Technical ✓ Specification

dhf Raising Standards Advancing Safety

Code of Practice for the Design, Manufacture, Installation and Maintenance of Industrial Doors and Domestic Garage Doors

DHF TS 012:2019

Contents

Revision	Description	Date
DHF TS 012:2018 v1	First edition	Feb 2018
DHF TS 012:2019 v2	Second edition, reflecting publication of EN 12453/12604:2017	Apr 2019
DHF TS 012:2019 v3	Update of logo	Mar 2020

Foreword

This code of practice draws on applicable legislation, European standards, British standards and industry best practice to assist all those involved in the industrial and garage door industry to meet their legal obligations by providing clear guidance on the design, manufacture, installation and maintenance of industrial and garage doors.

The objectives of this code of practice are to:

i. explain the minimum safety standards for design, manufacture, installation, maintenance and operation of industrial and garage doors
ii. provide guidance on the required level of user training and safety awareness
iii. explain the minimum requirements for technical documentation
iv. advise on a training and competency framework.

In 2011, the UK Health and Safety Executive lodged a formal objection to the package of standards covering industrial and garage doors in place at that time. After consultation and consideration, in July 2015, the European Commission issued a warning that the harmonised standard (EN 13241-1:2003+A1:2011) did not, by reference to the other standards in the package (primarily EN 12453:2000), achieve a level of safety that would comply with the Machinery Directive 2006/42/EC. Those who were relying on EN 12453:2000 and BS EN 12604:2000, by reference from EN 13241, were advised to review their risk assessment to ensure that their product did in fact meet the required level of safety for legal compliance.

BS EN 12453:2017 has now been published in the UK as an update to the original 2001 UK version but sadly has still not achieved the level of safety required for Machinery Directive compliance, despite the presence of an annex ZA that claims to confer compliance. A standard does not actually confer compliance with the Directive until it has been listed in the Official Journal.

https://ec.europa.eu/growth/single-market/european-standards/harmonised-standards/machinery_en

BS EN 12453:2017 contains a foreword, warning users not to rely on this standard (or by reference BS EN 12604:2017) for compliance with the Machinery Directive; HSE has also issued a warning.

http://www.hse.gov.uk/safetybulletins/revision-standards-powered-doors.htm

Where existing standards have been proven to be defective, or where industry experience or legal precedent has indicated there are common misinterpretations, this code of practice provides a workable method of mitigating the resulting risk.

As compliance with standards is technically in law mostly voluntary, the term “should” as opposed to “must” is used in many of the clauses. Users of this code are reminded however that product specific standards represent the legal minimum level of safety acceptable in law (variously the state-of-the-art or reasonable & practicable measures depending on legal jurisdiction) and hence where these standards are not followed, an equal or improved level of safety must be achieved – see 4.1.1. Account must also be taken of the fact that, in some areas, existing standards are not deemed adequate for legal compliance and hence additional steps must be taken, the advice given in this code strives to address these shortfalls. This is done to protect the safety and legal interests of users, service providers and owner groups.

Compliance with this code of practice cannot confer immunity from legal obligations.

Scope

This code of practice contains requirements and recommendations for the design, manufacture, installation, modification, repair and maintenance of industrial doors and domestic garage doors intended primarily for vehicles, but which could also be accessed by persons; this code also includes shop front shutters over pedestrian accesses.

This code of practice does not cover the fire/smoke resisting properties of fire/smoke resisting doors within the scope but does cover all other aspects of safety in use and legal compliance of such doors in normal day to day use.

This code of practice excludes the following:

(i) lock or dock gates (for boats)
(ii) lift doors
(iii) doors in vehicles
(iv) armoured doors (eg safe or strong room doors)
(v) doors mainly for the retention of animals
(vi) theatre textile curtains
(vii) perimeter gates (see DHF TS 011:2019)
(viii) traffic barriers (see DHF TS 011:2019)
(ix) automated doors used exclusively for pedestrians (see EN 16005)
(x) railway crossing traffic barriers (contact Network Rail)
(xi) the fire and smoke resisting properties of doors within scope of this code.

This code of practice does not cover in detail the design or manufacture of control panels, drive units or safety devices. It does make reference to the minimum compliance requirements for these components where they are incorporated into doors covered by this code.

References

Normative

The latest versions of the following standards provide information which is supplementary to the requirements of this code of practice. Where referenced in this code of practice, compliance with the relevant elements of these standards is a requirement for compliance with this code.

For dated references, the latest edition of the publication referred to applies (including amendments).

BS 7671 (as amended), Requirements for electrical installations, also known as the IET Wiring Regulations

ET 101 (as amended), ETCI Rules for electrical Installations (Republic of Ireland)

EN 12978 (as amended), Industrial, commercial and garage doors and gates – Safety devices for power operated doors and gates – Requirements and test methods

ISO 13849-1 (as amended), Safety of machinery – Safety related parts of control systems - Part 1 General principles for design

BS 6375-1 (as amended), Performance of windows and doors. Classification for weathertightness and guidance on selection and specification

EN 1991-1-4 (as amended), Eurocode 1. Actions on structures. General actions. Wind actions

Informative

For companies undertaking the design and manufacture of mass-produced or series produced doors, or for micro-enterprises conducting their own type-testing for Construction Products Regulation (EU) 305/2011 compliance, the current versions of the following standards describe the state-of-the-art necessary for legal compliance, notwithstanding the points raised in the foreword in regard to current standards.

EN 13241: 2003+A2:2016, Industrial, commercial and garage doors and gates – product standard - performance characteristics.

EN 12453:2017, Power operated industrial, commercial and garage doors and gates – safety in use.

EN 12604:2017, Industrial, commercial and garage doors and gates – mechanical aspects.

ISO 13857, Safety of machinery – Safety distances to prevent hazard zones being reached by upper and lower limbs.

EN 12635, Industrial, commercial and garage doors and gates – Installation and use instructions.

EN 60204-1, Safety of machinery – Electrical equipment of machines, general requirements.

European Commission - Machinery Directive 2006/42/EC

https://ec.europa.eu/docsroom/documents/9202/attachments/1/translations/en/renditions/native

European Commission - Guide to Machinery Directive compliance

https://osha.europa.eu/en/legislation/guidelines/guide-application-machinery-directive-200642ec

Definitions

Activation device

Button, switch, key switch, handheld radio transmitter, radio transponder, digital keypad, intercom, ground loop, radar movement sensor or any other device used to generate or deliver a command to a door system.

Assembler

Company or person who assembles a door from components and hence takes on the responsibilities of a "manufacturer" in regard to legal compliance.

Certificate of compliance

Document issued to a system manager certifying that the door meets the requirements of this code of practice. Not to be confused with or replace a Declaration of Conformity (below).

Declaration of conformity

A legally required document from a company or person responsible for legal compliance stating that the product to which it applies meets all relevant requirements of the Machinery Directive (see section 4) and all other European product safety Directives applicable to that product, when first placed on the market or put into service.

Declaration of incorporation

A legally required document from the manufacturer of a partly completed machine (PCM) to inform the assembler of the final machinery into which it will be incorporated that the PCM fulfils the requirements of all applicable European product safety Directives.

Declaration of performance

A legally required document declaring a construction product's performance made in accordance with the Construction Products Regulation. Performance must be declared against a list of essential characteristics specified in the relevant standard harmonised under the regulation, where one exists.

Designer

Company or person responsible for the design of a door. Designers are responsible for ensuring that the design will be safe, legally compliant and is suitable for the working environment and task as agreed with the client. The designer is commonly the architect or specifier but can also be the assembler or the manufacturer.

Extensive modification

An alteration to an existing door that is so extensive that a new powered door has been created and hence the need for re-CE marking in accordance with the Machinery Directive. This does not occur where parts are replaced like for like but, does occur where the way it operates has changed significantly.

Industrial door or domestic garage door

A door primarily intended for vehicular use, but which might also be encountered by persons in industrial, commercial, residential or domestic premises.

Installer

Individual employed by an installation contractor to install, repair, maintain or modify door systems.

Installation contractor

Company or person responsible for the safe installation of a door system.

Manufacturer

Company or person responsible for the manufacture of a component or complete door.

Maintenance contractor

Company or person contracted to provide maintenance, modification or repair of an existing door.

Partly completed machine

An assembly which is almost machinery, but which cannot itself perform a specific application; a drive unit and control board is partly completed machinery.

Planned preventative maintenance

Routine servicing of a door carried out on a regular basis, to ensure ongoing safety and reliability.

Reactive maintenance

Repair, maintenance or modification carried out in response to the development of a fault.

Residual hazard

The hazard that remains when the legal minimum "state-of-the-art" degree of safety has been achieved.

Risk assessment

The process of identifying hazards and controlling, or checking that they are controlled, to legally acceptable levels.

Safety component

A component which serves to fulfil a safety function and is is independently placed on the market. The failure and/or malfunction of which endangers the safety of persons, and which is not necessary in order for the machinery to function, or for which normal components could be substituted in order for the machinery to function (albeit less safely).

Safe system

A door in conformity with the requirements of this code.

State-of-the-art

The state-of-the-art is a concept required by recital 14 of the Machinery Directive. It is the level of safety required and described in current product specific standards and other readily available relevant documents. The state-of-the-art represents the minimum level of safety permitted by the Directive. It is by this means that the state-of-the-art can change due to advances in technology and as standards are updated without the need to edit the Directive.

