



Ideal setup for safe doors

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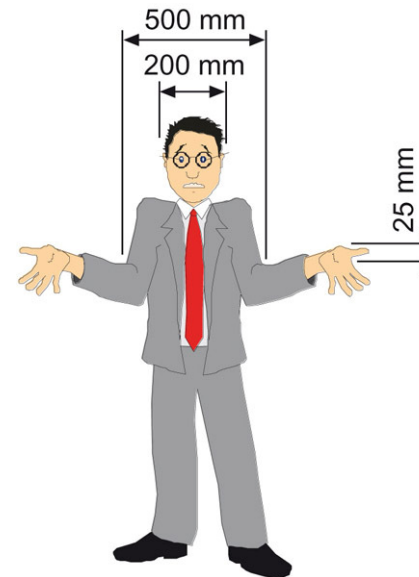
Main Issue of Machinery Directive (2006/42/EC)

- **Risks related to moving parts** (Chapter 1.3.7)
 - prevent the risk of contact with moving parts, persons cannot reach moving parts (guards, safety devices)
- **Safety and reliability of control systems** (Chapter 1.2.1)
 - a fault in hardware, software or logic control systems do not lead to hazardous situations (indicated with performance level)
- **Exceptions from Emergency stop** (Chapter 1.2.4.3)
 - if an emergency stop does not lessen the risk, reduce stopping time, not enable the special measures to deal with the risk, it can be left away (risk assessment)
- **Protection Against Mechanical Hazards** (1.3)
 - Risk of loss of stability and durability (durability tests)

