

Introduction

In June 2010 the tragic deaths of two young children in separate incidents in the UK less than one week apart served to highlight the safety issues facing the gate automation industry. This was particularly the case since these tragedies followed so soon after the conviction of a gate manufacturer for breaches of health and safety law in relation to an earlier child fatality. Numerous articles can be found highlighting fatalities worldwide and in May 2014 CCTV footage of 4 year old boy losing his life in Russia appeared on the internet.

This guide is presented as a summary of the current legislation and standards which it is hoped will assist user & owners in understanding the requirements and meeting their obligations.

The legal position is that powered gate systems are considered to be “machinery”. This means that, by law, every powered gate, when it is put into service, must comply with the European Machinery Directive (2006/42/EC), especially the Directive’s Essential Health and Safety Requirements, be CE marked and accompanied by a Declaration of Conformity. The responsibility for complying with the law rests with the owner or board of directors if no Maintenance contract is in place. If a contract is put in place by the owner the responsibility transfers to the maintenance company. Provided the Maintenance company is capable of providing an adequate risk assessment, Pressure test and CE conformity labeling. Awareness of what is required within the industry is low and employing a company not adhering to the new standards will leave owners also liable. DNA Security carried out full training with Nick Perkins of the Door & hardware federation. <http://www.dhfonline.org.uk/> Set up to provide accreditation to companies in the UK installing to the now required standards. There is no accreditation body available in Ireland and no governing body inspecting installations. The Health and Safety authority will investigate all injuries relating to automatic gates and doors and prosecute for each non compliance with the legislation.



The key to compliance with the law is risk assessment, which includes identifying the hazards, estimating the severity and likelihood of each hazard, followed by an evaluation to determine whether each hazard is adequately controlled and, if it is not, what further action needs to be taken to control the risk; the principal aim is to secure compliance with the Machinery Directive’s Essential Health and Safety Requirements.

Some guidance on hazards presented by powered gates is given below. It should, however, be noted that these standards were, for the most part, written for use in a factory environment and it may not be possible to carry out all the necessary tests where a gate is created on site. A brief description of the available standards is given.

Responsibilities of the installer/manufacture/maintenance company

DOCUMENTATION

Technical file

The Machinery Directive requires several key documents to be created in a “technical file”. This file must be retained by the responsible person (i.e.: the individual or organisation responsible for CE marking) for at least ten years. Where the file is being created by the installer, the documentation would include the following:

- A description of the gate, including technical drawings, electrical/control schematics, and design calculations
- Risk assessments – including hazards identified and protective measures implemented to secure compliance with the applicable Essential Health and Safety Requirements
- Test results - including force testing results where applicable
- Any standards or technical specifications used, indicating the Essential Health and Safety Requirements covered by these standards
- Declarations of Incorporation or Conformity from suppliers of drives, controls and safety devices
- Installation instructions provided by suppliers of drives, controls and safety devices
- A copy of the operating instructions and maintenance log book issued to the customer
- A copy of the Declaration of Conformity issued to the customer

Declaration of Conformity

This document must be drawn up by the person responsible for CE marking.

The exact format is not prescribed but it must contain the following:

- Name and address of the responsible person
- Description and identification of the machinery
- A sentence declaring that the machinery fulfils the provisions of the Machinery Directive 2006/42/EC. Where relevant, similar sentences relating to other directives which are applicable
- A reference to the harmonised standards used (if appropriate) eg: EN 13241-1:2003
- References to other technical standards and specifications used
- Signature, date and place of the declaration

A copy of the declaration must accompany the gate.



CE marking

The marking consists of the letters “CE”, affixed visibly, legibly and indelibly to the machine. This must be accompanied by the name of the responsible person (generally the installation company DNA Security Limited).

RISK ASSESSMENT

What is it?

Risk assessment is a series of logical steps to permit analysis and evaluation of risks associated with machinery. Where necessary, this is followed by risk reduction. It may be necessary to repeat the process to eliminate hazards as far as practicable and to adequately reduce risk by implementation of protective measures.

