PRIME SECURITY
GATE AUTOMATION LTD

Guide to Gate Safety Legislation & the Machinery Directive

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Guide to Gate Safety – Legislation & Machinery Directive

Gate Safety in the UK market

In June 2010 the tragic deaths of 2 young children in separate incidents less than 1 week apart only served to highlight the safety issues facing the UK gate automation industry. All automatic gate systems by LAW must be installed in compliance with the Machinery Directive MD2006/42/EC and supporting standards as highlighted by recent safety advisories from the Health & Safety Executive. The HSE will be primarily responsible for any investigations carried out on gates where incidents have occurred and can prosecute installers or manufacturers accordingly. All Manufacturers and installers of automatic gate systems should take all necessary steps to meet compliance with the Machinery Directive to ensure their completed products are safe.

To aid manufacturers & installers in meeting the requirements for directive compliance, a harmonised product standard for gates was produced in 2003. The standard BS-EN13241-1:2003 provides an umbrella platform for creating a compliant gate product. The umbrella platform refers to supporting standards which contain information and requirements for various aspects of the gates performance & design. This guide is designed to provide installers with a summary of the key requirements of each supporting standard referred to by the product standard, and show how to apply appropriate solutions to meet each requirement.

(The information provided in this guide is based directly on key extractions of information from official British and European standards documentation. This information is based on 10 years experience of working with these standards but could still be deemed as interpretation and as a result we can accept no responsibility for any errors or omissions contained therein).

Index of Standards

BS-EN13241-1 makes reference to the following standards:-

BS-EN12453:2001 - Industrial, commercial and garage doors and gates. Safety in use of power operated doors. Requirements.

BS-EN12445:2001 - Industrial, commercial and garage doors and gates. Safety in use of power operated doors. Test methods.

BS-EN12978:2003 - Industrial, commercial and garage doors and gates. Safety devices for power operated doors and gates. Requirements and test methods

BS-EN1760-2:2001 - Safety of machinery. Pressure sensitive protective devices. General principles for the design and testing of pressure sensitive edges and pressure sensitive bars

BS-EN12604:2000 - Industrial, commercial and garage doors and gates. Mechanical aspects. Requirements

BS-EN12605:2000 - Industrial, commercial and garage doors and gates. Mechanical aspects. Test methods

Required Documentation

In addition to the following guidance for product standards, the machinery directive requires several key documents to be created in a technical file. Parts of this technical file can then be handed over with the finished gate product. In addition the final product must also be CE marked and display a label or stamp from its manufacturer. The required documents include the following:-

- Risk Assessment
- Declaration of conformity (Handed over with gate)*
- Manufacturers CE marked stamp or label (Handed over with gate or applied to gate)*
- Force testing results
- Declarations of incorporation (conformity) from drive unit & safety device manufacturers
- Guide for safe use of gate (operational instructions) (Handed over with gate)*
- Installation / Maintenance log (Handed over with gate)*

Responsibilities of the Installer/Manufacturer

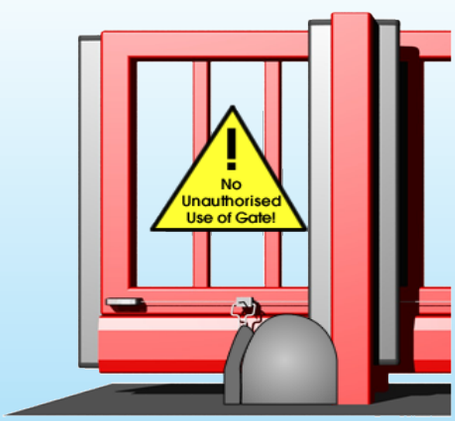
New Installation

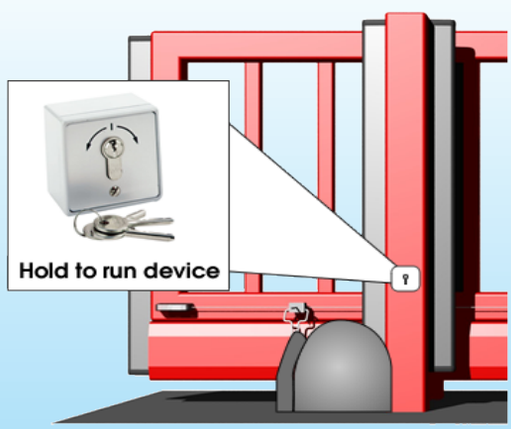
When commissioning a new gate installation, you are required to comply with the machinery directive. This applies to all of the below.