Basics of safety distances

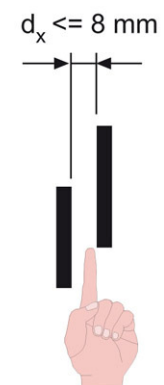
Protection against squeezing

- Body → min. 500mm
- Head → min. 200mm
- Fingers → min. 25mm



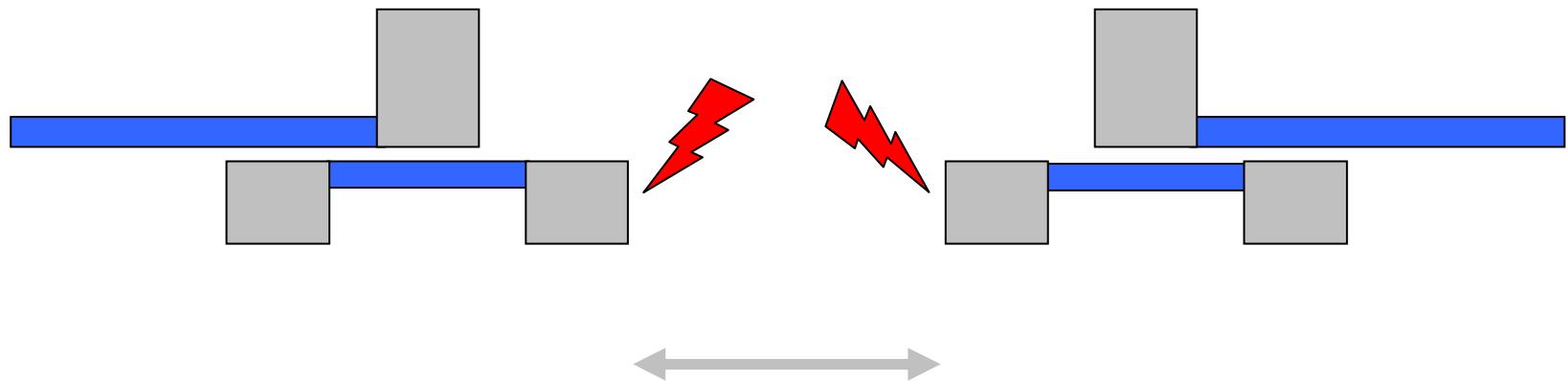
Protection against drawing-in

- Fingers → less than 8mm
- Hand → less than 30mm



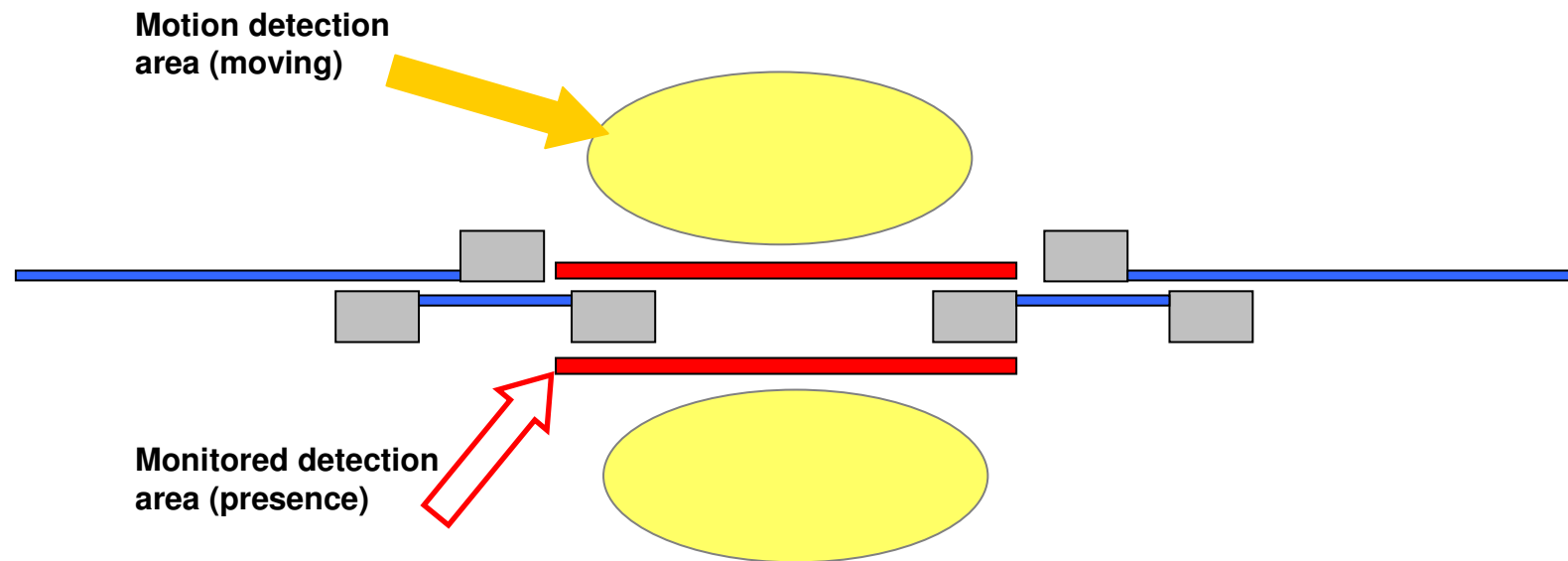
Main closing edge of sliding doors

- **Danger:**
 - Squeezing / collision on the main closing edge



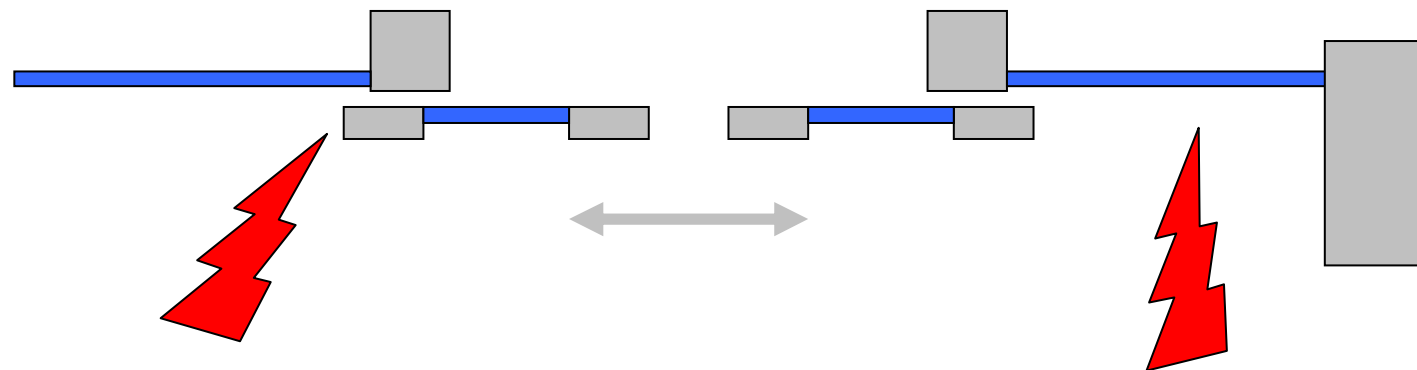
Manage risks on the main closing edge

- **Solution:**
(State of the art since 2007)