System manager

Company or person owning, or in control of, or with legal responsibility for a door in service. The system manager has legal responsibilities to users or others who may encounter the door in use. The system manager is very often the client of the installation or maintenance contractor.

System safety unknown notice

A notice issued to a system manager informing them that due to a lack of safe access, the safety of the door in question cannot be ascertained, and hence it is not known if it is safe to use or not.

Unsafe system notice

A notice issued to a system manager informing them that the door in question has been assessed as being unsafe in accordance with this code of practice.

User

Anybody operating, using or passing by the door system who may be affected by it.

1. Requirements for safety

This section is based on information gained from current and past standards; primarily EN 12453 and EN 12604. Where a requirement reflects a change that only applies to systems installed after a certain date, this is declared in the relevant clause. Overall, the requirements for safety in this section relate equally to new or existing industrial and garage doors.

1.1. Training and competency

Central to providing the required level of safety is the training, experience and competence of those involved; guidance for training and qualification are outlined in Annex G of this code.

1.2. Design and suitability of the door

The door should be designed and specified to reflect the demands of the site and the needs of users and yet remain safe. Factors that should be considered are: **a)** environment (wind, rain, flood risk, dust, ultra violet, flora or fauna); **b)** location (sloping ground, emergency entry and egress, visibility and nature of traffic); **c)** duty cycle (how often the door will operate per hour/24-hour period); **d)** user vulnerability (vicinity to the public, young children, people with physical and sensory limitations or people with learning restrictions). The final specification should be compliant with this code, be drawn up as a design proposal and be agreed with the client.

1.3. Risk assessment

A suitable and sufficient risk assessment must be conducted and recorded as evidence of compliance for: **a)** the design of a new door; **b)** installation of complete door supplied by a 3rd party; **c)** upon modification of an existing door; **d)** and prior to taking on reactive or planned maintenance of a door for the first time. The risk assessment should include the seven steps described in section 2 and be recorded and retained as evidence of compliance. Where the risk assessment is being conducted for the design of a new powered door, it should include a list of Machinery Directive Essential Health and Safety Requirements complied with (see section 4.1).

Where the risk assessment for installation of a new CE marked door, supplied by a third-party (see 4.1.1), indicates that the door ***does not*** achieve the state-of-the-art (the requirements for safety in this section), the installation contractor should refer to and apply the process described in Annex H. Where the risk assessment of such a door indicates that the state-of-the-art ***is*** achieved but residual hazards are present based on its local environment or use, the installation company should address them, see 1.5.12.

1.4. Certificate of compliance (See Annex B)

A certificate of compliance should be issued to the client on successful completion of a compliance assessment: **a)** upon completion of a modification of an existing door; **b)** at take-over of a door under maintenance contract; **c)** following a one-off repair of a door not under a planned maintenance contract. Alternatively, where the compliance assessment of an existing door indicates non-compliance with this code, an unsafe system notice (see Annex C.1) should be issued instead. Where access to safety critical elements is not possible in safety, it cannot be ascertained if the door is safe or not and hence a system safety unknown notice (see Annex C.2) should be issued instead.

1.5. Hazards and hazard control strategy

Hazards are the things that could potentially cause harm. All doors possess hazards. Some hazards like structural failure, electric shock and crush at the leading edge are generic to all doors, other hazards are more door or site specific. The first step is always to identify and list all potential hazards present. Hazards do not represent what is wrong or deficient with a door, they are the things that could go wrong and hence need to be prevented or controlled.

Installations should be designed to eliminate or reduce hazards wherever reasonably practicable rather than use sensitive devices to control hazards created by the design.

Hazards should be controlled by one of four main strategies:

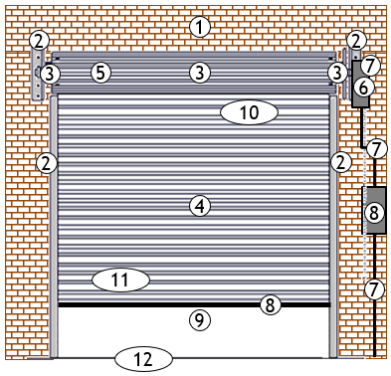
(i) safe design (structural integrity, remove the hazard or make it inaccessible), 1st priority

(ii) human visual control (hold-to-run)

(iii) safe contact (limit the exerted force on people)

(iv) non-contact presence detection (ensure that hazardous movement cannot make contact with people).

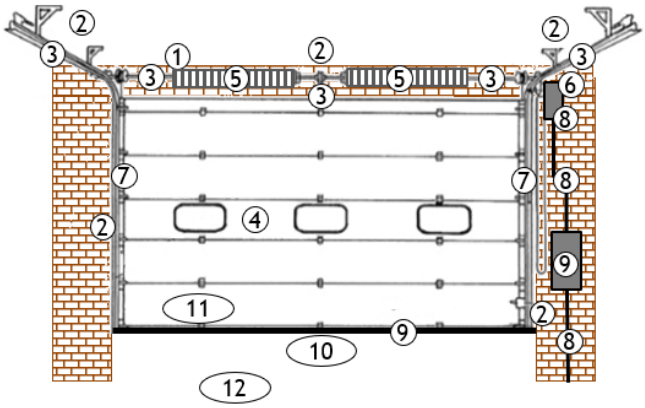
1.5.1.1. Common rolling shutter hazards and acceptable control measures



Other hazards commonly exist; all hazards must be identified and controlled in the same manner as those shown here.

	Hazard	Acceptable control measures
1	Structural failure - supporting structures	Provide adequate strength 1.5.2
2	Structural failure - fixings	Provide adequate strength 1.5.2
3	Structural failure - shafts, plates, bearings, barrel, guides & travel stops	Provide adequate strength 1.5.2
4	Structural failure - wind load	Provide adequate strength 1.5.2.4
5	Fall-back - spring(s)	Provide fall-back protection 1.5.2.5/6
6	Fall-back - drive	Provide fall-back protection 1.5.2.5/6
7	Electrical - shock/fire	Provide electrical safety 1.5.3
8	Control - faults in safety systems	Provide control system integrity 1.5.3.11 & 12
9	Crush - closing between ground and 2.5m	Hold-to-run 1.5.5, force limitation 1.5.6, presence detection 1.5.7
10	Draw-in - at the roll when below 2.5m	Enclosure 1.5.4.1/2, hold-to-run 1.5.5, presence detection 1.5.7 or 1.5.11
11	Lifting - people, when hand/foot holds exist	Limit hand/foot holds, limit force, hold-to-run, presence detection 1.5.8
12	Imprisonment	Provide manual release or alternative route 1.5.9

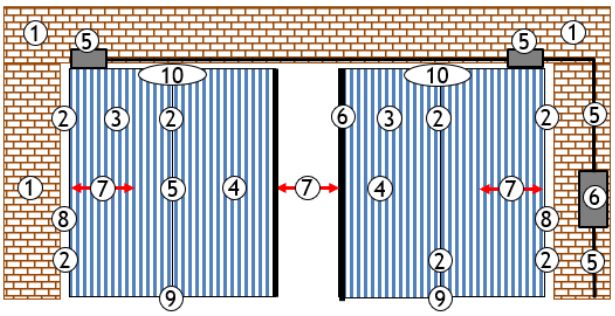
1.5.1.2. Common sectional door hazards and acceptable control measures



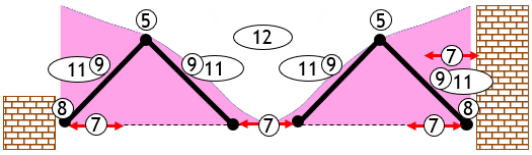
Other hazards commonly exist; all hazards must be identified and controlled in the same manner as those shown here.

	Hazard	Acceptable control measures
1	Structural failure - supporting structures	Provide adequate strength 1.5.2
2	Structural failure - fixings	Provide adequate strength 1.5.2
3	Structural failure - shafts, plates, bearings, rollers, tracks, & travel stops	Provide adequate strength 1.5.2
4	Structural failure - wind load	Provide adequate strength 1.5.2.4
5	Fall-back - spring(s)	Provide fall-back protection 1.5.2.5/6
6	Fall-back - drive	Provide fall-back protection 1.5.2.5/6
7	Fall-back - cables	Provide fall-back protection 1.5.2.5/6
8	Electrical - shock/fire	Provide electrical safety 1.5.3
9	Control - faults in safety systems	Provide control system integrity 1.5.3.11 & 12
10	Crush - under door between ground and 2.5m	Hold-to-run 1.5.5, force limitation 1.5.6, presence detection 1.5.7
11	Lifting - people, when hand/foot holds exist	Limit hand/foot holds, limit force, hold-to-run, presence detection 1.5.8
12	Imprisonment	Provide manual release or alternative route 1.5.9

1.5.1.3. Common folding/swing door hazards and acceptable control measures

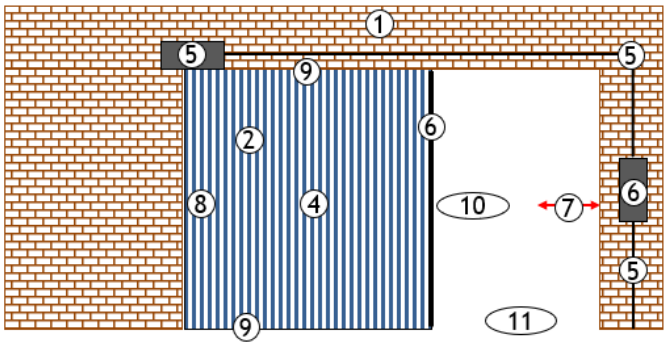


Other hazards commonly exist; all hazards must be identified and controlled in the same manner as those shown here.



	Hazard	Acceptable control measures
1	Structural failure - supporting structures	Provide adequate strength 1.5.2
2	Structural failure - hinges, fixings & travel stops	Provide adequate strength 1.5.2
3	Structural failure - leaf	Provide adequate strength 1.5.2
4	Structural failure - wind load	Provide adequate strength 1.5.2.4
5	Electrical - shock/fire	Provide electrical safety 1.5.3
6	Control - faults in safety systems	Provide control system integrity 1.5.3.11 & 12
7	Crush - within 500mm of a fixed object (open/close)	Safety distance (open only) 1.5.4.1, hold-to-run 1.5.5, force limitation 1.5.6 or presence detection 1.5.7
8	Crush - hinge area	Safety distance 1.5.5, flexible guard 1.5.4.3, hold-to-run 1.5.5, safe edge 1.5.6.2 or presence detection 1.5.7
9	Crush - under door	Safety distance 1.5.4.4, hold-to-run 1.5.5, force limitation 1.5.6, presence detection 1.5.7
10	Crush - at the lintel, when below 2.5m	Hold-to-run 1.5.5, force limitation 1.5.6 or presence detection 1.5.7
11	Impact - swept area	Hold-to-run 1.5.5, force limitation 1.5.6, presence detection 1.5.7
12	Imprisonment - of people	Provide manual release or alternative route 1.5.9

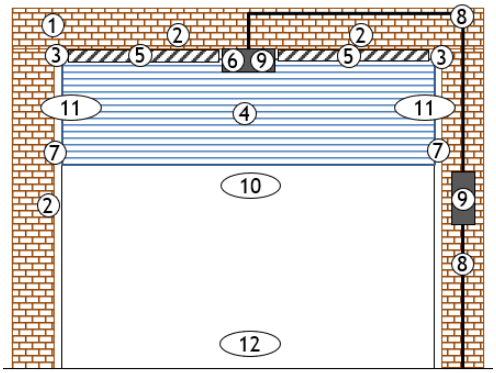
1.5.1.4. Common sliding door hazards and acceptable control measures



Other hazards commonly exist; all hazards must be identified and controlled in the same manner as those shown here.

	Hazard	Acceptable control measures
1	Structural failure - supporting structures	Provide adequate strength 1.5.2
2	Structural failure - leaf	Provide adequate strength 1.5.2
3	Structural failure - guides, rolling gear & travel stops	Provide adequate strength 1.5.2
4	Structural failure - wind load	Provide adequate strength 1.5.2.4
5	Electrical - shock/fire	Provide electrical safety 1.5.3
6	Control - faults in safety systems	Provide control system integrity 1.5.3.11 & 12
7	Crush - within 500mm of a fixed object (open/close)	Safety distance 1.5.4.1, hold-to-run 1.5.5, force limitation 1.5.6 or presence detection 1.5.7
8	Shear & draw-in - building	Enclosure 1.5.4.2, hold-to-run 1.5.5, safe edge 1.5.4.5 or presence detection 1.5.7
9	Crush - at guide rollers, when below 2.5m	Enclosure 1.5.4.2, hold-to-run 1.5.5, presence detection 1.5.7
10	Impact - swept area	Enclosure 1.5.4.2, hold-to-run 1.5.5, force limitation 1.5.6, presence detection 1.5.7
11	Imprisonment - people	Provide manual release or alternative route 1.5.9

1.5.1.5. Common canopy/retractable door hazards and acceptable control measures



Other hazards commonly exist, all hazards must be identified and controlled in the same manner as those shown here.

	Hazard	Acceptable control measures
1	Structural failure – supporting structures	Provide adequate strength 1.5.2
2	Structural failure - fixings	Provide adequate strength 1.5.2
3	Structural failure – shafts, rollers, tracks, & travel stops	Provide adequate strength 1.5.2
4	Structural failure – wind load	Provide adequate strength 1.5.2.4
5	Fall-back – spring(s)	Provide fall-back protection 1.5.2.5/6
6	Fall-back - drive	Provide fall-back protection 1.5.2.5/6
7	Fall-back - cables	Provide fall-back protection 1.5.2.5/6
8	Electrical – shock/fire	Provide electrical safety 1.5.3
9	Control – faults in safety systems	Provide control system integrity 1.5.3.11 & 12
10	Crush – under door between ground and 2.5m	Hold-to-run 1.5.5, force limitation 1.5.6, presence detection 1.5.7
11	Crush – at linkages	Hold-to-run 1.5.5, presence detection 1.5.7 or relaxed rules 1.5.11
12	Imprisonment - people	Provide manual release or alternative route 1.5.9

1.5.2. Structural integrity

The leaves and their supporting structures should be designed (new doors) or assessed as being able (existing doors) to resist permanent deformity, ultimate structural failure or derailment in normal use, manual use or under foreseeable misuse. Any deformity that does occur in use should not be detrimental to safety or function.

1.5.2.1. Design strength

The supporting structures, the leaf and any supporting elements should be designed (new doors) or assessed as capable of (existing doors) resisting falling down, collapsing or derailment in normal use and under foreseeable misuse conditions. The prescribed design safety factors (from EN 12604) are as follows:

(i) the supporting structures, fixings, suspension elements and door leaves should be designed to withstand 2 x the total foreseeable load without permanent deformity

(ii) the supporting structures, fixings, suspension elements, fixings, door leaves and travel stops should be designed to withstand 3.5 x their total foreseeable load without ultimate structural failure.

As these are the ***design strength*** safety factors required, any on site testing at these levels could seriously damage a door, hence EN 12604 suggests that any non-destructive testing should be conducted at 1.1 x times ultimate theoretical maximum load. The safety factors quoted in (i) and (ii) above should be used as an indicator of the levels of overengineering necessary when assessing existing doors on site. The responsibility for initial assessment of the building's ability to support the door (new doors) is a job for an architect, principle designer or surveyor.

Travel stops should prevent derailment (eg sliding door) and suspension element failure (eg hinge failure) when used in manual or in windy conditions. The entire door structure should prevent any movement that could cause misalignment (eg chains, gears or tracks). Foreseeable misuse should be allowed for, which could mean a user moving the door too fast in manual. It should be possible to secure swing and folding doors against wind action in the fully open and closed position, particularly when used in manual mode. Rolling shutter curtain attachments should be secured against normal loads and shock loads (eg safety brake engagement). EN 12604 suggests at least 50% of the barrel be covered at fully closed, many manufacturers prefer 100%, DHF suggests the use of large washers to prevent pull through of bolt heads.

1.5.2.1.1. Post 2018 swing and folding door addition

Swing and folding doors produced since 2018 (post publication of EN 12604:2017) should be protected against hinge failure such that if a hinge fails the door will not drop nor move more than 300mm off its vertical axis. They should also be protected against being lifted more than 50% of their hinge pin length.

1.5.2.2. Barrel/shaft retention and alignment

Barrels, shafts, drive gears, drive chains, bearings, guide tracks, wheels and rope drums should be positively aligned and secured such that detrimental movement, misalignment or disengagement is prevented. This can be achieved in a variety of ways depending on the design: bolts in shaft ends; split pins and washers; collars; grub screws on steel keys; end plate bracing and end plate bracing struts are all viable examples of methods used to achieve positive alignment.

1.5.2.3. Steel wire rope

There should be at least two ropes, the load should be shared equally, and the minimum safety factor is 6 x load.

Pulleys and drums should have a pitch circle diameter (PCD) of at least 20 x rope diameter; unless the rope maker certifies the rope on a smaller PCD. Drums should be grooved to keep the rope in one layer, pulleys should prevent jumping out or derailing and it should be possible to inspect the entire rope length for maintenance. Rope terminations should achieve a safety factor of at least 6 x load or have at least two turns remaining on the drum in the closed position.

1.5.2.4. Resistance to wind load

Door leaves should be designed to withstand their expected wind load both in negative and positive pressure differential conditions. The methods for wind resistance testing can be found in EN 12444 and the classes of wind resistance (derived from EN 12424) and are as follows:

Class	Performance	Class	Performance
0	No performance determined	**3**	700 pascals *(around 75 mph peak gust)*
1	300 pascals *(around 50 mph peak gust)*	**4**	1000 pascals *(around 90 mph peak gust)*
2	450 pascals *(around 60 mph peak gust)*	**5**	Exceptional (pascal rating declared by the manufacturer)

The figures are in pascals and relate to the resulting pressure differential rather than actual wind speed. Relating this to actual real-world gusting wind is not an exact science and very difficult at best, but in all cases the door should be able to withstand wind gusts without danger. Unless otherwise stated, withstand is assumed to be bi-directional.

The required wind class for a given door at a given location should be declared by the principal designer; in the absence of a specification from a principal designer (eg architect) the door supplier or manufacturer should take great care when specifying a suitable product. The absolute minimum requirement for a door in an external wall is class 2, but a door specified for a given location should be able to withstand its reasonably expected environmental conditions without compromising safety; it is not possible to simply resort to class 2.

An abbreviated method for predicting the expected wind load on buildings can be found in BS 6375-1 and a more accurate method can be found in EN 1991-1-4. Some worked examples to illustrate example outcomes using the method described BS 6375-1 are outlined in Annex I.

Companies or persons producing new doors who are not a micro-enterprise and not producing bespoke products must employ the services of a Notified Test Laboratory to verify resistance to wind load as applicable under the Construction Products Regulation (EU) 305/2011 and Annex ZA of EN 13241 (see 4.2).

1.5.2.5. Vertically acting door static balance

Vertically moving door leaves should achieve static balance such that:

(i) they remain static in the fully open and fully closed position

(ii) any slight out of balance movement when the door is stopped in any other position should not exert a static weight of more than 15kg.

Static balance is commonly achieved by use of non-reversing drives (with or without drive chains), springs and cables.

Curtain attachments of rolling shutters should leave at least 10% of the curtain on the barrel or 50% of the barrel covered in the fully closed position and be capable of keeping the curtain attached when any fall-back protection device is activated (eg a sudden stop).

1.5.2.6. Vertically acting door fall-back protection

Vertically moving door leaves should be protected against failure of vulnerable balancing system components.

Some structures within the suspension system can be considered to be resistant to failure provided they achieve the design strength described in 1.5.2.1 above. The components that can be protected in this way include: fixings & supporting structures; hinges, panels & lath sections; guides, rollers & tracks; shafts, barrels, bearings & key steels.

Other more vulnerable elements such as: springs; cables; drives; drive/suspension chains; or functional brakes; should be provided with a backup system. The protection should be effective even when the door is manually released and ensure that at the point of failure of any one single vulnerable component, one or other of the following should be achieved:

(i) the door leaf must not exert a static weight of more than 20kg with any one vulnerable balancing component failed

(ii) the door leaf must not travel more than 300mm when within 2.5m of the ground or any other permanently available access level when any one vulnerable balancing component fails.

The required fall-back protection can be achieved by an inherently safe design system, or by using devices; hence doors with an effective fall-back protection system will not need to be fitted with fall-back protection devices. A functional motor brake used to enhance door stopping in normal use cannot be considered to be fall-back protection.

Where a device is required to provide fall-back protection, it should also prevent further use of the door. If a fall-back protection device manufacturer requires that the device has a stop switch connected when used on a powered door, the switch should be used.

User instructions should explain how to identify when a fall-back protection device or system has deployed and what the user should to do in the event of engagement or deployment of a fall-back protection.

1.5.2.7. Fall-back type testing of post July 2013 vertically acting doors

Since July 2013, the Construction Products Regulation (legal requirement) has required that before new doors are placed on the market for the first time they must be type tested for fall-back protection (amongst other characteristics) and bear a CE label that explains (amongst other things): who made the door; that it has passed testing for SAFE OPENING (fall-back protection); and who conducted the testing. For most doors the type testing must be conducted by an EC approved (notified) test laboratory, rather than the manufacturer, as was the case before July 2013; more specific detail on this can be found in section 4.

<table>
<tr><td colspan="2">COMPANY NAME</td><td colspan="2">COMPANY ADDRESS</td></tr>
<tr><td>CE</td><td>(EU) 305/2011
2006/42/EC
Year of manufacture</td><td colspan="2">PRODUCT DESCRIPTION
SERIAL OR MODEL NUMBER</td></tr>
<tr><td colspan="2">Essential Characteristics</td><td>Declared Performance</td><td>Harmonised Standard</td></tr>
<tr><td colspan="2">Dangerous substances</td><td>NONE</td><td rowspan="6">EN 13241</td></tr>
<tr><td colspan="2">Resistance to wind load</td><td>CLASS (0-5)</td></tr>
<tr><td colspan="2">SAFE OPENING</td><td>PASS</td></tr>
<tr><td colspan="2">Definition of geometry of glass components</td><td>PASS</td></tr>
<tr><td colspan="2">Mechanical resistance and stability</td><td>PASS</td></tr>
<tr><td colspan="2">Operating forces</td><td>PASS</td></tr>
<tr><td>Type testing by:</td><td colspan="3">NOTIFIED BODY NAME AND FOUR-DIGIT REFERENCE NUMBER</td></tr>
<tr><td>Intended use:</td><td colspan="3">Description</td></tr>
</table>

Example of the CE label required since July 2013. The information underlined in red is mandatory to indicate adequate fall-back protection type testing. The "operating forces" and "2006/42/EC" references are mandatory for powered doors but are not required or significant on manually operated doors.

1.5.2.8. Assessing fall-back protection on existing vertically acting doors

Where the door is correctly CE marked as above (all underlined fields present) and it can be confirmed that the door has not been modified since manufacture, it is normally safe to assume that fall-back protection is adequate unless there are obvious deficiencies. Where this is not the case it may not be easy to immediately or at a glance, tell if a particular door in service, has adequate fall-back protection.

Continued over page.

To assist with this process the following guidance is offered:

(i) non-reversing drive, manual or powered, with/without drive chain, without springs, with safety brake; are the drive and brake correctly rated? - YES = OK, NO = SAFETY CRITICAL

(ii) non-reversing drive, without drive chain, with integral fall-back protection; is the drive correctly rated?

(iii) YES = OK, NO = SAFETY CRITICAL

(iv) non-reversing drive, with/without chain, with spring(s):

(v) Can the drive hold the door static with one spring failed? - NO = SAFETY CRITICAL

(vi) Will the door function normally following a spring failure? - NO = OK, YES = REQUIRES IMPROVEMENT

(vii) push-up/hand chain operated, with spring(s); will the static weight of the door, with one failed spring be less than 20kg? - YES = OK, NO = SAFETY CRITICAL

(viii) door supported on cables:

- Are the cables correctly rated and sharing the load? - YES = SEE BELOW, NO = SAFETY CRITICAL
- If one cable fails, will the door drop more than 300mm? - NO = SEE BELOW, YES = SAFETY CRITICAL
- Manual door, will it be obvious to the user that a cable has failed? - YES = OK, NO = REQUIRES IMPROVEMENT
- Powered door, are cable slack stop switches fitted? - YES = OK, NO = REQUIRES IMPROVEMENT
- Powered doors, if cable slack devices are fitted, are they rated for use on a powered door without stop switches? - YES = OK, NO = REQUIRES IMPROVEMENT

This list is not exhaustive, other configurations exist, but the same general ethos should be applied. Where any of the above cannot be confirmed, further, more in-depth investigation will be necessary. This could include more detailed testing or contacting the manufacturer for more advice or written evidence/confirmation of type testing.

1.5.3. Electrical safety of powered doors

Electricity at work legislation requires that work on electrical systems should be conducted by an electrically skilled person (eg a qualified electrician) or by someone being instructed by an electrically skilled person (eg a trained installer following a product specific installation manual, using safe isolation procedures). This does not make the installer an electrically skilled person, only skilled enough to execute a specific task.

1.5.3.1. Supply wiring

The supply to the installation should be provided, tested and certified to comply with BS 7671/ET 101 as currently amended. Where an existing supply is utilised for an installation, evidence should be gained to demonstrate that it has been tested to ensure safety and compliance with BS 7671/ET 101 (eg client Electrical Installation Certificate or Periodic Inspection Report copy).

1.5.3.2. System wiring

The control panel/motor manufacturer's installation manual should take precedence in this regard. Where cable specifications and installation methods are prescribed in the manual, they should be followed. Where no installation manual is available the principles outlined in EN 60204-1 should be applied. Where the control panel/motor manufacturer prescribes the use of an RCD in the supply circuit one should be present upstream of the installation.

1.5.3.3. Isolation

A means to safely electrically isolate all poles (single phase = double pole & 3 phase = 4 pole) from the system for maintenance should be provided. Where an electrical isolator is remote from the door (cannot been seen from the place of work) it should be possible to secure the isolator in the off position. Acceptable methods are multi pole switches or plug and socket combinations.

Safe isolation practices should be applied when working on electrical systems and warning notices posted as appropriate during the works.

1.5.3.4. Conductive parts earthing

The control panel/motor manufacturer's installation manual should take precedence in this regard. Where the earthing requirements are prescribed in the manual, they should be followed. Where class 1 earthed conductive equipment (230/400v earthed) is present, all reachable extraneous conductive parts should have a continuity of no more than 0.5Ω to the supply earth terminal. *Please note that many 24v drives are in fact 230v class 1 devices.*

1.5.3.5. Differing voltage bands

Where cables containing differing voltages share a conduit, all cables should have a voltage rating of the highest voltage present or the higher voltage cable should be surrounded by an earthed metallic screen, for example, steel wired

armoured (SWA) cable or similar. The control panel manufacturer's installation manual should take precedence in this regard. Many panel manufacturers do not allow conduit sharing at differing voltage bands.

1.5.3.6. Communication or data cables

Where communication or data cables share a conduit with power cables, clause 1.5.3.5 above should apply with the addition that the data cable should also be screened and earthed.

1.5.3.7. Cable ratings

The control panel/motor manufacturer's installation manual should take precedence in this regard. Where cable specifications and installation methods are prescribed in the manual, they should be followed. Cables should be rated for the voltage present and the maximum current possible; volts drop should be no more than 5% or within the control system supplier's specification. Cable sizes should not deplete the earth fault loop resistance required by the circuit protective device.