- You manufacture the gate and automation drive unit.
- You manufacture the gate but use automation from another manufacturer.
- You buy the gate and automation from other manufacturers, and commission as a product.

Full compliancy to the machinery directive safety guidelines may vary with commercial & residential gates that meet the below criteria. In these scenarios the risk assessment carried out may identify reduced risks associated with the use of the gate. However even in these circumstances consumer's, Owner's, Installer's & Service Engineer 's safety when using the gate must be considered.

- The gate is only used by trained users and there is no intended, inadvertent or unauthorised access to it by members of the public (e.g secure M.O.D facilities)
- The gate is operated only by trained users using a physical hold to run device (such as a keyswitch) when the trained user is in the direct vicinity of the gate

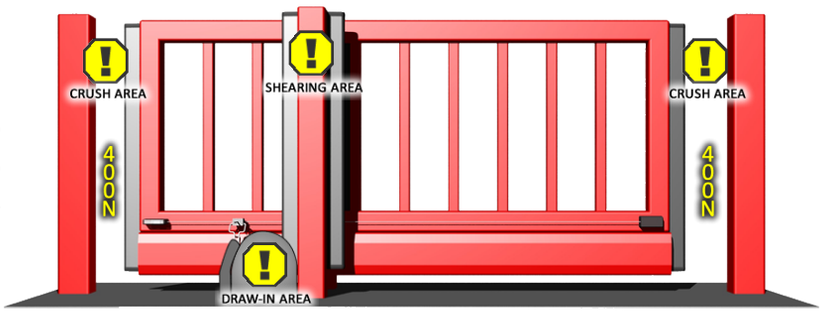


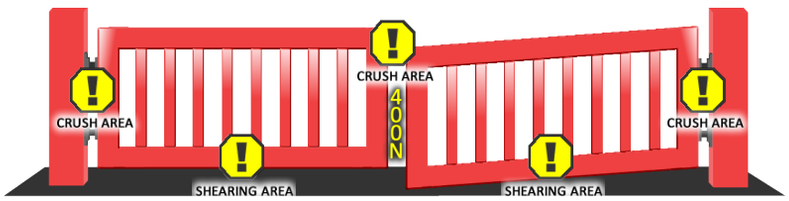


Standards Explained

EN12453 – Key Requirements

- Define areas of crushing, shearing & draw in on gates (see diagrams).
- Stipulates a maximum of 400N of crushing force allowed before gate must start to reverse in these areas (see diagrams). Areas outside of this are allowed up to 1400N.
- States the force exerted on contact must begin to reduce within 750 milliseconds to below 150N
- Requirement to reduce force & back off applies to both opening & closing operations of the gate system
- Defines that a danger area is considered to exist when a gap between the gate and a stationary object reduces to 50cm or below.





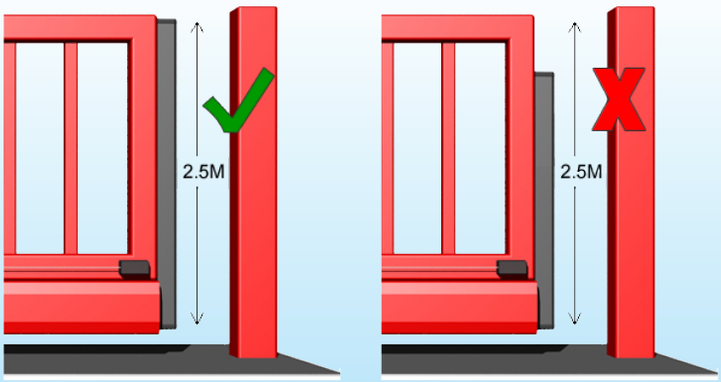
- Lists accepted technologies for providing this protection as torque limitation in drive units, laser light curtain devices & PSPE equipment (safety edges).

Drive Unit

Laser Curtain

Safety Edges

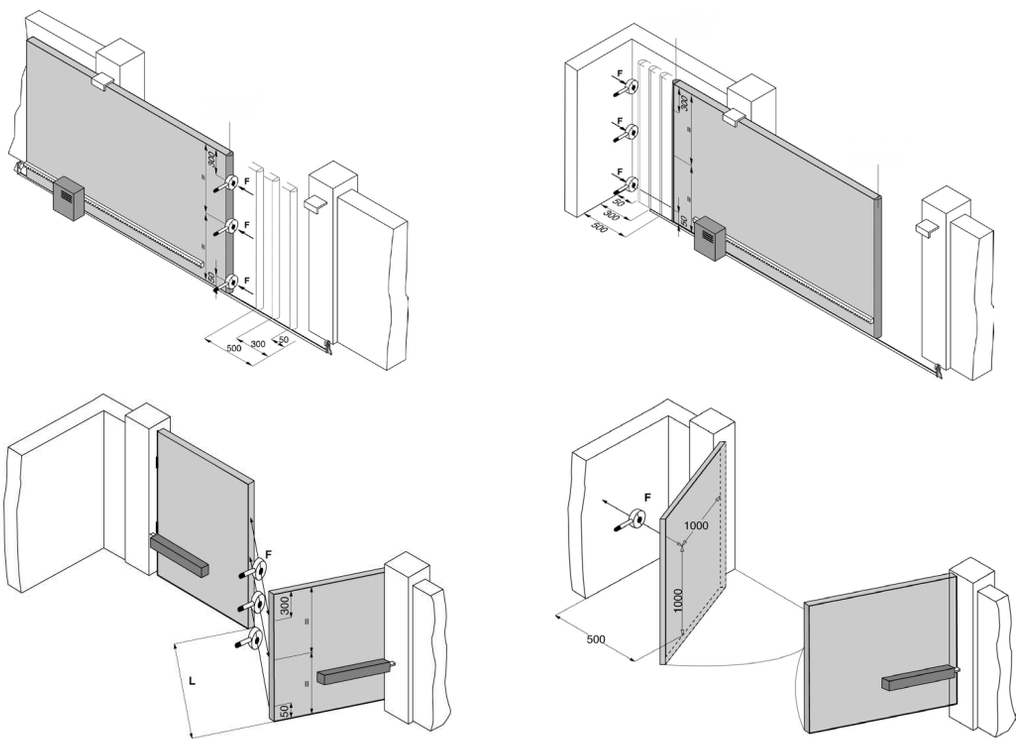
- Requires selected force limitation technology to protect danger areas of gate fully up to a height of 2.5 meters on both sliding and swing gates.
- Requires that the gate must be equipped with an emergency release system (e.g release key). Users must be trained in how to operate the system.



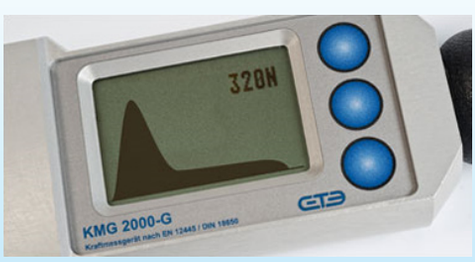
Standards Explained

EN12445 – Key Requirements

- Defines force testing requirement points on sliding and swing gates as the areas illustrated in the diagrams below, please note that the area designated for testing on swing gates when opening only exists when a gate opens within 500mm of a wall, fence or other object in the gates travel.



- Test points are horizontally 500mm, 300mm, 50mm from stop post (See above diagram).
- Vertically 300mmm from top of gate, 50mm from bottom & halfway between these points
- Each test point is measured 3 times
- The average value is then calculated from these results and submitted as a PASS or FAIL
- An EN12445 compliant force testing device must be used !!



- As part of any ongoing maintenance contracts, a gate should be force tested annually, or when any changes to the safety devices are made (e.g altering torque settings in control panel or replacing a drive unit).

Standards Explained

EN12978 – Key Requirements

- Defines required safety category for the electronic transmission system used to connect the safety devices to the automation control board.
- Stipulates the transmission system must employ monitoring against faults in the attached safety devices and use force guided relays to signify a fault.
- Stipulates that the system must be fail safe and ideally CATEGORY 3.

CAT2	Feature	CAT3
√	Edge Monitoring	√
X	Full Self Monitoring	√
X	Backup Relays	√
X	Backup Micro-processor	√
X	Fully Fail-safe	√

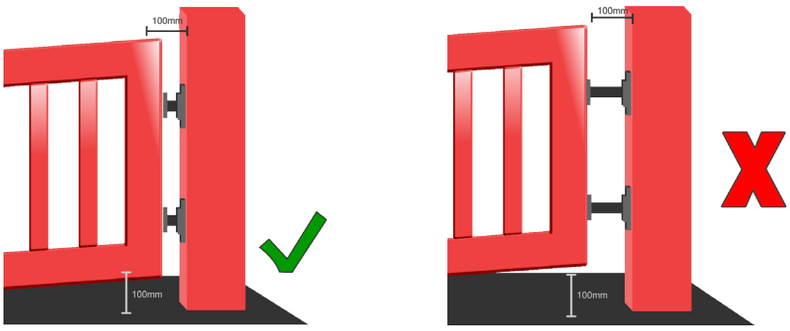
- Minimum device safety level is CATEGORY 2 utilising an external test signal
- A Category 2 transmission system employs a single force guided relay and circuit which is used to monitor the input from the attached safety device. In the event of a failure of the attached safety device the transmission systems relay will open signalling the gate control board. However a Category 2 transmission system does not have in-built monitoring of its own circuit or relay providing no resilience to a point of failure. Due to this design a Category 2 transmission system MUST be externally tested by the gate control board before each gate movement to meet safety requirements.

EN1760-2 – Key Requirements (if using safety edge devices)

- Defines level of sensitivity, performance characteristics, response time and percentage of sensitive surface area of safety edges used
- Tests on the edge are carried out by a notified body
- Certificates for the safety edge devices used must be made available upon request

Standards Explained

- <u>EN12604 & EN12605 – Key Requirements</u>
- Defines mechanical aspects and assembly of the physical gate itself
- Design should eliminate gaps over 100mm in the following areas



- Hinge posts being the gap measured between the gate post and gate frame, this should be 100mm or under and not reduce down by anymore than 25mm when the gate operates
- Centre meeting points (swing gates)
- Gap's above and below the gate must also comply with the 100mm rule. To protect gaps that exceed this measurement the use of torque limitation, pressure sensitive edges or other "state of the art" techniques may be used.

<u>Documentation Explained</u>

In addition to fulfilling the requirements of the product standards each manufacturer or installer should also create a technical file for the finished gate. This technical file should contain the following described documents and be kept by the manufacturer or installer for a minimum period of 10 years.

<u>Risk Assessment – Key requirements</u>

- Should contain definitions of the risks associated with gate being installed
- Layout of design or images illustrating danger areas of that particular gate
- Definitions of the risk illustrated in the layout or image
- Definitions of the applied solutions to either protect or reduce the risk

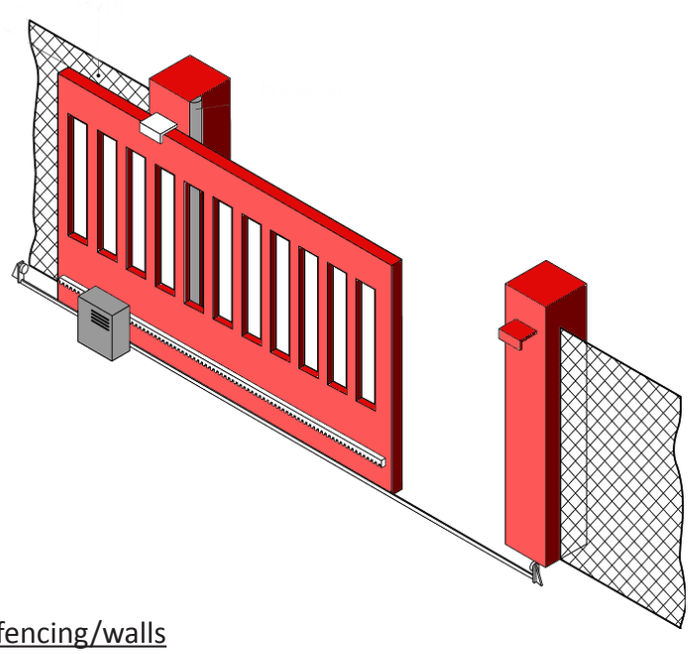
<u>Declaration of conformity – Key requirements</u>

- Should contain company name and address details of issuer of certificate
- Location of installed product and model & serial number
- Compliance statement to machinery directive (MD2006/42/EC)
- List of compliance to standards (i.e. BS-EN13241-1)

Protecting gates opening past meshed, open bar/palisade fencing.

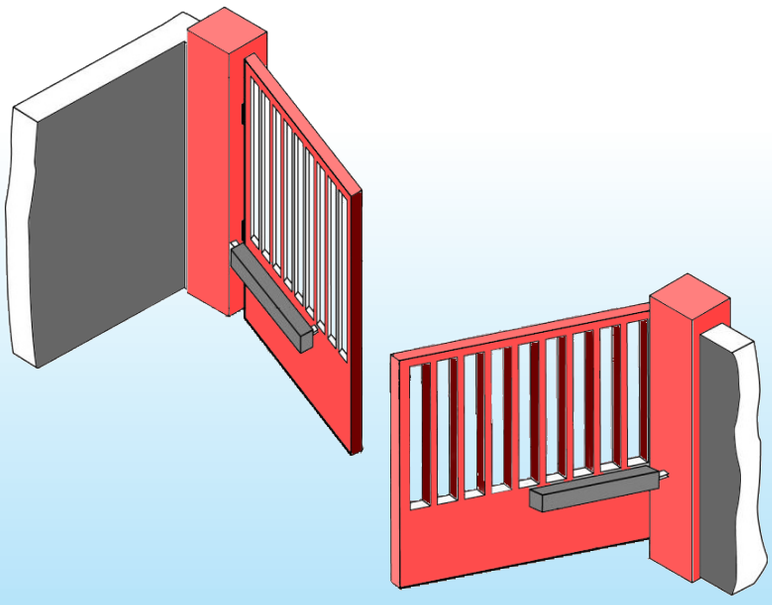
When installing a gate which is moving into or past perimeter fencing, or which is itself mesh in-filled, the following mesh sizes must be applied to the gate or fencing to prevent entrapment or draw-in. Alternately the protection can be provided by utilising an appropriate torque limitation technique, pressure sensitive edge or other "state of the art" technique full-filling the requirements set out in the harmonised standard BS-EN13241-1

Fence Mesh Size (mm)	Distance Between the Leaf and Fence (mm)
<18.5	120
18.5 to <29	300
29 to <44	500
Greater than 44	850

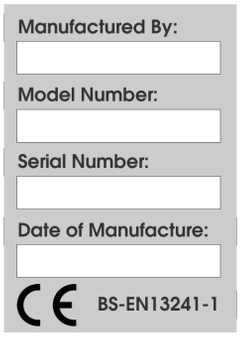


Protecting gates opening into or against stationary fencing/walls

When installing a gate which opens within 500mm of a fence, wall or other solid structure protection must be applied to prevent entrapment. This protection can be provided by utilising an appropriate torque limitation technique, pressure sensitive edge or other "state of the art" technique full-filling the requirements set out in the harmonised standard BS-EN13241-1



Manufacturers label/Stamp – Key requirements



- Should list company name and contact details of issuer of label/stamp
- Model & serial number of gate
- Date of manufacture
- CE mark

Installation/Maintenance log book – Key requirements

- Should contain company name and address details of location of installed product
- Product model & serial number
- Installation details including settings of control board or any relevant settings effecting operation of gate
- Service log area for maintenance/repair of gate
- Signature of responsible person

Servicing, maintenance & repair of existing gates

The current machinery directive MD2006/42/EC came in to force on 29/12/2009, however there were no significant changes from the previous revision Supply of Machinery (Safety) Regulations 2008. In addition to the directive both the Health & Safety at work act 1974 and Workplace (Health, Safety & Welfare) Regulations 1992 can be used in relation to any gate incidents and have been used to prosecute in one case already by the HSE.