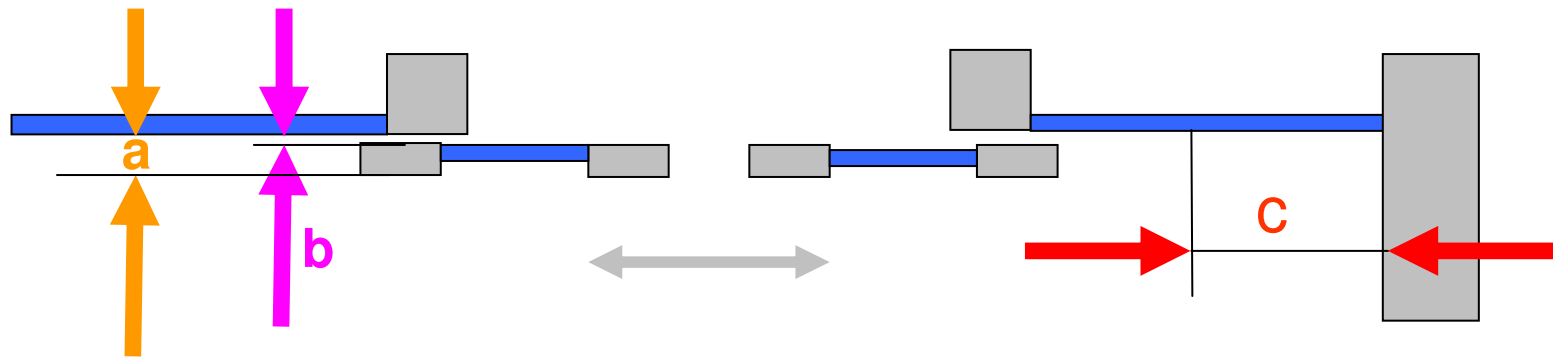
Secondary closing edge of sliding doors

- **Danger :**
 - Collision and squeezing on secondary closing edge



Manage risks on the secondary closing edge

- **Solution** for plane walls behind the door



a < 100mm

Accepted as **safe enough**
(since DIN18650:2010)