How does it work?

The following steps can be identified:

Risk analysis

1. *Determination of the limits of the machinery. Essentially, this part of the process is about setting boundaries to the risk analysis process. It includes both the intended use and reasonably foreseeable misuse of the gate. Limits on use would include what operating modes are available and who is likely to use and/or come into contact with the gate, their physical abilities, their level of knowledge, etc. Space limits would include the range of movement, location of controls And space required for maintenance. Limits on time would include the life times of components and recommended service intervals. Environmental limits could include whether the gate is expected to operate in extreme weather conditions.*
2. *Hazard Identification. This includes the systematic identification of reasonably foreseeable hazards which could arise at any stage of the gate's life, including while it is being commissioned, used, maintained, or dismantled. Many of these hazards are mentioned below (under "Standards"), but this cannot be regarded as a comprehensive list.*
3. *Risk estimation. The risk associated with each hazard will depend on the severity of the harm caused and how likely it is that harm will be caused. The likelihood, in turn, depends on exposure of people to the hazard, the probability of the hazardous event and the possibility that the harm can be avoided or limited.*

Risk evaluation

This process must be carried out to determine whether risk reduction is required. If the need for risk reduction is identified, then, once the necessary measures have been taken, the process of risk analysis and evaluation should be repeated to ensure that no further risk reduction is required. Satisfactory risk reduction requires that, in order of preference:

- a) The hazard has been eliminated or the risk reduced by design;
- b) The risk has been reduced by the application of safeguarding measures (see below for examples);
- c) When (a) or (b) are not practicable, adequate warning of any remaining risk and instructions required to control it has been given to users;
- d) The application of mitigation measures e.g. Means by which persons may be released from the hazard quickly and safely.

STANDARDS

Electronic Access Control – From the 1st of October 2012 all contractors working on Electronic Access control must be registered with the National Standard Authority of Ireland for SR40:2005

Registration with the Private Security Authority is also compulsory from this date.

(Unfortunately ensuring your contractor is registered does not confirm that they are fully trained in the requirements for the Machines Directive.)

Machines Directive -

IS EN 12635:2002+A1:2008: Industrial, commercial and garage doors and gates- Installation and use

IS EN 12604:2000: Industrial, commercial and garage doors and gates - Mechanical Aspects- Requirements

IS EN 12453:2000: Industrial, commercial and garage doors and gates - Safety in use of power operated doors - Requirements.
Building regulations and electrical specification to be harmonised.

To aid manufacturers in meeting the Machinery Directive's requirements, a "harmonised" European product standard for gates was published in 2003: BS EN 13241-1. The fact that it is harmonised means that, if a gate complies with the standard, there is a legal presumption that it complies with health and safety requirements of the directive itself.

The standards explained

EN 12453 – Key Requirements. The level of safety required is determined by the risk:

Type of control	Conditions of use		
	Trained users, no public present	Trained users, public may be present	Untrained users, public may be present
Hold to run (ie continuous pressure required) located in sight of gate	0	*	***
Impulse (ie continuous pressure not required) located in sight of gate	**	**	***
Impulse not located in sight of gate	**	***	***
Automatic	***	***	***

Key to table

0 = no additional safety required;

* = Key switch or similar to prevent unauthorised use;

** = EITHER force limitation OR a means of presence detection which ensures that in no circumstances can a person be touched by the gate;

*** = EITHER a combination of force limitation and presence detection which would detect a person or obstacle on the floor at either side of the gate OR a means of presence detection which ensures that in no circumstances can a person be touched by the gate.

Note that "force limitation" in this context can refer to protection built into the drive system and/or to protection provided by PSPE - pressure sensitive protective equipment (safety edges). Also, "presence detection" in this context can refer to ESPE - electro-sensitive protective equipment (photoelectric cells). When referring to presence detection preventing a person being touched by the gate in any circumstances, currently photoelectric/laser light curtains providing a detection area from ground level up to a height of 2.5 metres should be used and are the current "state of the art" devices available to provide this level of protection.