Manufacturers and installers of automatic gate systems who provide maintenance of gates should take steps to address safety on existing sites. Companies should consider making contact with their existing customers to update them on legislation & machinery directive requirements and offer a risk assessment service to ensure the gate is safe, including any safety upgrade recommendations. If the person or company responsible for the gate declines to have any safety upgrades applied the installer must make record that the upgrades were refused.

The risk assessment is an essential requirement and is used by the installer to demonstrate that a gate is safe to be worked on and used. If an installation is described as dangerous to the general public or employees on a commercial or industrial site, the installer should notify the client that the gate in question should with immediate affect be taken out of service. The gate should not be placed in use again until the gate is singed off as meeting the machinery directive guidelines and compliance with a declaration of conformity.

If a residential installation is found to be dangerous to the public or authorised users due to its design, location & condition then the installer should again notify the client that the gate should be taken out of service. It is possible that if the client left the dangerous gate in operation that this could fall under a Civil law claim resulting from any accident occurring on the gate.

In both of these circumstances it is not advisable for the installer to physically decommission the equipment by disconnecting it from its power source or disabling it by other method without prior authorisation from the client. The installer should follow the procedure of issuing a notice of un-safe operation in relation to the equipment to the appropriate party and not carry out further work on that gate until it has been bought in line with safety requirements.

Further references can be found here in relation to HSE safety advisories:

http://www.hse.gov.uk/safetybulletins/electricgates.htm
http://www.hse.gov.uk/safetybulletins/electricgates2.htm
http://www.hse.gov.uk/safetybulletins/poweredgates.htm

Frequently Asked Questions

Is it a requirement under LAW to comply with the Machinery Directive?

Yes. If you are installing a gate product that you have manufactured yourself it must comply with the relevant Machinery Directive requirements. When installing gates supplied from OEM manufacturers check that the gate is supplied with the appropriate declaration of conformity, CE mark and technical documentation required to full-fill the machinery directive requirements.

Must I carry out a Risk Assessment?

Yes. You are required to carry out a risk assessment to show that you have either:-

A. Identified the risks associated with the particular gate being installed and have demonstrated where and how you have applied appropriate protection under the relevant requirements of the harmonised product standard (BS-EN13241-1)

B. You are relying on the risk assessment as your proof of compliance when servicing, maintaining or repairing an existing gate. This would also apply to installing a new gate when not following the harmonised product standard. In this case the risk assessment must demonstrate how you have full-filled safety requirements to the same levels as required in BS-EN13241-1.

What can I do about unprotected risks or residual risks identified in my risk assessment that cannot be protected due to gate construction or design?

Residual risks MUST be pointed out in the assessment and if they cannot be protected using “state of the art” technique’s must be pointed out to the customer as part of the handover procedure and safe us of operation procedure for the gate. This could include applying signage warning of the danger on the affected area of the gate.

What is CE marking?

CE marking is a declaration by a manufacturer that the product bearing the mark complies with relevant European directives. There are currently twenty-three directives providing for CE marking, ranging from medical devices to toys.

Is CE marking a legal requirement?

Yes. In the case of most of the above directives it is an offence to place a relevant product on the market without a CE mark. For example, powered gates are covered by the Machinery Directive and the CE mark must be applied when they are manufactured or put into service.

Who is responsible for CE marking of machinery?

The manufacturer or, if he cannot be identified, the person responsible for putting the machinery into service. In the case of powered gates, HSE has identified the responsible person as being the installer. This is because the gate as it leaves the factory is generally not regarded as being a complete machine since it cannot function until it has been installed and adjusted for site conditions.

Where should the CE mark appear?

The machinery directive requires the marking to be indelibly applied to the machine in a visible position.

Are any other directives relevant?