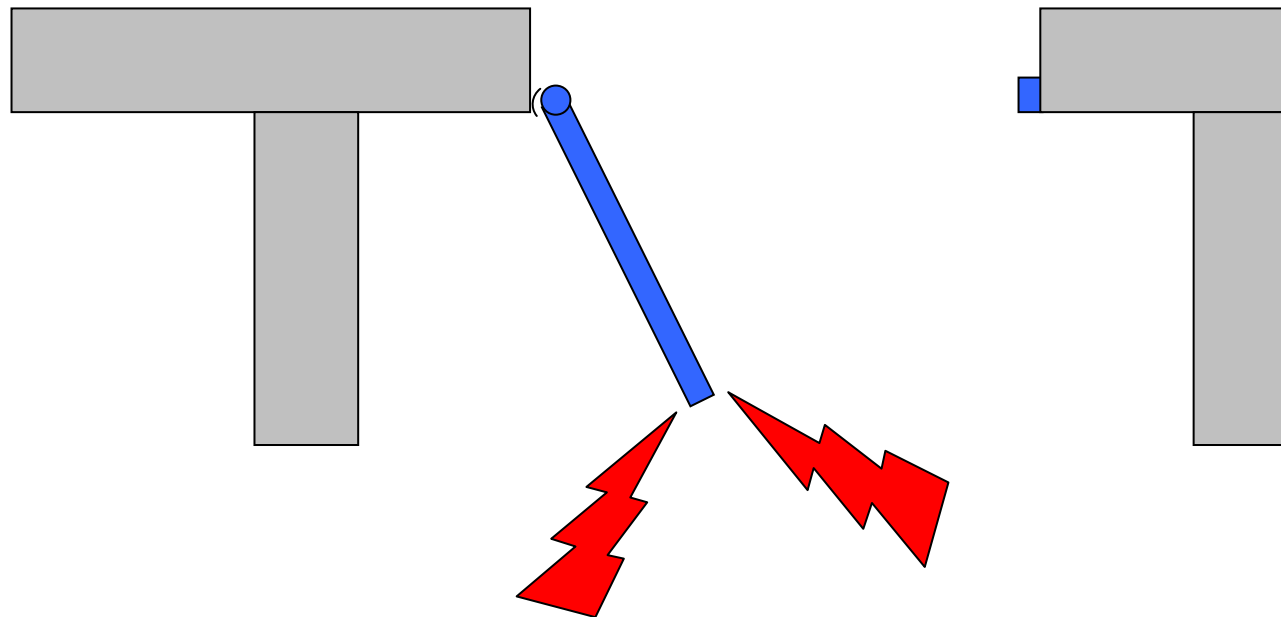
b < 8mm against drawing
in of fingers

c > 200mm

against
squeezing
of the head

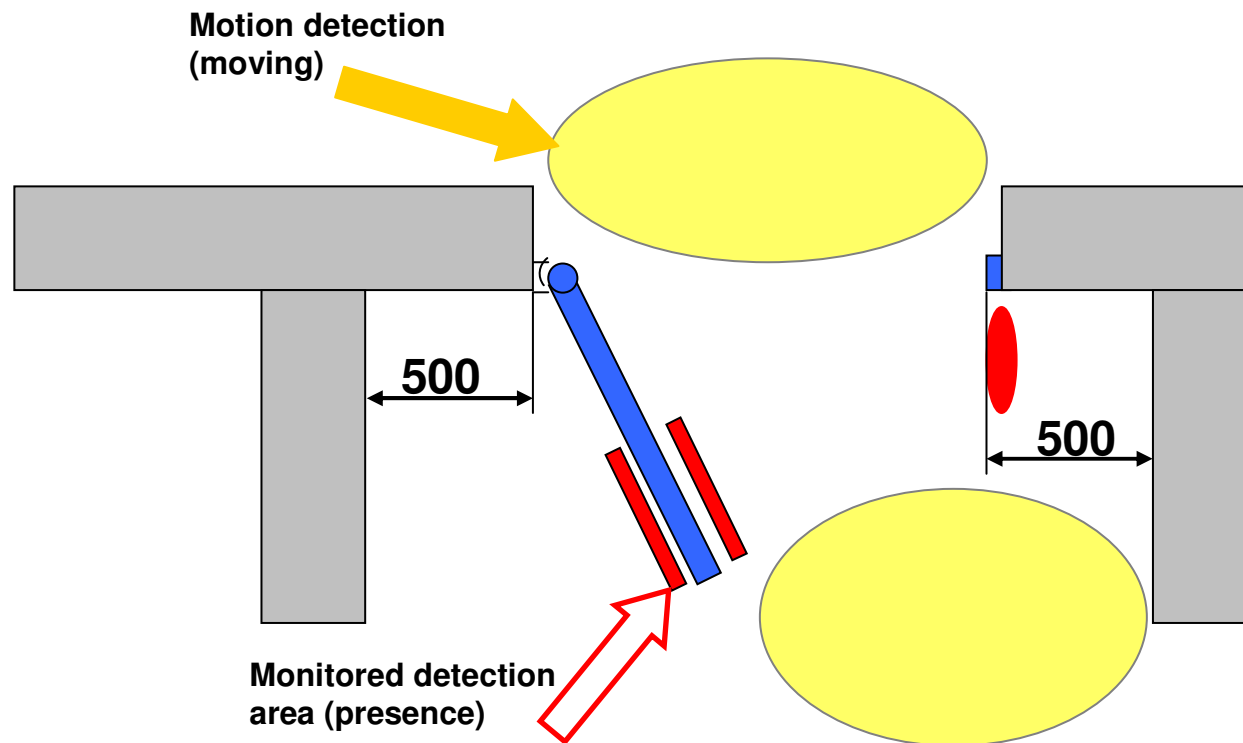
Main closing edge of swing doors

Danger: opening → collision
 closing → collision and squeeze at closed position



Manage risks on the main closing edge

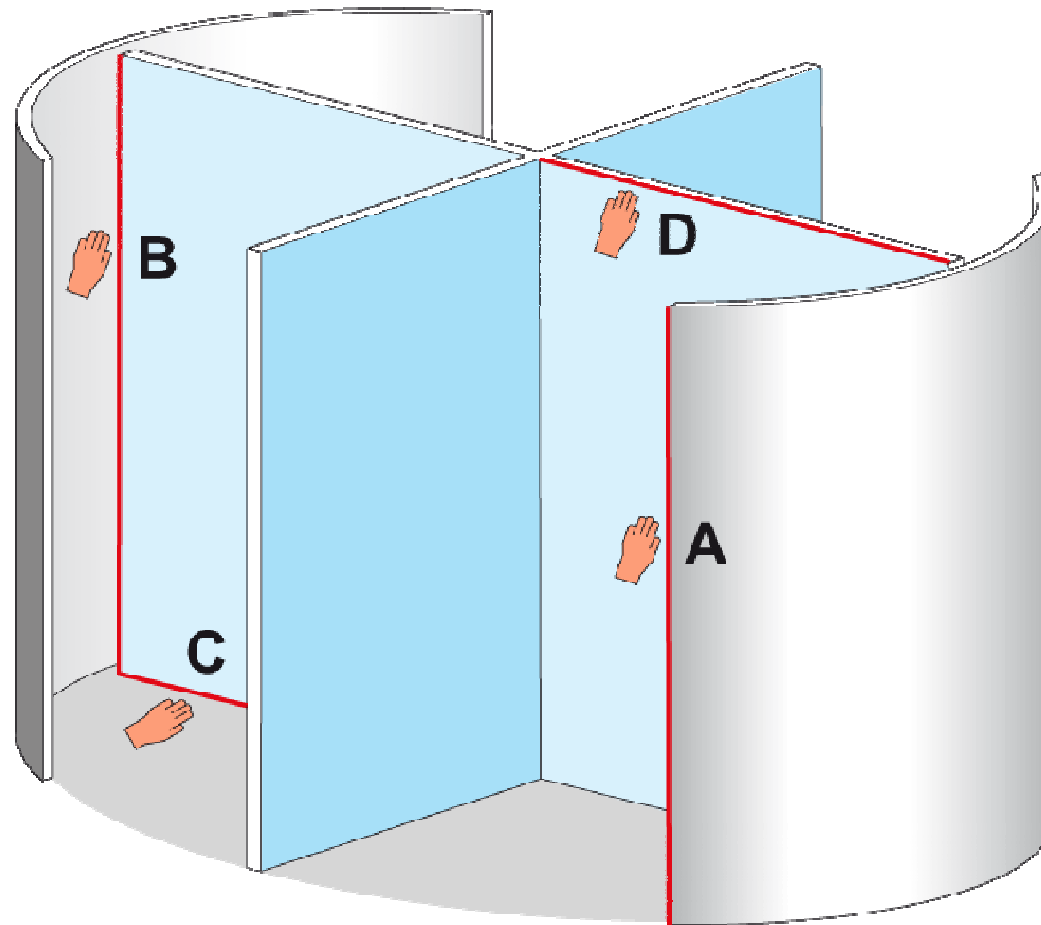
Solution for opening and closing: Guards, safety distances and sensors



Solution for secondary closing edge:

→ apply profiles with a round shape, gap max. 8mm to protect fingers

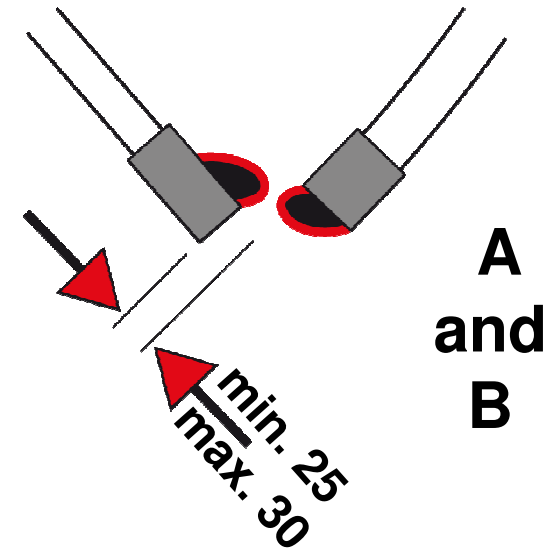
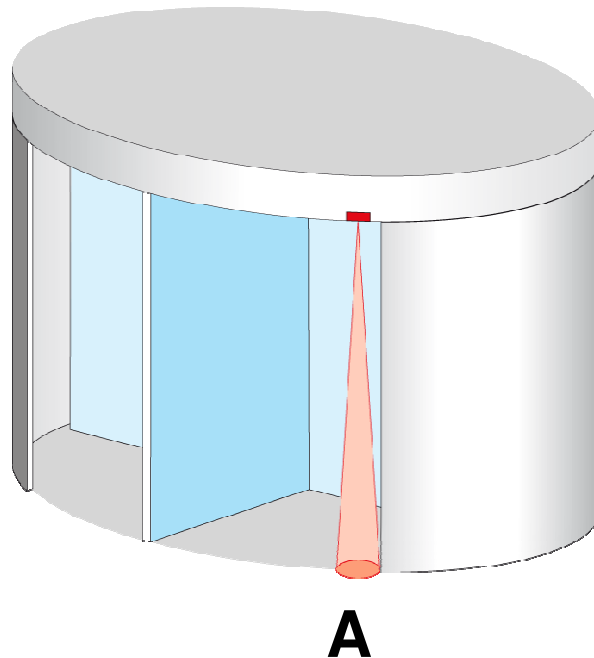
Main and secondary closing edges of revolve doors



Manage risk on the main closing edge

Solution against risk of shearing at A:

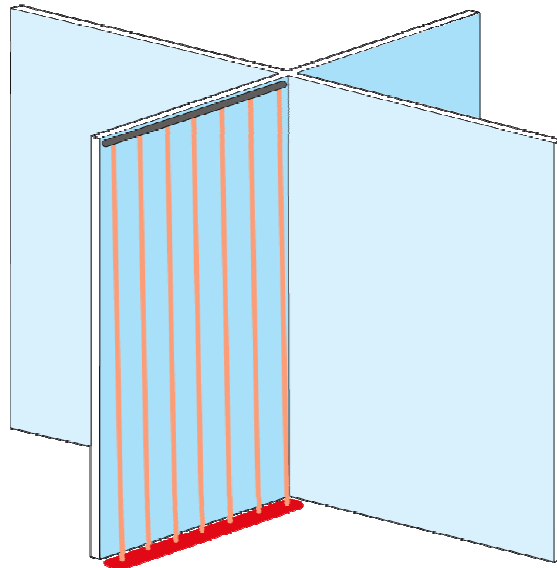
- pre-mullion Safety sensor to stop
- safety distance min. 25mm to max. 30mm
- actively switching safety bumpers for final stop



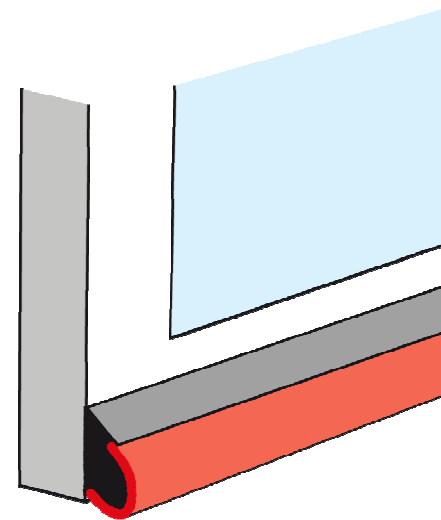
Solution against drawing in (at B) between drum wall and main closing edge: actively switching safety bumpers (stop)

Manage risk on the secondary closing edge

C1; Solution against collision with Door: protection sensor to stop the door



C1



C2

C2; Solution against drawing in: actively switching safety bumpers (stop)

Easy reminders to install good safety

Basics for integration of safety, measures

Information taken out of
EU-Machinery directive 2006/42/EC and Standard EN 12100

- a) **avoid** the risks, eliminate them
(Safety distances, guards)