1.5.3.8. Flexible cables

Cables used to connect equipment that moves relative to fixed elements in normal use (eg folding door drives) should be of multi-stranded conductors to IEC 60228 class 5 or 6 (multiple fine strand copper conductor, not SWA, etc).

1.5.3.9. Electrical enclosures

Enclosures subject to external conditions should be at least IP54 (to prevent insect or slug ingress).

Enclosures and drive units used below ground should be at least IP67. As IP67 only covers temporary immersion, where IP67 components are used underground, effective drainage should be provided.

Enclosures containing exposed dangerous voltages (55v or more) should be marked with an appropriate dangerous voltage label and be openable only by means of key or tool.

1.5.3.10. Mechanical protection of cables

All vulnerable cabling should be provided with mechanical protection by means of conduits, trunking or armouring. Vulnerable cabling is anything containing 55v or greater or anything that forms part of a control system; examples include photo beam cables, safe edge cables, non-contact presence detection cables, motor cables, encoder cables or access control device cables.

All cables, trunking, conduits and enclosures should have adequate UV protection where they are subject to sunlight.

1.5.3.11. Control system integrity

Manufacturers and assemblers should only use door specific control panel and drive systems supplied with an appropriate Machinery Directive Declaration of Incorporation and installation manual. The supplied manual should be followed and a copy of both documents should be retained and kept in the technical file for the completed door.

Alternatively, if the manufacturer or assembler has built their own control system, they should type test the control system for conformity with Machinery Directive Essential Health & Safety Requirements (EH&SR) 1.2 Safety and Reliability of Control Systems and 1.5.1 Electrical Supply, and any other applicable EH&SRs in addition to all other applicable product safety Directives (see section 4). This will include the Electromagnetic Compatibility Directive (electrical devices) and the Radio Equipment Directive (radio devices) where applicable. EN 12453:2017 and the relevant parts pf EN ISO 13849-1 describe the current requirements.

1.5.3.12. Safety device circuits

Manufacturers and assemblers should use door specific safety devices (EN 12978 compliant) supplied with an appropriate Machinery Directive Declaration of Conformity and follow the supplied installation manual. A copy or the original of both documents should be retained and kept in the technical file.

The system connecting safe edge and non-contact presence detection devices should be fully compatible with the control system they are connected to such that, as installed, they conform to category 2 or 3. The circuit should be either protected from short circuit faults by a control panel derived category 2 test of the circuit at least once in every cycle, or for some category 3 devices not protected from short circuit faults, by means of:

(i) oversized and robust conductors and the use of short as possible cable routing, and

(ii) the use of crimped, feruled or tinned conductor ends to prevent stray strands.

Wherever reasonably practicable, the device should be placed within the control panel, or failing that be connected via armoured cable or cable in conduit.

1.5.3.12.1. Post 2018 doors

Doors produced after 2018 (since publication of EN 12453:2017) are required to have all safety related parts of the control system in conformity with EN 13849-1 at minimum performance level (PL) C through the entire control system from any switch or sensing element to the motor terminals or be in full conformity with EN 60335-1 and EN 60335-2-103, this should include any wicket door stop switch or fall-back protection stop switch.

Limit switch, safe edge or non-contact presence detection devices will additionally need to achieve at least category 2 as installed and prevent further movement by at least the end of the current open/close cycle in the event of a fault.

1.5.3.13. Wicket door stop circuit

Where a wicket door is fitted in a powered door, movement of the main door should be prevented whenever the wicket door is not in a safe position; devices and wiring used to achieve this should only fail to a safe condition.

1.5.4. Moving parts hazard safe zone

All hazards related to moving parts should be eliminated or controlled up to a height of 2.5m above ground level, or any other permanent access level, eg stairway, mezzanine floor or control cabinet. Moving parts hazards that are not reachable do not need additional control measures.

1.5.4.1. Minimum distances to prevent crushing (powered doors)

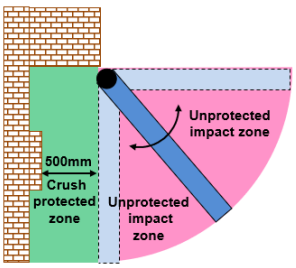
Various minimum safety distances exist (derived from EN 349 & EN 12453) to prevent injury to differing body parts.

Crush hazard		Draw-in/shear hazard
Finger = 25mm	Leg = 180mm	Finger = 8mm
Hand wrist = 100mm	Head = 300mm	(4mm at a hinge)
Arm, foot = 120mm	Body = 500mm	

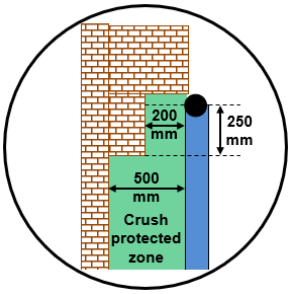
These can only be applied or utilised at points where only that size of body part could reasonably be affected. Hence use of these distances, other than 500mm, is severely restricted in most cases.

For example, there is no point restricting a reducing gap to 25mm where an arm or leg could easily be inserted; the arm or leg would be seriously injured when the gap reduces to 25mm.

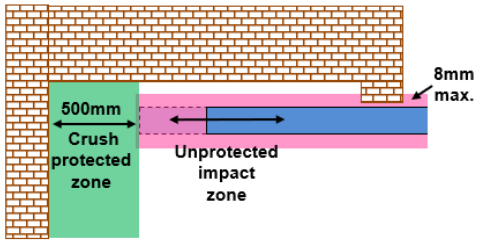
A gap greater than 500mm between a swing/folding door and a fixed object eliminates the crush hazard potential at that location; this can be relaxed to 200mm within 250mm of the hinge.



Swing door crush zone



Relaxation to 200mm within 250mm of the hinge



Sliding door crush zone

Regardless of any safety distance used, an impact hazard will remain across the swept area of the door during opening and closing movement that should be controlled by one or more of the means described in clauses 1.5.5 to 1.5.7.

1.5.4.2. Guard to prevent access to moving parts (powered doors)

Guards or fencing can be used to prevent access to hazardous movement areas (eg sliding door run back area). They should be permanently fixed and only removable with a tool or key and be durable and resistant to foreseeable abuse.

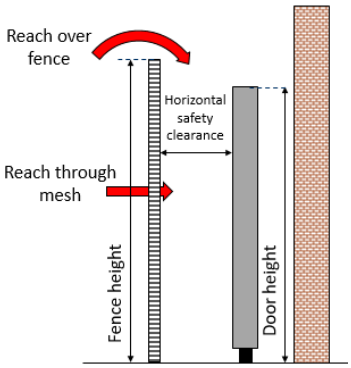
They should: **1)** be designed to resist climbing with vertical elements on the outside and a maximum gap of 40mm between verticals; **2)** conform to table 1 for reach over; **3)** conform to table 2 for reach through protection.

Height of guard	Height of hazard		
	2	2.2	2.4
	Horizontal clearance		
2	350	350	100
2.2	0	250	100
2.4	0	0	100
2.5	0	0	0

Table 1 reach over

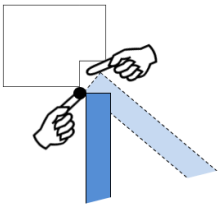
Mesh size smallest dimension mm	Horizontal clearance		
	Slot	Square	Round
4-6	20	10	10
6-8	40	30	20
8-10	80	60	60
10-12	100	80	80
12-20	[1]900	120	120
[1]Where the length of the slot is less than 40mm the safety clearance can be reduced to 120mm			
20-30	900	550	120
30-100	900	900	900

Table 2 reach through

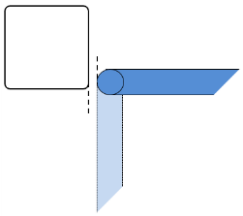


1.5.4.3. Hinge area of folding & swing doors (powered doors)

Reducing gaps at the hinge area can generate a very high force. Access to a reducing gap at a hinge area is possible from a variety of directions (see below). Reducing gaps at the hinge area should be avoided by safe design wherever possible.



Example reducing gap



Example safe design hinge area

The safe design hinge area criteria are:

(i) a constant gap of less than 4mm or more than 25mm, or

(ii) a maximum gap change of 20% is permissible, where the overall gap is less than 100mm.

When the safe design hinge area criteria is not met, one or more of the following measures should be applied such that the hazard is controlled: hold-to-run; safe edge; flexible guard and in some cases fine mesh to prevent access through the infill.

Flexible guards should be durable, cover the entire hazard and not fold into the reducing gap. They will also need to be removable by key or tool for inspection and maintenance of hinges with the guarded space.

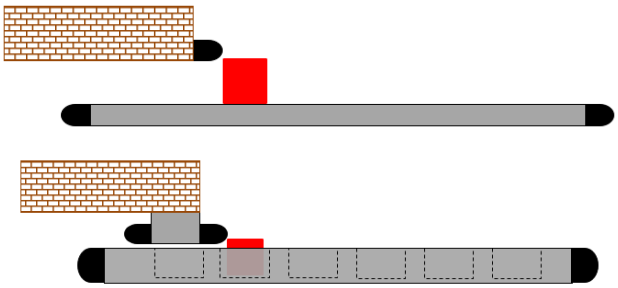
1.5.4.4. Gaps under swing & folding door lower edges (powered doors)

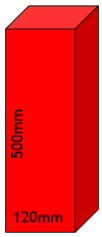
A foot crush hazard exists wherever the gap under a swing or folding door ***exceeds 8mm*** and is ***less than 120mm***. A crush hazard also exists wherever the door moves over sloping uneven floors. These should be controlled by one of: hold-to-run 1.5.5, force limitation 1.5.6 or non-contact presence detection 1.5.7.

