



Type A Standards

Type A standard specify basic concepts, terminology and design principles applicable to all categories of machinery for correct application of the Machinery Directive.

ISO 12100 - Safety of Machinery is the starting point of safeguarding plants and machinery

Vibrating Equipment	Dust (emissions)	Live Electrical Parts	Moving Elements	Gravity, stability	Objects or material with a high or low temperature	Posture	Noisy manufacturing process	Gravity (bulk material solidified)	Location of control Devices	Laser beam	Fumes	Approach of a moving element to a fixed part	Rotating or moving elements

Type B Standards

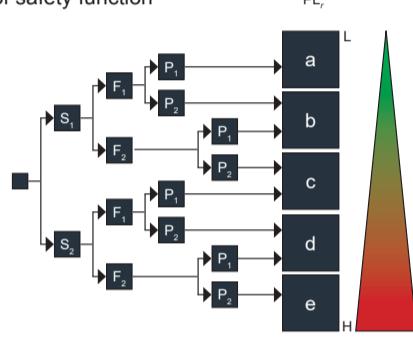
Deals with one or more safety aspect(s), or one or more type(s) of safeguards that can be used across a wide range of machinery. These include:

ISO 13849 - ISO 14120 - ISO 14118 - ISO 14119 - ISO 13855 - ISO/TS 19837

ISO 13849 Safety of Machinery: Safety-Related Parts of Control Systems

Provides guidance in the design and assessment of control systems. The ability of safety-related parts of control systems to perform a safety function can be allocated one of five performance levels (PL_a-PL_e).

(Cat.B- Cat.4) Behavior under fault conditions drives possibility of danger. Cat. 4 behavior is defined by a single fault not leading to a loss of safety function



• Severity of Injury:
 - S1 Slight injury, (bruise).
 - S2 Severe injury, (Amputation or death).
 • Frequency of exposure to injury:
 - F1 Seldom.
 - F2 Frequent to continuous (Frequent to continuous are not defined in the standard).
 • Possibility of avoiding the hazard:
 - P1 Possible.
 - P2 Less possible.
 • Based on the speed of approach of the hazard and the ability of the operator to avoid the hazard. If the operator can avoid the hazard then you would choose (P_a).

To achieve PL_e with the Fortress, our mGard range offers mechanical trapped key interlocks which enforces keys are returned before isolation contacts can change state.



This removes the risk of fault masking that occurs with series wired I/O at every access point and avoids the cost of network diagnostic (OSSD) solutions.

Our amGardpro actuators provide locking forces greater than guarding itself ensuring broken actuators do not limit the safety function, making redundant safety devices such as RFID not necessary.



ISO 14120 Safety of Machinery: General requirements for the design and construction of fixed and movable guards

Specifies general requirements for the design, construction and selection of guards. Fixed guards are only openable with tool or by destruction of the means by which the guard is fitted. Movable guards can be opened without the use of tools.

Interlocked guards are those that:

- Ensures a machine cannot operate until a guard is closed.
- Provides a stop command if the guard is opened while machine is operating
- Allows hazardous functions to operate when the guard is closed.

Lockout/tagout (LOTO) procedures are popular additions to interlocked guards to ensure functions cannot restart by closing a guard behind a person entering a hazardous area.

Providing a trapped key mechanism within the interlock is an enhanced version of the LOTO procedure.

A personnel key (a key released upon unlocking guard) is always available at the door, it cannot be forgotten. Procedure must always be followed as operating the isolation key is required to open the guard.

Fortress Interlocks also offers LOTO additional accessories to all ranges.

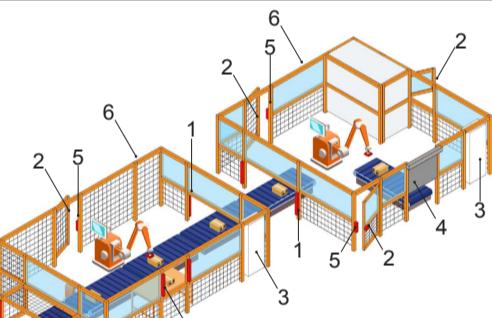


Image Key:
 1: Active optoelectronic protective device (AOPD)
 2: Interlocking Guard
 3: Electrical Cabinet
 4: Interlocked movable guard with pressure-sensitive edge
 5: Reset device
 6: Distance guard



ISO 13855 Safety of Machinery: Positioning of safeguards with respect to the approach speeds of parts of the human body

Methodology to determine the minimum distances a hazard in a zone is from the detection devices of safeguarding the hazard.

Safeguards considered in ISO13855 includes:

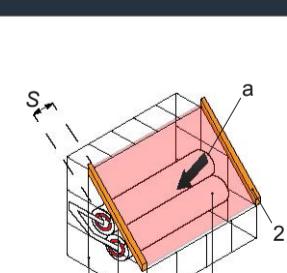
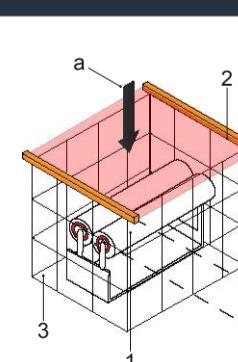
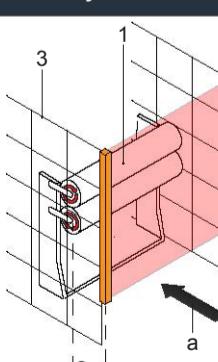
- Interlocked Guards
- Two Hand Control Devices
- Pressure Sensitive Equipment
- Light Curtains & Laser Scanners

When calculating distances for light curtains, laser scanners, and pressure censors, the detection response time and the stopping time of machinery must be considered.

However, interlocked guarding that remains locked until a machine has stopped or has been isolated negates the need to consider the possibility of human approach speeds.

This saves valuable floor space in new facilities, it also can be the only method of safeguarding when adding to existing layouts.

Image Key:
 1 - Hazard zone
 2 - Detection zone
 3 - Fixed guard
 S - Minimum distance
 a - Direction of approach



ISO/TS 19837:2018 Safety of Machinery: Trapped Key Interlocked Devices

This standard specifies principles for the design, selection, and application of trapped key interlocking devices. ISO/TS 19837 is recommended reading when implementing Fortress Interlock products. ISO 14119 always applies unless an expectation is given in this document. Major points this standard identifies are the difference sub functions of a Trapped Key Interlocking System:

