

Automated Door, Gate & Traffic Barrier FAQs

INTRODUCTION

These FAQs are intended as a quick reference to the main points of automated entrance legal compliance and safety. They cover automated doors, gates & traffic barriers primarily intended for vehicle use, but which might also be accessible to people; they also include shutters over commercial entrance doors, eg shop front shutters.

These FAQs do not cover automatic doors that are intended *solely* for pedestrian access. The Automatic Door Suppliers' Association (ADSA) can provide guidance on automatic pedestrian door safety.

Use of these FAQs should be backed up by consulting the appropriate DHF COP as appropriate; DHF TS 011:2018 Code of practice for automated gates & barriers AND DHF TS 012:2018 for industrial doors & domestic garage doors.

DHF codes of practice are available for download in the technical specification section of the publications area of the DHF website at www.dhfonline.org.uk.

MACHINERY DIRECTIVE

1. Does the Machinery Directive apply to all automated doors, gates and traffic barriers?

Yes, without exception, all automated entrance systems are covered by the Machinery Directive.

2. How is the Machinery Directive brought into national law?

The directive is brought into national criminal law by the appropriate national legislation; in the UK it is the Supply of Machinery (Safety) Regulations 2008 and in the Republic of Ireland it is the European Communities (Machinery) Regulations 2008.

3. Has the Machinery Directive ever been updated?

The directive and the relevant national legislation has been subject to change since introduction but there have been no significant changes to the requirements for safety. In 1995, compliance with the 1998/37/EC version became mandatory; this was withdrawn and superseded by 2006/42/EC in 2009.

4. Who does the Machinery Directive apply to?

The person or company who apply automation to the door, gate or barrier. This can be the manufacturer of the complete system, the person or company who combines components to form a new system or the person or company who automates an existing manual door, gate or barrier. There are no responsibilities for owners, managers or operators under the directive, apart from the fact that, if their system was not compliant with the directive when installed, they will almost certainly have liabilities under other health and safety legislation - see FAQ 20 onwards.

5. What is the scope of the Machinery Directive?

The Machinery Directive covers a wide range of machinery from simple hand-held tools to complete robotic production systems in factories. Machinery is defined in the directive as: *“An assembly, fitted with or intended to be fitted with a drive system other than directly applied human or animal effort, consisting of linked parts or components, at least one of which moves, and which are joined together for a specific application.”*

6. What are the minimum requirements for safety under the Machinery Directive?

There are two parts to this:

- i. The Essential Health and Safety Requirements set out in Annex 1 of the directive, and
- ii. Recital 14 requires that the “state of the art” is met in achieving EHSR compliance

7. What is the state of the art?

The state of the art is not, as many people, suppose *cutting edge* or *ultimate* safety; it is simply the levels of safety described in various existing product specific standards. Under the directive, a chainsaw must be as safe as a chainsaw standard; an automated door, gate or traffic barrier must be as safe as a door, gate or barrier standard; and a robotic production machine must be as safe as a robotic machine standard. The state of the art is focussed on the safety of people and must be achieved as a primary requirement; any hazard that remains is considered to be a residual hazard, protection of vehicles is a residual matter.

8. Is there any requirement to retrospectively CE mark an existing system?

The answer is no, only where such extensive modifications have taken place that the modification produces a fundamentally different structure or significantly different functionality. Please note, however, this only covers the need for new or replacement CE marking; other national health and safety legislation will require that all maintenance, improvement or modification work results in a safe and compliant system, regardless of its current state or history - see also FAQ 20 onwards.

9. Does an installation company need to risk assess installation of a complete system supplied by a 3rd party?

Yes, although compliance is mainly the responsibility of the manufacturer of the system, the installation company must make an “as installed” risk assessment, taking into account any exposed hazards on the site in question. This assessment should consider all hazards caused by topography, environment, vehicles and users and apply appropriate primary or residual hazard controls.

If the installation company suspect they have been supplied with a fundamentally non-compliant system, it should consult the annex at the end of the appropriate DHF COP for details of how best to proceed.

10. What documentation should be supplied with a new automated gate or traffic barrier system?

- User warnings and safe use instructions
- Detailed maintenance instructions, including: what will need doing; how often; what skills and experience are necessary
- A Declaration of Conformity with the Machinery Directive 2006/42/EC
- A log book to record maintenance activity
- A CE plate or label on the system bearing: the CE, 2006/42/EC; manufacturer contact details; the year of manufacture.