It will be seen that, in most cases, a perimeter gate where the public may be present as users or passers-by will require the highest (***) category of safety provision.

The standard also:

- defines areas of crushing, shearing & draw in on gates (see figure 1). (Note that if such risks exist in these areas they must be safeguarded in addition, using means such as infilling with mesh to prevent access through rails and use of suitable CE marked protective safety devices.)
- stipulates a maximum of 400N of crushing force allowed before gate should start to reverse in these areas (see diagrams)
- for gaps greater than 500 mm a maximum crushing force of 1400N is specified
- stipulates that the force exerted on contact must have reduced to no greater than 150N within 750 milliseconds
- specifies a requirement to reduce force & back off for 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
- requires selected force limitation technology to protect danger areas of gate fully up to a height of 2.5 metres on both sliding and swing gates (figure 2)
- requires controls to be sited so that the operator is not in a dangerous position
- lists accepted technologies for providing this protection as :-
 1. inherent protection (eg: torque limitation, encoders or sensors) in drive units
 2. electro-sensitive protective equipment (eg: light curtain devices)
 3. pressure-sensitive protective equipment (eg: safety edges)

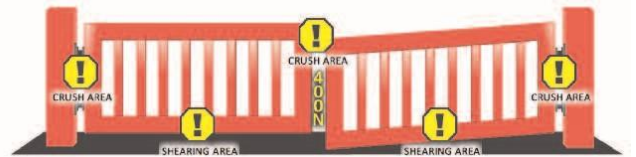
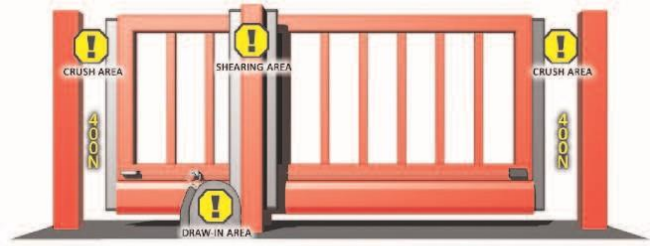


Figure 1 - Hazards



Figure 2 – safeguarding required up to 2.5m from ground level3. pressure-sensitive protective equipment (eg: safety edges).

The above listed technologies provide protection utilising current “state of the art” techniques available to the European gate installation market.

Notes:

1. A flexible edge may be required in order to achieve the force limitation required.
2. The requirement to reduce force and back off are important to prevent sustained crushing and suffocation should someone get caught.
3. Consideration should not be limited to just the closing edge but also to the opening and hinged areas.
4. Over-running of the gate when opening or closing that could lead to the gate becoming detached and falling should also be considered e.g. stops provided to ensure this does not happen.

EN 12604 & EN 12605 – Key requirements (see also BS 6180)

- Defines mechanical aspects and assembly of the gate
- Design should eliminate gaps over 100mm in the following areas
- Hinge posts
- Centre meeting points (swing gates)
- Gap between floor and gate

Notes:

1. Gaps that close due to movement of the gate, e.g. at the hinge post should also be assessed in relation to arm, leg and head trapping.

EN 12635:2002 – Key requirements

Specifies the information to be provided by the manufacturers of gates and components to ensure safe installation, maintenance, operation and use of powered gates.

EN 12445 – 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 gate's travel
- Test points are horizontally 500mm, 300mm, 50mm from stop post (See figure 3)
- Vertically 300mm 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 EN 12445 compliant force testing device must be used!

