

Safety solutions for the glass manufacturing process

Markus Kick summarises the safety solutions available from Horn Glass Industries for the glass manufacturing process in the digital era.

The melting and conditioning of glass are examples of highly developed processes. Both are required to be highly efficient, as well as environmentally-friendly. Furthermore, increased networking and automation is mandatory in order to achieve competitive production.

Each step of the process and all machines involved need to be stable to ensure low production risk and safe working conditions. Due to the updated edition of the European standard, Thermal Process Standard 746-2 in February 2011, Horn has reviewed and revised its own already high standards of functional safety, leading shortly into a worldwide standard ISO 13577.


Horn safety technology and the required safety functions are based mainly on risk analysis according to EN 12100. The safety circuits and their safety features have been extensively evaluated and reported with the DGUV (Deutsche Gesetzliche Unfallversicherung; German Social Accident Insurance) software tool, SISTEMA.

From the customer's perspective, the Horn risk assessment protocol involves safety circuits for furnace combustion and control, for distributor/forehearth operation, for boosting and for associated furnace equipment, including batch chargers.

Background decentralized safety control :

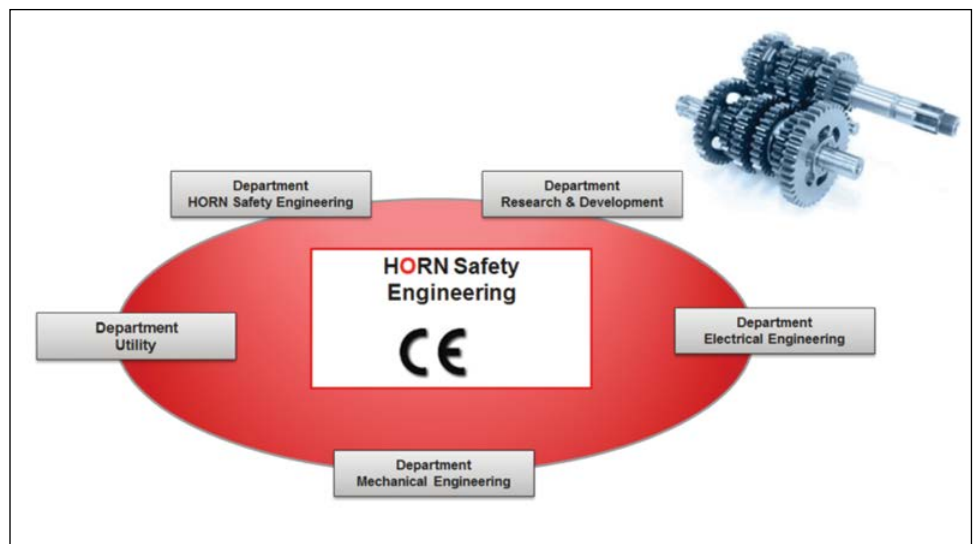
- samosPRO Compact fulfills all world wide standards
- samsoPRO Compact is totally free of any licensing costs
- samosPRO Compact is able to communicate with every fieldbus protocol
- samosPRO Compact creates own safety verification reports

Safety control samosPRO Compact




- (1) CPU with onboard communication gateways Ethernet, Profinet, Modbus TCP, SD memory card, 20 inputs or 16 inputs and four outputs
- (2) External additional communication gateways (here: PB-DP)
- (3) I / O modules
- (4) Relay modules (two-channel)

Decentralised safety control.




Safety lifecycle, where one wheel always grips the other.


- A safety circuit always consists of at least one safety function which is constructed according to the following principle:



SENSOR
(pressure guard)



LOGIC
(safety-PLC; safety-relay)



ACTUATOR
(safety shut off valves)

- Functional safety according to DIN EN ISO 13849-1/2

Definition of a safety circuit.

- At HORN the risk assessment software **DOCIFY** is used.



Process to minimise from the customer's perspective.

Why "Functional Safety"?

- higher overall equipment effectiveness (OEE)
 - best-in-class companies achieve 5 to 7% higher OEE, 2 to 4% less unscheduled downtime, and less than half the injury rate of average performers.
 - the global GDP will require 80% faster productivity growth to compensate for the projected decline.
- **Safety Management:**
 - GOAL: Optimize your performance!
 - **Machinery Safety:**
 - GOAL: Increase Productivity!
 - **Process Safety:**
 - GOAL: Reduce risk!
 - **Electrical Safety:**
 - GOAL: Reduce exposure!

Functional safety experiences, practical solutions and results.

Validation Service: HORN Safety Engineering:

If our customers do not have the legal respectively personnel prerequisite to check the safety functions according to the requirements then HORN will offer this to you once a year.

V-model for the software development of the safety PLC.



Markus Kick addressing the 41st ASEAN Glass Conference.

For each safety circuit, a Wieland Electric GmbH Samos Pro safety programmable logic controller is used. The programme meets all required standards for electrical equipment of thermal process systems, including EN50156-1.

Using its independent, free-of-charge and totally freeware safety control tools, Horn can communicate with any process control system (eg Eurotherm, Siemens, Honeywell, Rockwell, ABB, etc). The safety-related signals are wired directly to the Samos PLC according to their safety function and transferred to the control system for diagnosis. ●

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