11. What documentation should be supplied with a new automated industrial door or domestic garage door?

- User warnings and safe use instructions
- Detailed maintenance instructions including: what will need doing; how often; what skills and experience are necessary
- A Declaration of Performance with the Construction Products Regulation EU 305/2011
- A Declaration of Conformity with the Machinery Directive 2006/42/EC
- A log book to record maintenance activity
- A CE plate or label on the system bearing: the CE; essential characteristics and performances; the notified body who did the type testing; EU 305/2011; 2006/42/EC; manufacturer contact details; the year of manufacture.

A more detailed description of the documentary requirements and sample documents can be found in section 4 of the appropriate DHF COP - see introduction.

STANDARDS

12. What are the appropriate standards for Machinery Directive and other legislation compliance?

Automated doors, gates and traffic barriers intended primarily for vehicles, but which might also be encountered by people, are covered by EN 12453 (BS EN 12453 in the UK and IS EN 12453 in the Republic of Ireland).

13. Are there any problems with vehicle door, gate and traffic barrier standards?

Yes, in 2011, the UK Health and Safety Executive lodged a formal objection to EN 12453 and other associated standards; this was renewed in 2014. In 2015, the European Commission responded by issuing a formal warning to industry that EN 12453 might not in all cases provide adequate levels of safety to achieve legal compliance. Manufacturers and others relying on the standard were urged to re-visit their risk assessments to ensure that adequate safety was in fact in place. To assist with this, DHF issued DHF TS 011:2016 to cover gates and barriers. We later updated the layout of the 2016 document and added a second document in 2018 (DHF TS 012) to cover industrial doors and domestic garage doors.

14. Is compliance with standards mandatory?

By the letter of the law, no, but the following points must be accommodated in order to achieve legal compliance:

- A. Anything that can be considered a construction product (eg industrial doors and domestic garage doors) must comply with the relevant harmonised standard when placed on the market, where one exists. The doors highlighted above are covered by EN 13241 which is harmonised with the Construction Products Regulation and, hence, must comply with the clauses listed in Annex ZA of the standard.
- B. Safety legislation is generally performance setting in nature but not technically specific; in virtually all cases, the technical detail on how to achieve compliance is left to standards. Very often, by the letter of the law, compliance with a standard is voluntary but reaching or exceeding the levels of safety described in the appropriate standard is not. For example, in the UK BS 7671 - IEE Wiring Regulations (currently 17th edition) is a standard; the Electricity at Work Regulations and Building Regulations are the appropriate law. No one in the UK construction industry nor the building management industry would consider BS 7671 compliance as being optional in practice; the same applies to EN 12453 compliance for doors, gates and barriers.
- C. Legal precedent in multiple door, gate and traffic barrier incident prosecutions has proven that using or failing to use the appropriate standard has been central to the court deciding if reasonable and practical steps have been taken to achieve legal compliance.

15. What are the main requirements of automated door, gate and traffic barrier standards?

EN 12453, either directly or indirectly via references to other standards, requires the following:

A. **Structural integrity** (*also applies to manual doors, gates and barriers*)

The structural design should be such that deformation, falling over and derailment are prevented by good structural design and application of structural safety factors.

B. **Fall back protection** (*also applies to manual doors*)

Vertically moving doors must be protected against single fault failure in the balancing system such that falling back will not occur if a spring, cable, chain or gear fails and that, following a failure, further use is prevented.

C. **Moving parts**

Hazards created by moving parts must be protected between ground and 2.5m above ground or any other permanent access level (all reachable hazards) by:

- Safer design and shaping (the primary Machinery Directive requirement)
- Enclosures and guards, or
- Hold-to-run (trained users only, and then only where hazards are visible), or
- Limiting crushing force to 400N, reducing to 150N in 0.75s and to 25N in 5 seconds, and limiting horizontal impact force to 1400N, reducing to 150N in 0.75s and to 25N in 5 seconds, or
- Use of light grid, laser scanner or similar technology to prevent all possible contact with hazardous movement

Note that point 4 usually needs to be supplemented by photo beams.

D. **Control systems**

Control systems and safety devices should be fail safe in nature and be of adequate integrity.

More detailed descriptions of the requirements and test methods can be found in section 1 of the relevant DHF COP - see introduction.

16. Is force testing a legal requirement?

As standards feature so heavily in deciding if reasonable steps have been taken to provide legal levels of safety, testing is invariably required to prove legal compliance. Of course, testing forces is only one small part of the equation and many other checks and tests are needed to demonstrate adequate safety is achieved and continues to be maintained.