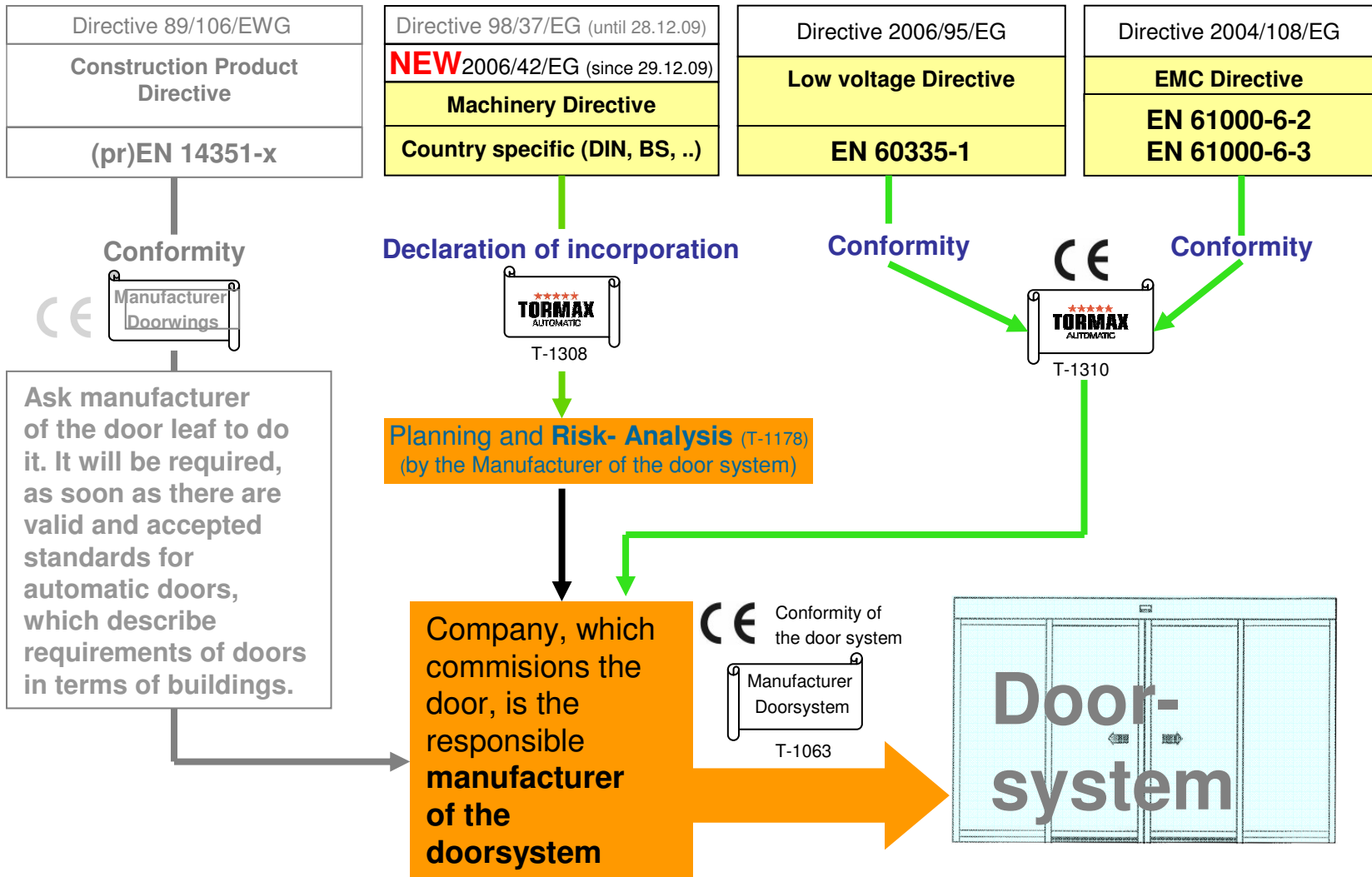
- b) **control** the risks, measures according to the risks
(Sensors, limited forces and limited energy)

- c) **inform** the users about the remaining risks
(Markings on the doors)



Overview, using the forms on example iMotion 2301

(T-1308, T-1178, T-1310, T-1063)



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