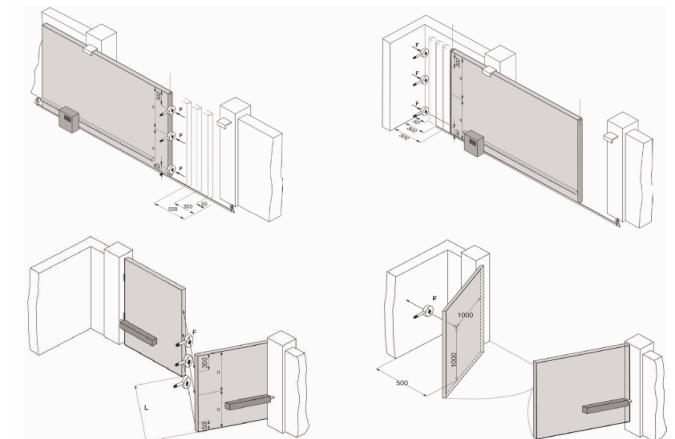


Figure 3 – measurement points for force testing to EN 1244

Additional recommendations

The Health and Safety Authority has issued a safety notices relating to electric gates:

http://www.hsa.ie/eng/Topics/Safety_Alerts/Electrically_Powered_Gates/

The Health and Safety Executive in the UK has issued a safety notices relating to electric gates:

<http://www.hse.gov.uk/safetybulletins/electricgates.htm> - <http://www.hse.gov.uk/safetybulletins/electricgates2.htm>

Among the recommendations not specifically covered in the above European standards are:

Emergency arrangements. An important consideration is what happens if someone becomes trapped in the gate. Some designs may require use of a special release key or similar and, if this is the case, arrangements must be in place to ensure that the keys and instructions for their use are readily available to all authorised users.

Force testing. Use of force testing equipment is required if force limitation is used as a risk reduction measure, both when a new gate is installed and periodically thereafter.

SERVICING, MAINTENANCE & REPAIR OF EXISTING GATES

The Machines Directive was written by the Italian Government and came into effect in Europe in 2000 but unfortunately awareness was not highlighted to the directive until the British Government went to write legislation after a number of incidence involving automatic gates. The current Machinery Directive 2006/42/EC came into force in the UK on 29/12/2009; however, there were no significant changes from the previous version of the directive in relation to safety requirements. Other legislation, including the Health & Safety at Work Act 1974, the Workplace (Health, Safety & Welfare) Regulations 1992 and the Provision and Use of Work Equipment Regulations 1998 applies to the use and maintenance of gates in the workplace.

Anyone who provides maintenance for gates should take steps to address safety on these sites. Companies should consider making contact with their existing customers to update them on legislation and current standards of safety and to offer a risk assessment service to ensure the gate is safe including any safety upgrade recommendations. DNA Security will carry out a free survey of any existing gate. If the person or company responsible for the gate declines to have any safety upgrades applied, the installer should keep a written record that the upgrades were refused.

Risk assessment is an essential requirement for compliance with the health and safety legislation referred to above and should be carried out by the installer or maintenance engineer to demonstrate that a gate is safe to be used and that necessary steps have been taken to bring the gate up to current standards. If an installation is found to be dangerous to the general public or employees on a commercial or industrial site, The installer should ensure the gate is left in a safe condition (e.g. out of use or on manual hold to run control) and should contact the client to explain the danger and that the gate has or must be taken out of automatic/remote use immediately. The installer should notify the client in writing what measures have and need to be taken and that the gate in question should remain out of service. If required, the installer should explain the reason: (e.g. that the installation contravenes the Workplace (Health, Safety & Welfare) Regulations 1992 or Provision and Use of Work Equipment Regulations 1998). The gate should not be placed in use again until the gate is signed off as meeting the requirements of the legislation.

If a residential installation is found to be dangerous to the general public due to its design, location and condition (e.g. accessible from a public right of way or road and unsafe), then the installer should again notify the client in writing that the gate should be taken out of action. It is possible that, if the client left the dangerous gate in operation, this could result in a civil claim resulting from any accident occurring on that gate.

In both of these circumstances, the device may be left switched off provided that this can be done without disconnecting a cable, removing a component or exposing a live conductor. The installer should inform the appropriate party in writing that the equipment is unsafe and should not be used again until it has been bought in line with current safety requirements.



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