Whatever strategy has been employed to control moving parts hazard must be tested, eg:

- Measuring overtravel for hold to run
- Measuring forces for limitation of force
- Testing light grid or laser scanner coverage and response
- Testing electrical circuits
- Measuring guard and enclosure apertures and safety clearances

Past prosecutions of installation and maintenance companies and employees have centred on the lack of adequate verification of safety measures, including force measurement.

SAFETY DEVICES

17. Do doors, gates and traffic barriers need safe edges?

Standards require that any system not operated in hold-to-run mode must protect moving parts hazards by providing guards or light grid/laser scanner type protection such that contact with hazardous movement is not possible, or by limiting force. Safe edge is one way of providing force limitation, the other equally viable method (for some crush and impact hazards only) is inherent force limitation, where the drive unit is able to sense an obstruction and retract the moving leaf before crush or impact force becomes too high - see section 1 of DHF TS 011 or DHF TS 012.

Note: Since July 2013, all new industrial doors and domestic garage doors must display a CE label that itemises the relevant type test results, in this case **OPERATING FORCE = PASS**. Where this is in place, and it lists the relevant details, and the door has not been modified, it is reasonable to assume that operating force was properly provided when the system was type tested, see section 4 of DHF TS 012:2018 for the finer detail.

18. Do all rolling shutters need safety brakes?

All vertically moving doors must be protected against any single failure of a spring, cable, chain or gear such that at the point of any single failure, the door is either very light, or will not fall back more than 300mm and be prevented from further use.

Not all doors will need devices fitted to achieve this, the tests are:

- Does the door exert a static force of more than 200N ($\approx 20\text{kg}$) when measured at the leading edge, in the least favourable (heaviest) position with any single spring, cable, chain or gear failure?
- Or if yes for A, will the door travel more than 300mm at the point of failure of any single spring, cable, chain or gear and be prevented from further use?

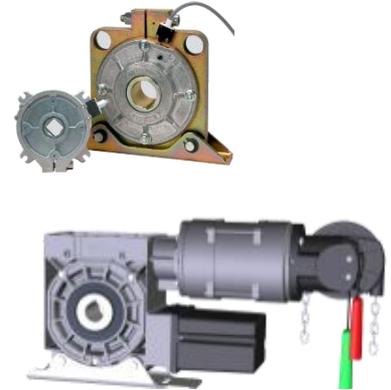
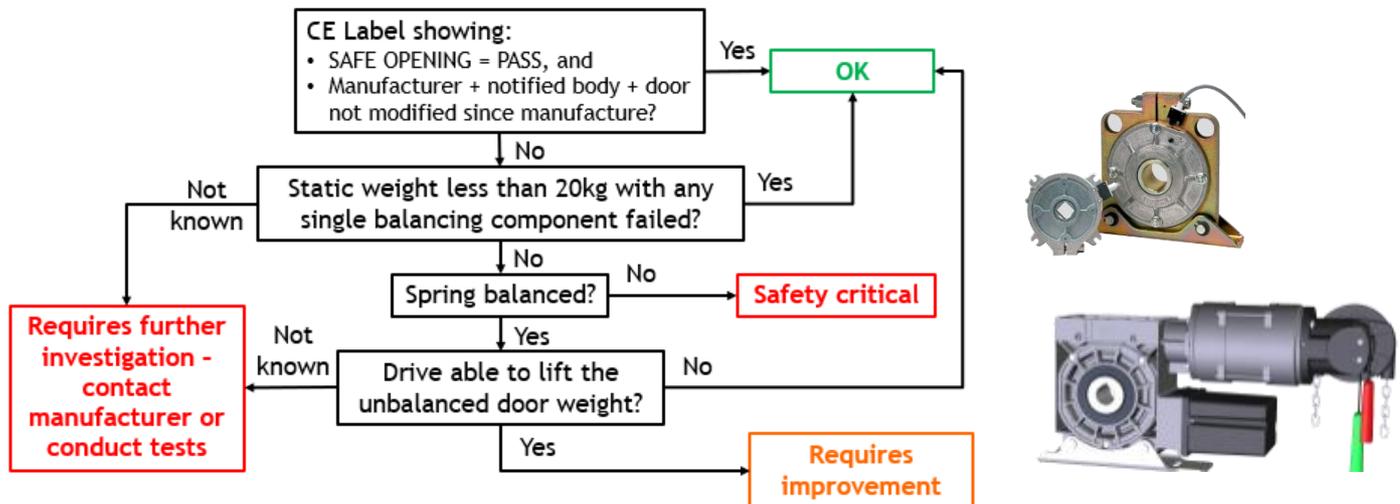
If the answer is yes, the door will need a safety brake.

If the shutter is powered and has a spring balanced barrel and the drive has sufficient torque to lift the door once the spring has failed, the fact that the spring has failed will not be known and the door will become dangerous if it continues to be used. If, however the drive is not powerful enough to open the unbalanced door weight, further use will be prevented.

Note: Since July 2013, all new industrial doors and domestic garage doors must display a CE label that itemises the relevant type test results, in this case **SAFE OPENING = PASS**. Where this is in place, and it lists the relevant details, and the door has not been modified, it is reasonable to assume that operating force was properly provided when the system was type tested.

See section 4 of DHF TS 012:2018 for the finer detail of type testing and CE labelling.

Rolling shutter without safety brake or integral safety brake



If switching to manual mode with a failed spring would cause the door to fall back catastrophically the door would be classified as safety critical. Where a safety brake manufacturer requires the use of a stop switch but it is not connected, this would be classified as requiring improvement.

19. Do all sectional doors need spring break or cable break devices?

All vertically moving doors must be protected against any single failure of a spring or cable such that at the point of any single failure, the door is either very light, or will not fall back more than 300mm and be prevented from further use, the tests are:

- Does the door exert a static force of more than 200N ($\approx 20\text{kg}$) when measured at the leading edge, in the least favourable (heaviest) position with any single spring or cable failure?
- Or if yes for A, will the door travel more than 300mm at the point of failure of any single spring or cable, and be prevented from further use?

If the answer is yes, the door will need a safety device.

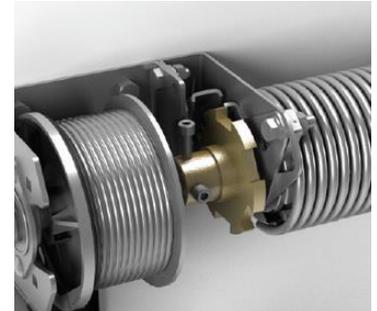
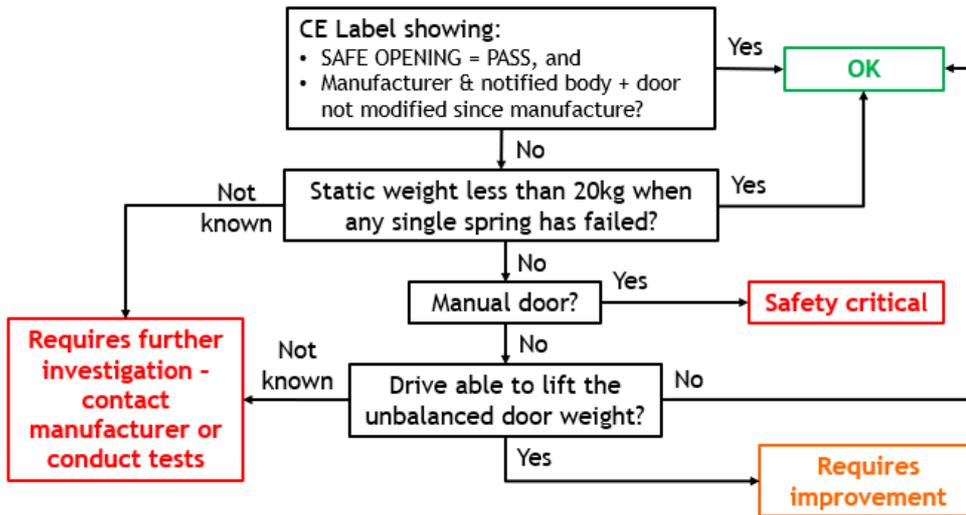
If the door is powered and the drive has sufficient torque to lift the door once the spring has failed, the fact that the spring has failed will not be known and the door will become dangerous if it continues to be used. If, however the drive is not powerful enough to open the unbalanced door weight, further use will be prevented.

If the door does not fall more than 300mm when a cable fails the door does not need a jamming device but continued attempts to move the door under power could cause the other cable to fail and hence a stop switch may be required instead.

Note: Since July 2013, all new industrial doors and domestic garage doors must display a CE label that itemises the relevant type test results, in this case **SAFE OPENING = PASS**. Where this is in place, and it lists the relevant details, and the door has not been modified, it is reasonable to assume that operating force was properly provided when the system was type tested.

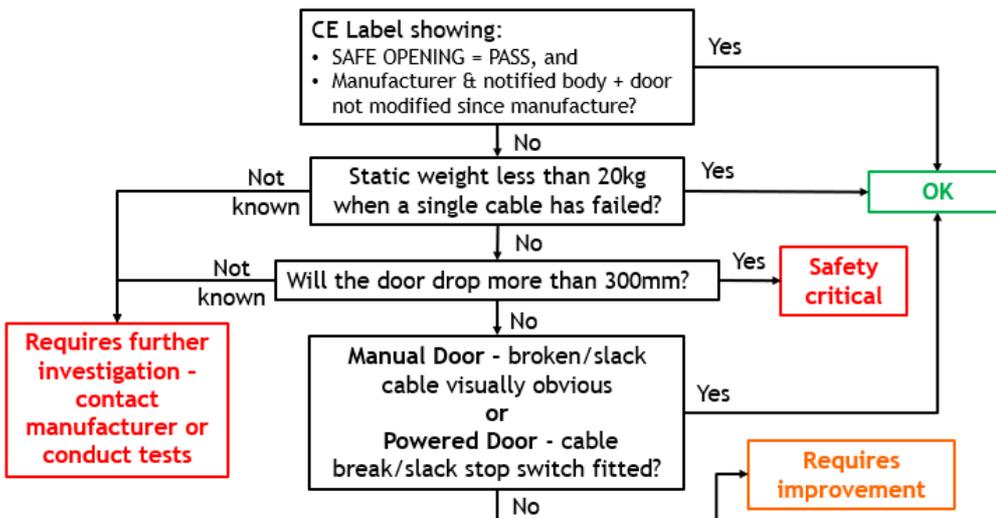
See section 4 of DHF TS 012:2018 for the finer detail of type testing and CE labelling.

Spring balanced sectional door without spring break jamming devices installed



If switching to manual mode with a failed spring would cause the door to fall back catastrophically, the door would be classified as safety critical.

Sectional door without cable break or cable slack jamming devices installed



Where a jamming device manufacturer requires the use of a stop switch but it is not connected, the door would be classified as requiring improvement.

EXISTING SYSTEM REPAIR AND MAINTENANCE

20. Do systems at workplaces need to be brought up to current standards?

Invariably, this question turns out to be: did the system comply with the standards in force at the time of installation?

Given that the standards for vehicle doors, gates and traffic barriers have not changed significantly since 2000 and, before that, there were no standards for these systems, it would be reasonable to judge an existing system against these standards. Although there is no requirement for *manufacturers* to upgrade *existing* systems in line with changes to standards, workplace legislation requires that owners and managers of workplaces keep up with current levels of safety; eg the levels of safety allowed in the 1960s would not be tolerable in a modern workplace.

The following criminal legislation is applicable to workplace owners and managers:

- UK = Workplace (Health Safety and Welfare) Regulations
- Republic of Ireland = Safety, Health and Welfare (General Applications) Regulations

These require that “reasonable and practicable” steps are taken to provide safety. Legal precedent has proven that current standards represent “reasonable and practicable” measures in this regard.

21. Do systems at rented property need to be brought up to current standards?

As with FAQ 20 above, this question usually turns out to be: did the system comply with the standards in force at the time of installation?

Given that the standards for vehicle doors, gates and traffic barriers have not changed significantly since 2000 and, before this, there were no standards for these systems, it would be reasonable to judge an existing system against these standards. Although there is no requirement on *manufacturers* to upgrade *existing* systems in line with changes to standards, general health and safety legislation requires that owners and managers keep up with current levels of safety; eg the levels of safety allowed in the 1960s would not be tolerable in a modern rented property.

The following criminal legislation is applicable to rented property owners and managers:

- UK = Section 3 of Health and Safety at Work Act 1974 (Article 5 1978 Order in NI)
- Republic of Ireland = Safety, Health and Welfare at Work Act 2005 and the Housing (Standards for Rented Houses) Regulations 2008.

These require that “reasonable and practicable” steps are taken to provide safety. Legal precedent has proven that current standards represent “reasonable and practicable” measures in this regard.

22. I am a domestic householder, does my system need to be brought up to current standards?

Again, as with FAQs 20 & 21, this question usually turns out to be: did the system comply with the standards in force at the time of installation?