One CE mark will apply to all relevant directives. In the case of gates, the other relevant directives are the Low Voltage Directive, the Electromagnetic Compatibility Directive and the Radio and Telecommunications Terminal Equipment Directive. Compliance with these directives will have been declared by the manufacturers of the drive and control systems and will not normally be assessed by the installer.

What is a Declaration of Conformity?

This is a document issued by the manufacturer (or installer, in the case of gates) declaring that the machinery complies with the machinery directive (and other applicable directives). It should be issued to the purchaser of a new machine. The machine to which it applies must be CE marked.

What is a Declaration of Incorporation?

This applies to partly completed machinery (including drive systems) which are not CE-marked under the machinery directive and declares that the equipment will comply with the machinery directive if incorporated into the final machine in the manner foreseen by the manufacturer. The declaration should be retained in the installer's technical file, assuming that installer will be responsible for completing the machine and issuing the final declaration of conformity.

Who else is responsible for safety of a powered gate?

Except in a private dwelling where no staff are employed, the person in control of the premises has responsibilities under health and safety legislation. The relevant legislation includes the Health and Safety at Work Act 1974, the Workplace (Health, Safety and Welfare) Regulations 1992 and the Provision and Use of Work Equipment Regulations 1998. These responsibilities include ensuring that the gate is fitted with any necessary safety devices, maintaining it in efficient working order and keeping a suitable record of maintenance. Note that 'efficient' in this context means from the point of view of health and safety (not convenience or economy).

If an existing gate does not comply with current safety standards, who is responsible?

The gate as supplied at time of installation should have complied with the relevant safety requirements that were applicable. However developments in "state of the art" technology and health & safety legislation may have altered or increased over time. This would mean that, while the original installer may be obliged to make good any deficiencies in the specification of the gate as originally supplied compared with the requirements in force at that time, extra work to upgrade the gate to today's standards or to repair worn or damaged parts would still be chargeable to the customer.

What does "State of the art" technology mean?

"State of the art" is defined as the highest level of development, as of a device, technique, or scientific field, achieved at a particular time. When assessing the obligation to make good any deficiencies in the original gate installation this should be considered. Current protection techniques or "state of the art" technology may not have been readily available or existed at the time of the original installation and therefore may not have been applied.

If the user of an unsafe gate refuses to have it upgraded, what should the installer do?

Do give the user a letter describing the problem and advising him/her to have it rectified;
Do give the user an estimate to carry out the work;
Don't remove any components or damage the gate in any way;
Do leave the gate switched off (provided that this can be done without exposing a live conductor, removing a component or doing any damage).

Timeline of Legislation and Standards:

1992	Supply of Machinery (Safety) Regulations 1992 [EU Machinery Directive]	Required machinery to be safe and to carry the CE marking. Compliance was demonstrated principally by risk assessment since no harmonised standards existed at the time.	CE marking was required from 1st January 1995
2001	EN 12453:2000	Intended as a supporting standard to EN 13241-1, this nevertheless established the state of the art regarding safety of powered doors and gates. Available to support risk assessments.	Published as a British Standard in January 2001
2003	EN 13241-1:2003	Harmonised product standard under both the Machinery Directive and the Construction Products Directive. Powered door safety requirements based on EN 12453. Compliance with EN 13241-1 gives a presumption of conformity with the directives.	Available for CE marking from 1 May 2004
2008	Supply of Machinery (Safety) Regulations 2008 [EU Machinery Directive revision]	Revision of 1992 regulations; compliance process largely unchanged.	Replaced 1992 regulations from December 2009
2010	HSE Safety Notice FOD WSW 1-2010	Guidance establishes a new "state of the art" for safety of powered gates. The guidance is not itself law, but is rather a new interpretation of the existing law, so could be challenged in court. However, this interpretation should be considered authoritative until modified or replaced.	Published 26th February 2010
2010	HSE Safety Notice FOD 7-2010	Updates and reinforces previous notice.	Published 2nd September 2010
2011	HSE Safety Notice OPSTD 1-2011	Release aimed at Landlords, Commercial owners or facilities managers of property's with Powered Perimeter Gates. Sets out to inform of the duty of care responsibilities of the afore mentioned to ensure gates are maintained correctly or bought in-line	Published 21st January 2011