, is noteworthy.

Often the incident ordinance (12. BImSchV 2000) is used as a legal basis, if the approach over the process industry is adopted. Here it says under §3 “The quality structure and state of the system must comply with state-of-the-art safety technology”. The safety-relevant norms IEC 61508-1 and especially the IEC 61511-1 (Functional Safety for the Process Industry) are also mentioned here.

A variety of the mentioned standards can be summarised in the graph below.

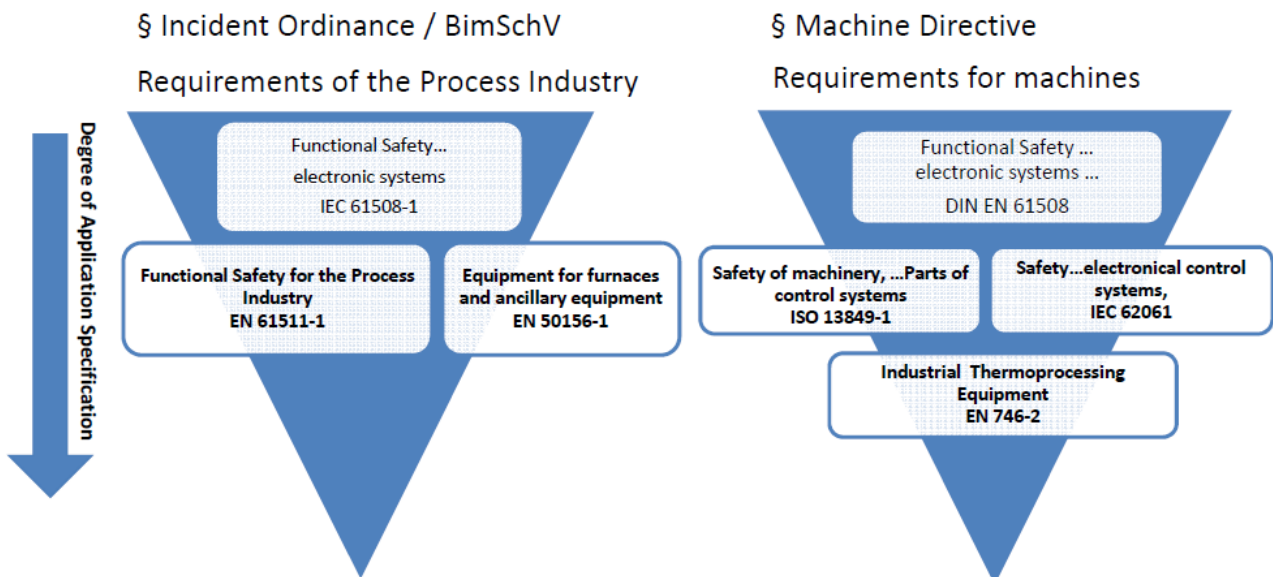


Fig. 1 Relevant Standards for Process Applications

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The diagram visualises the complexity of standards in reliance to the system, more specifically to the application. Generally, application-related C-norms are prioritised over the basic norms (i.e. in Figure 1; below has priority over above). This means, that for process- and melting furnaces and vessels the standard EN 746-2 in combination with EN 50156-1 (electrical equipment for furnaces and ancillary equipment), should be used.

Generally, standards are used as orientation, but other possibilities for achieving the safety goals are acceptable. In compliance with this, the equivalence has to be proven and the personal liability risk for the accountable planer is significantly higher.

The excursion also clarifies that the applicability of the mentioned standards for safety-related components through the classical mechanical engineering safety considerations merge in a Performance Level (PL) or SIL-class. The industrial burner can be given as a generic example. In the early stages of a project, it may be difficult to decide for the project planner, whether the industrial burner has to be classified as a machinery component as stated in EN 746-2, including PL and SIL, or if it has to be treated as a component integrated in a kettle process according to EN 50156-1 or rather IEC 61511-1. A solution would be, that all safety-related components fulfil all these norms.

Here comes the great advantage of the following presented safety logic units from Zander Aachen – these are type approved by TÜV Rheinland for all norms mentioned above.

This means a verification in form of a certificate for the user, which proves the compliance of all normative basic principles. In light of this, the following products can be highlighted.

Safety Coupling Relays and Extension Module SK3D / Safety Relay SR3D

The coupling relay SK3D is ideally suited for contact reinforcement, multiplication of contacts and for galvanic isolation. On top of that it enables the filtration of safe, often also clocked semiconductor-outputs of superordinate safety control systems. This takes place with a minimal wiring effort (retrenchments up to 60% compared to standard safety relays) and optional screw free connections via spring-cage terminals.

The safety relay SR3D meets the requirements of a classic emergency stop switchgear with distinctive feature of it also being approved specifically for a continuous operation at combustion plants, just like the SK3D. The great advantage of this product is, that instead of the normative required, diversified contactor combinations as stated in EN 50156-1 / EN 746-2 can be used. This results in great space and cost savings. Both products are available with either 24 V or 230 V input voltage.



Mini Safety Timer SCB

The safety timer SCB allows a safe, delayed ON-/ OFF- switching within the process- or combustion-chain. The compact controller system provides a maximum of diagnostics, including error reports, which reduces the cumbersome commissioning and maintenance work to a minimum. Variations with semiconductors- and/or relay-outputs are available.

A unique feature is the bandwidth, as well as the precise configuration of delay times. Time spans from 0.1 sec to 99 sec up to 99 h are possible. All that with an accuracy of 0.1 via a push and rotary button in combination with a LED-display.

The starting behaviour (manual or auto start) and the characteristic of each output (time or non-time delayed, On- or OFF-delay) can be easily and Pin protected selected by the customer.

Another advantage is the retrigger function (stop of the switch-off countdown).



The individually configured Compact Safety Controller TALOS

If the whole process chain ought to be monitored with a maximum of diagnostics, look no further than the TALOS. 14 safe inputs, 3 semiconductor-outputs as well as 6 message outputs enable a safe surveillance of the whole process chain.

TALOS, like all mentioned Zander products, meets all normative requirements for combustion plants in continuous operation according to EN 50156-1, as well as requirements for thermoprocessing plants according to EN 746-2, while meeting the highest safety requirements PL e, Kat.4 according to ISO 13849-1, as well as SILCL 3 according to IEC 62061, at the same time.

Zander configures and customises the control system. The following applications can thus be realised:

- Applications with many different delays, e.g. signalling of an imminent shutdown.
- Hand-shaking-processes with the representation of the current state, e.g. via a signal light or an acoustic signal. If no acknowledgement occurs after a given time, the system is safely shut down.
- TALOS as a safe re-start-up after a power failure (the process is brought in operating position through a re-trigger).
- Safe burner-start-surveillance.
- Visualization and monitoring of the whole safety chain.

All that with a maximum of diagnostics. On top of that, the relay-expansion-module TE-OR3D for electrically isolated switching up to 250 V is available for the TALOS.



Outlook: MINOS SD

In autumn, the ultra-small Safety Relay MINOS SD will be presented. With a width of just 6.8 mm it saves a lot of space in the control cabinet.

The maximum switching capacity will be 250 V, 6 A. MINOS SD Relays will be certified up to PLe, SIL CL3 according to ISO 13839-1, IEC 62061 and also for furnaces in continuous operation according to EN 50156-1.

Two versions will be available, the standard Safety Relay MINOS SD1E and the Coupling Relay SK1K for galvanic separation and contact extension.



We are very much looking forward to your visit at the sps ipc drives in Nuremberg:
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