Where the gap below the door is ***less than 8mm*** or ***greater than 120mm*** and the swept area is level, there is no foot crush hazard potential, but an impact hazard remains that should still be controlled by one of: hold-to-run 1.5.5, force limitation 1.5.6 or non-contact presence detection 1.5.7, higher force is permissible where there is no crush hazard, see 1.5.6.

1.5.4.5. Safe edge position at sliding door shear and draw-in points

The safe edge should be positioned as close as possible to the moving leaf to prevent draw-in occurring.





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The minimum distance allowable between the moving leaf and safe edge should be verified with a rigid rectangular test piece measuring 120mm x 120mm x 500mm. The test piece should be placed as deep as possible into the leaf infill material; the safe edge should be in close enough proximity to be activated by the test piece.

The nature of the gaps in the leaf infill dictate safe positioning of the safe edges.

Warning, the test must only be conducted in manual mode, not under power!

1.5.5. Hold-to-run (safety by human visual control)

The door should only move when pressure is being applied to the activation device and:

(i) the door should not over travel more than 100mm on release of the activation device, and

(ii) sliding and vertically moving doors should not over travel more than 50mm on release of the activation device in the last 500mm of horizontal movement, and

(iii) only trained people should use the door and the activation device should prevent unauthorised use where untrained people might be present (by use of key switch or similar), and

(iv) it should only be possible to operate the activation device in such a position that allows full, direct and permanent real-time view of the leaf during the leaf movement and ensures that the person controlling the door is not in a hazardous position (video cameras do not give a full, direct and permanent real-time view)

(v) the activation device should be the only active activation device

(vi) the door should travel at no more than 0.5m/sec (for converging leaves this means 0.25m/sec. each).

Hold-to-run can be used to control reachable **crush, impact, shear or draw-in** hazards.

1.5.6. Force limitation (safety by safe contact)

The maximum allowable forces and durations are as follows:

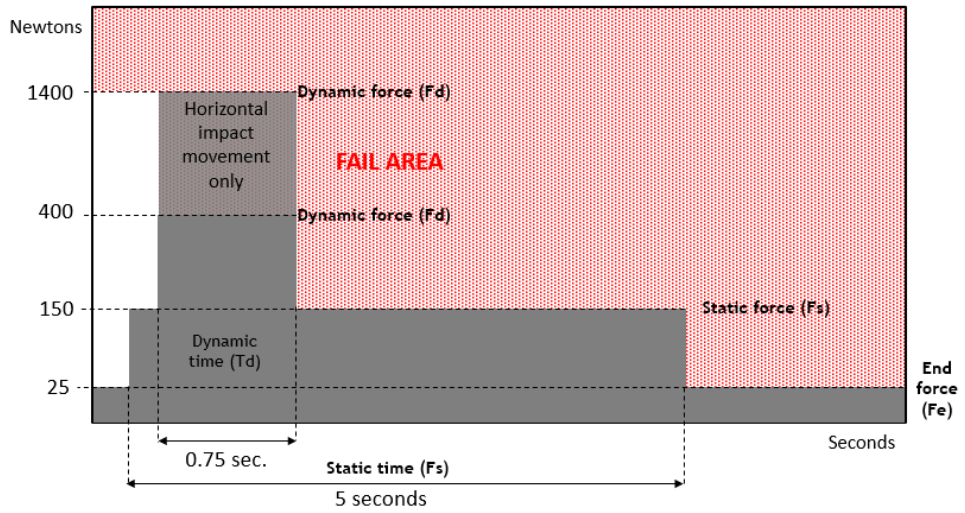
(i) 400N at crush, shear and draw-in hazards; all vertically reducing gaps below 2.5m and horizontally reducing gaps of 500mm or less

(ii) 1400N at horizontal impact hazards; contact with a horizontally moving leaf outside of a crush, shear or draw-in zone

(iii) the maximum time force can remain above 150N in all cases is 0.75 seconds

(iv) the maximum time force can remain above 25N in all cases is 5 seconds

(v) the maximum time a force can exist at or below 25N in all cases is infinite.



Force limitation maximum values

On a force tester

Fd	1400N	Max
Fd	400N	Max
Td	0.75s	Max
Fs	150N	Max
Fe	25N	Max

1.5.6.1. Supplementary photo beam

Force limitation should be supplemented with at least one horizontal photo beam wherever automatic closing is in use and wherever untrained persons might encounter the door. The beam(s) should be mounted between 700mm and 300mm above the ground and no more than 200mm horizontally from the face of the door. For swing and folding doors, the inner beam should be no more than 200mm horizontally from the open extremity of the swept area.

1.5.6.1.1. Post 2018 doors

Doors produced after 2018 (post publication of EN 12453:2017) with a distance greater than 150mm between the device and the opposite face of sliding and vertically moving leaves, are required to have a beam on both sides.

1.5.6.2. Safe edge

Force limitation can be provided by safe edge in resistive, optical, mechanical or pneumatic format and:

(i) the device must be supported by a manufacturer's Machinery Directive Declaration of Conformity and conform to EN 12978

(ii) the safe edge should provide force limitation and reduction in accordance with clause 1.5.6

(iii) the safe edge should protect the full height/width of the crush/impact zone with the exception that the edge does not need to be sensitive in the final 30mm of each end

(iv) the control circuit should meet the requirements of clause 1.5.3.12.

The required safe edge specification is based on: the speed & weight of the door, the reversal torque of the drive and the time the door takes to reverse. All of these affect the amount of overtravel required in the safe edge profile.

A safe edge can be used to control any reachable **crush, impact, shear or draw-in** hazard.

1.5.6.3. Inherent force limitation

Force limitation at some hazards can be provided by sensitive drive units (common on garage doors).

The system should reliably provide force limitation and reduction in accordance with clause 1.5.6.

Inherent force limitation can be used to control some, but not all reachable hazards, as follows:

(i) inherent force limitation should not be used to control draw-in hazards on sliding doors; by implication this will also apply to any associated shear hazards at these locations.

(ii) inherent force limitation is unlikely to be able to provide safe force in the hinge area of swing and folding doors, particularly in reducing gaps at:

- the hinge area, or
- the lower edge in the pier area, or
- the leaf junctions/hinges of folding doors.

These areas will usually need safe edges to provide force limitation. If inherent force limitation is to be relied upon to provide force limitation in these areas, the resulting crush force should be measured directly in that location.

(iii) inherent force limitation systems are unlikely to provide safe force on swing and folding doors when subject to high winds. It will usually be necessary to rely on safe edges for force limitation on such doors, given that the door should be safe in all conditions. If inherent force limitation is to be relied upon for such a door, evidence should be provided that safe force is achieved in high winds.

1.5.6.4. Force measurements

Testing should be carried out with an annually calibrated instrument that complies with EN 12453 or EN 12445.

1.5.6.5. Type testing new door designs for CE marking

Companies or persons who are not a micro-enterprise and not producing bespoke products but are producing or assembling a new door must employ the services of a Notified Test Laboratory as applicable under the Construction Products Regulation (EU) 305/2011 and Annex ZA of EN 13241 (see 4.2).

1.5.6.6. Force measurement of new pre-CE marked doors

Installation companies commissioning new 3rd party CE marked doors should conduct testing in accordance with the installation and commissioning instructions supplied with the door or use the methods in 1.5.6.8.

1.5.6.7. Force measurement of new doors under Article 36 of (EU) 305/2011

Assemblers commissioning new doors utilising cascaded test evidence for compliance under Article 36 of the Construction Products Regulation (EU) 305/2011 should conduct testing in accordance with the installation and commissioning instructions supplied with the drive/control board/safety device package covered by the Article 36 authority (see section 4) or use the methods in 1.5.6.8.

1.5.6.8. Force measurement of all other doors

Installation and maintenance companies testing doors on site should conduct tests as follows.

Any test that produces a result in excess of 90% of the maximum permitted value should be repeated three times and the average of all three tests taken as the actual result for that test location. The 90% threshold values above which an average of three tests should be used are as follows:

(i) 360N (400N maximum) for crush hazards

(ii) 1260N (1400N maximum) for horizontal pure impact hazards

(iii) 0.68 seconds (0.75 second maximum) for force to remain above 150N

(iv) 4.5 seconds (5 second maximum) for force to remain above 25N.

1.5.6.8.1. Force measurement points on vertically moving doors

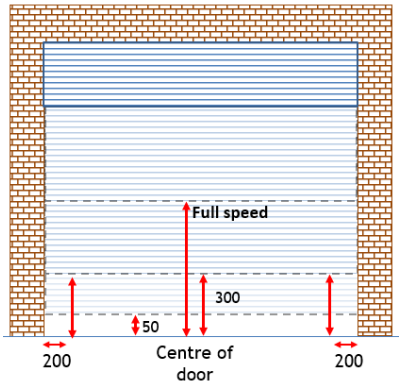
Test 1. centre of the door, with an extension on the tester that reaches in full speed movement. ***Test 1 is only required where slow down occurs above 300mm.***

Test 2. measurements are taken with a 300mm extension on the tester:

Test 2.1. centre of door

Test 2.2. at each side, 200mm in from the guides

Test 3. the point of the highest reading in test 2 is re-tested at 50mm from closed.