Although there is no health and safety legislation directly applicable to domestic householders, it would still be wise to ensure systems are safe, as there could still be civil action for negligence in the event of an incident. However, anyone working on a domestic system is bound by health and safety legislation and, hence, cannot leave a system in service with safety critical defects following repair, maintenance or modification. See also FAQ 23 below.

23. Are maintenance companies allowed to leave an unsafe system in service following repair, maintenance or modification work?

Essentially, no; to do so would leave them in breach of national health and safety legislation:

- UK = Section 3 of Health and Safety at Work Act 1974 (Article 5 of the 1978 Order in NI)
- Republic of Ireland = Safety, Health and Welfare at Work Act 2005

If the work the client has requested or agreed to would result in there being safety critical defects present, maintenance companies cannot legally leave the system in service. The client is of course at liberty to make their own decision once they are in possession of the facts; it is after all their system and their liability that is at stake.

If a DHF member company find themselves in this situation, they will explain the safety defects to the client, provide a solution proposal, leave the system safe, show the client how this has been done and issue them with an unsafe system notice. More detail on this can be found in section 5 of the relevant DHF COP - see introduction. This is not an attempt to dictate or influence policy on a system owner/operator, it is simply a measure to protect the maintainer's duties under criminal law and ensure that all stakeholders in the process are informed and able to make reasoned and informed decisions.

24. What hazards need to be addressed?

- A. Structural failure must be prevented
- B. Vertically moving doors must be prevented from falling back in the event of a fault
- C. Sharp edges and hooking hazards must be prevented
- D. Electrical safety must be maintained
- E. Hazards caused by moving parts must be controlled:
 - Crushing: where horizontally reducing gaps get to 500mm or less or any vertically reducing gap between the ground and 2.5m
 - Impact: where a person can be hit or pushed when not in a crushing zone
 - Shear: where passing elements create a guillotine effect
 - Draw-in: where body parts can be pulled into the gaps between moving elements

All reachable hazards must be either eliminated, prevented or controlled in line with the state of the art. Where the state of the art has been achieved, a residual hazard may still exist; these can be controlled further by the use of signs, markings, lights, audible warnings and railings etc based on a local risk assessment. All hazards must be controlled to the state of the art before they can be treated as residual; it is not possible to simply rely on signage and markings etc if the state of the art is not achieved - see FAQ 7.

FURTHER ADVICE

HSE advice on legal responsibilities.

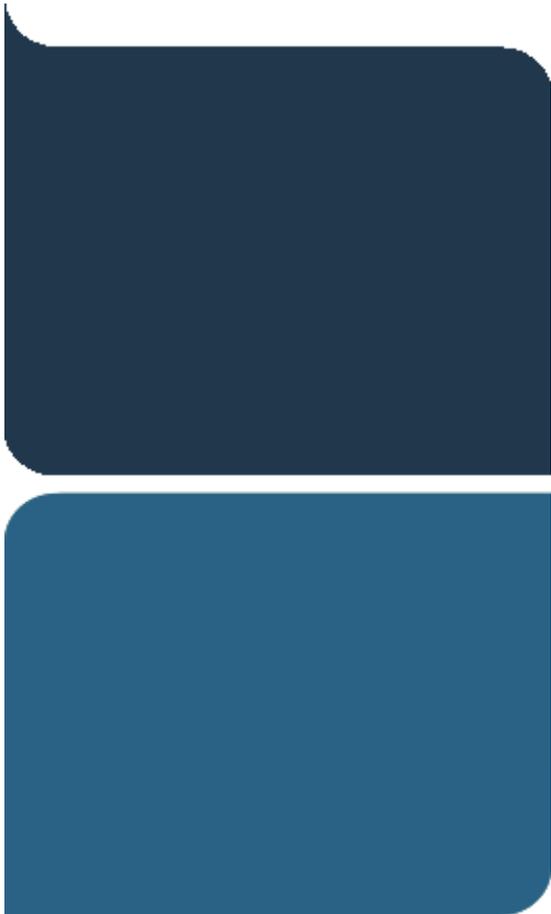
<http://www.hse.gov.uk/work-equipment-machinery/power-gates/responsibilities.htm>

HSE advice on ensuring automated doors and gates are safe.

<http://www.hse.gov.uk/work-equipment-machinery/power-gates/safety.htm>

DHF TS 011:2018 and DHF TS 012:2018

<https://www.dhfonline.org.uk/publications/technical-specifications/1.htm>



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