1.5.6.8.2. Force measurement points on horizontally moving doors

Please note that a single leaf is shown; where opposing leaves are in use, the tests are conducted in the centre of the opening where the leaves come together:

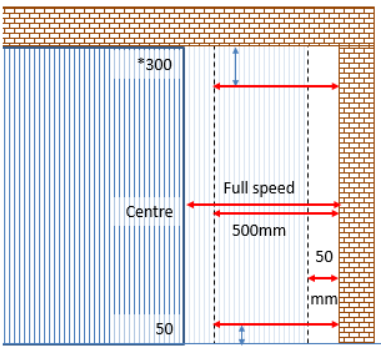
Test 1. at the mid height (or for doors taller than 2800mm high at 1500mm above ground) with an extension on the tester that results in full speed movement. ***Test 1 is only required where slow down occurs outside of the final 500mm.***

Test 2. Then at three heights with a 500mm extension on the test meter:

2.1. 300mm from the top of the door (or for doors taller than 2800mm high at 2500mm above ground)

2.2. at the mid height or 1.5m, whichever is the lower

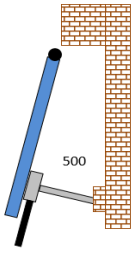
2.3. 50mm up from the base of the door



Test 3. The point of highest reading in test 2 is then re-measured with no extension on the test meter (50mm).

Test 4. Where a swing or folding leaf opens to within 500mm of a fixed object, force should be measured in the crush zone. A measurement should be taken with a 500mm extension on the tester:

- at the most outstanding feature in the crush zone up to 2m above the floor
- or in the absence of any outstanding features, 1m up from the floor and 1m out from the hinge.



A safe edge along the lower edge is very often the most outstanding feature and sliding door open crush hazards can be measured by repeating any of tests in 2 & 3 that are possible during the open cycle.

1.5.6.8.3. Results assessment for other horizontally moving door hazards

The full speed result can be used to assess safe force across the width of the swept area of swing/folding doors as follows:

(i) where the swept area contains crush hazards; where there is *more* than 8mm *and less* than 120mm under the door *or* where the swept area has varying ground levels, test 1 should result in a 400N maximum

(ii) where the swept area *does not* contain any crush hazards; where there is *less* than 8mm *or more* than 120mm under the door *and* the swept area is level, test 1 should result in a 1400N maximum.

Comparing the full speed result with the protection used on the leading edge and lower edges indicates the required action as follows.

Test 1 result *Full speed at the leading edge*	Leading edge protection	Lower edge protection	Lower edge *Crush or Impact only*	Test 1 result assessment outcome and required action at the lower edges.
Up to 400N	Safe edge	Safe edge	Crush	OK - no further testing/action required
Up to 1400N	Safe edge	Safe edge	Impact only	OK - no further testing/action required
Up to 400N	Safe edge	Inherent	Crush	Not verified - safe edges needed in the hinge area or verify the inherent force limitation directly in the hinge area
Up to 1400N	Safe edge	Inherent	Impact only	Not verified - Test inherent at the leading edge (off the safe edge)
Up to 400N	Inherent	Inherent	Crush	Not OK - safe edges needed in the hinge area or verify the inherent force limitation directly in the hinge area
Up to 1400N	Inherent	Inherent	Impact only	OK - no further testing required

The full speed result can also be used to assess safe force at safe edges protecting shear and draw-in at points on sliding doors where the moving leaf crosses a fixed structure as follows.

Full speed result at the leading edge	Leading edge protection	Shear/draw-in safe edge	Test 1 result assessment outcome and required action at the draw-in point
Up to 400N	Safe edge	Same	OK - no further testing/action required
Up to 1400N	Safe edge	Larger	Not verified - test sample of the larger safe edge on the leading edge
Up to 400N	Safe edge	Smaller	Not OK - fit equal size safe edge
Up to 1400N	Safe edge	Same/smaller	Not OK - fit larger safe edge
Up to 400N	Inherent	Safe edge	Not verified - test sample safe edge on the leading edge
Up to 1400N	Inherent	None	Not OK - inherent force limitation not suitable for draw-in

Do not attempt to measure force directly at a shear or draw in point; serious damage or injury is possible!

The full speed test should result in a 1400N or 400N maximum as per the tables above. Test 2, 3 & 4 should result in a 400N maximum, all tests should result in force reduction in line with 1.5.6. Account should be taken of points (i) and (ii) of clause 1.5.6.3 in relation to inherent force limitation.

1.5.7. Non-contact presence detection technology (safety by non-contact)

Non-contact presence detection technology should prevent all possible contact with hazardous movement and:

(i) the device must be supported by a manufacturer's Machinery Directive Declaration of Conformity and be compliant with EN 12978

(ii) single beam photo electric beams are not included unless it can exclude all possible contact with the hazard, for example, attached to the lower edge of a vertically moving door

(iii) any background field auto adjust time should be at least 30 seconds

(iv) microwave activation devices are not included in this classification

(v) the control circuit should meet the requirements of clause 1.5.3.12.

Non-contact presence detection technology can be used to control **crush, impact, shear, draw-in and lifting** hazards.

Continued over page.

There is no need for force limitation with this technology. The device can be installed directly within the movement plane of the door (eg within the guides of a rolling shutter) or set up an exclusion zone to either side of the movement plane of the door (shutters and sectional doors) or set up exclusion zones that move with the door (eg swing and folding doors) such that access to hazardous movement is not possible.

If the hazard is to be adequately protected, the door should stop quickly enough to prevent hazardous contact and hence the device should set up a protection zone of adequate depth to give the door time to react before hazardous contact occurs. The requirement is that hazardous movement is stopped before hazardous contact with the door occurs and that the test pieces (see 1.5.7.1) are not impacted, crushed, sheared or drawn-in.

Be aware that these systems can be subject to nuisance tripping due to adverse environment and weather conditions (heavy rain, snow, wind-blown debris or animals and birds). Where systems can be de-sensitised to accommodate these effects, they should still pass the tests set out below and will require re-testing following any adjustments.

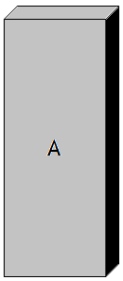
1.5.7.1. Testing non-contact presence detection systems

Hazards protected by non-contact presence detection should be tested by means of rigid material test pieces as follows.

Test piece A

Whole body detection.

Rigid material 700mm x 300mm x 200mm. Painted matt black on three sides RAL 7040 grey on the other three.



Test piece B

Arm, hand and foot crush detection.

Rigid material 300mm x 50mm painted half matt black and half RAL 7040 grey.

The test pieces should be presented to the moving door at all hazard locations. It should not be possible for the test piece to come into contact with hazardous movement. The test pieces are designed to simulate a part of the human anatomy and should be presented in a manner that simulates a person running, or falling, into the path of the hazardous movement.

The reaction of the door to an activation of the device will be crucial because, in some locations, the resulting reversal can present a further uncontrolled hazard elsewhere on the door. For this reason, either pause or stop will be the required reaction to activation at many hazard locations on horizontally moving doors. It is usually safe for vertically moving doors to retract on activation, but every door should be assessed on its individual merit.

1.5.7.2. Type testing of new door designs for CE marking

Companies or persons who are not a micro-enterprise and not producing bespoke products but are producing new doors should employ the services of a Notified Test Laboratory as applicable under the Construction Products Regulation (EU) 305/2011 and Annex ZA of EN 13241 (see section 4.2).

1.5.7.3. Testing new pre-CE marked doors

Installation companies commissioning new pre-CE marked doors should conduct testing in accordance with the installation and commissioning instructions supplied with the door or use the methods in 1.5.7.5.

1.5.7.4. Testing new doors under Article 36 of (EU) 305/2011

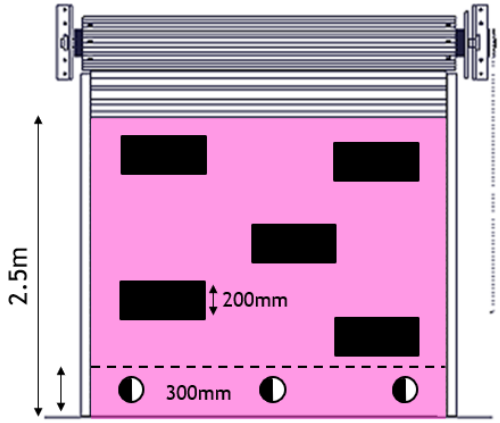
Installation companies commissioning new doors utilising cascaded test evidence under Article 36 of the Construction Products Regulation (EU) 305/2011 should conduct any necessary testing in accordance with the installation and commissioning instructions supplied with the drive/control unit/safety device package covered by the Article 36 authority (see section 4) or use the methods in 1.5.7.5.

1.5.7.5. Testing of all other doors on site

Installation companies and maintenance contractors testing doors on site should use the following methods.

1.5.7.5.1. Light grid mounted directly on the leading edge or within the guides of a vertically moving door

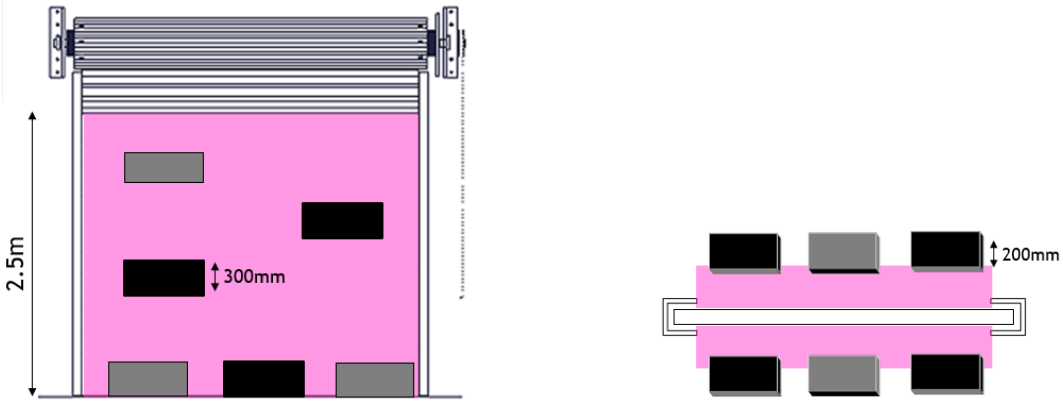
This test method only applies where the protective device is active directly within the movement plane of the door. Test pieces A & B should be placed directly under the door during closing at all locations shown; no contact should occur.



Test positions (200mm dimension vertical), device mounted within the guides or on the lower edge

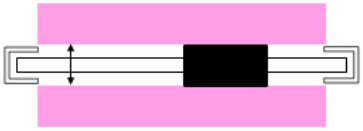
1.5.7.5.2. Non-contact presence detection *not* mounted on the leading edge, *nor* in the side guides, of a vertically moving door

This test method is used wherever the protective device is not fitted directly within the movement plane of the door. The A test piece should be offered towards the leaf at all points within the movement area up to 2.5m during closing; no contact should occur.



Test positions (300mm dimension vertical), devices not mounted on the leading edge nor in the guides

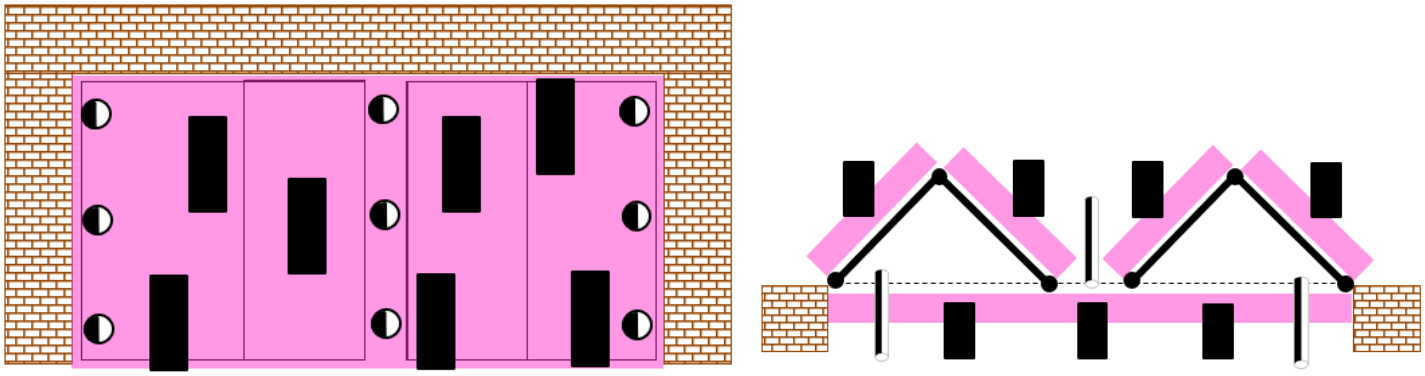
The central dead zone between the detection areas should not exceed 200mm; it is tested with the A test piece placed with its 200mm sides placed on the centre line of the leaf. This is to ensure that a person standing under the leaf is assured of being detected; the door should not close.



Test position (700mm dimension vertical), central dead zone

1.5.7.5.3. Non-contact presence detection *not* mounted on the leading edge *nor* in the side guides, horizontally moving door

This test method applies to swing, folding and sliding doors. Test pieces A & B should be presented towards the moving leaf in all hazard areas up to 2.5m above ground or any other permanent access level from both sides; test piece A should be used at all impact hazards and test piece B should be used at all crush, shear and draw-in hazards.



Test positions (700mm dimension vertical), horizontally moving door

Hazardous movement should cease, or the leaf should retract before the test piece is impacted or crushed. If the leaf retracts, the leaf should remain protected in the direction the reversal movement.

1.5.8. Lifting hazard (powered doors)

Wherever possible a powered door should be designed so that there are no useable hand or foot holds that might give rise to a person being carried aloft by the door either by accident or misuse; rolling grilles are particularly vulnerable to a lifting hazard due to the apertures inherent in the design. Where the lifting potential cannot negated by removing all potential hand/foot holds, a control measure should be implemented to prevent lifting of persons; the available options are one or a combination of:

(i) operate the door in hold-to-run (providing the person would be visible to the operator)

(ii) limit torque such that the leaf cannot lift a test weight of 20kg (domestic) or 40kg (industrial), mounted centrally on the lower edge of the door

(iii) install high-level category 2 or 3 photo beam(s) (see clause 1.5.3.12.) that will detect a person before they reach a hazardous height and/or location

(iv) install non-contact presence detection that prevent movement when a person is present on the leaf.

Thought should be given to what occurs when a person is detected by protective high-level beam; it is not acceptable to lift a person so high that they become injured when they fall, or to leave them suspended at a dangerous height. Use of a photo beam is only really practical where the beam is less than 3m above ground.

1.5.9. Imprisonment control

Imprisonment hazards should not be confused with entrapment hazards. Entrapment hazards only occur where crush, shear and draw-in hazards are not adequately protected; the solution should be to provide effective crush, shear or draw-in protection.

Imprisonment hazards and the inconvenience caused when automated doors suffer faults or during power cuts can be controlled by providing a manual release in the potential imprisonment area. The door should remain safe when being used in manual mode and also when power is restored unexpectedly. Where untrained users might need to use a manual release, instructions on its use should be provided in the immediate vicinity.

Depending on the location and use, fire safety regulations may require additional escape means that are less restrictive to use – eg push bar swing doors. Very few powered doors or vertically moving doors could achieve the ease of use required of an emergency escape route door in a multi occupancy building.

Consult Approved Document “B” for more accurate escape routes requirements.

https://www.gov.uk/government/publications/fire-safety-approved-document-b

1.5.10. Manual use (manual doors and powered doors in manual mode)

Use of the manual opening and closing mechanisms should not introduce hazards. Moving the leaf in manual should be achievable with ease and, where more than one person is required to move the leaf in manual mode, the user instructions should explain this.

A safe force for one person to move a leaf in manual is 390N in industrial environments.

1.5.11. Reduced levels of safety for domestic garage doors

Where a vertically moving domestic garage door is provided for the use of a single domestic household and:

(i) it does not open directly onto a public highway, and

(ii) it does not use automatic closing remote activation, and

(iii) the drive unit is in full conformity with EN 60335-1 and EN 60335-2-95.

it may be possible to protect only the leading edge of the moving door. Under these conditions, other draw-in or crush and shearing hazards may be disregarded. If auto close is subsequently enabled, additional measures may be required, eg a hood may be required to cover the roll on some rolling shutters.

1.5.12. Residual hazard control

A residual hazard is the hazard that remains after the state-of-the-art has been achieved (1.5.2 to 1.5.11), for example the effects of being subject to 399N for 0.74 seconds. For very young or infirm people, the effect of a residual hazard could in fact be significant and hence the risk assessment should attempt to reduce the degree of harm possible where a high-risk level exists (eg at an infant school) by selecting non-contact solutions over force limitation or reducing operating force even further. Protection of vehicles should be considered and provided for as the state-of-the-art is primarily concerned with the safety of people not vehicles.

Residual hazards should be addressed by applying suitable measures, eg one or a combination of the following; shown in order of merit for the protection of vulnerable users:

1. non-contact presence detection
2. even lower force than 1.5.7 allows
3. additional photo beams
4. warning lamps
5. LED warning strips
6. audible warning devices
7. activation devices
8. pedestrian railings
9. signage
10. zone lighting
11. hazard tape
12. ground markings
13. reflective materials
14. traffic lights
15. ground loop (vehicle detection)
16. traffic calming
17. written user warnings
18. safe use instructions
19. user training

Selection of appropriate residual hazard controls should be arrived at based on a local risk assessment. Unlike the main body of hazards dealt with by the state-of-the-art (1.5.2 – 1.5.11) where the focus is on the potential degree of harm, the control of residual hazards can be based on likelihood of occurrence.

The need for additional protection systems and warning devices reduces as the likelihood of contact with a residual hazard diminishes on a given site. Great care is required none the less, as in the event of an incident, the findings of the risk assessment will be brought into judgement to some degree at least.

Written user warnings, safe use instructions and user training should be provided and are an important aspect of residual hazard control.

2. Risk assessment process

The risk assessment process in this section applies equally to new or extensively modified doors, reactive maintenance, planned preventative maintenance and minor modifications. The actual requirements for safety are however the same for all door work and are described in section 1 which reflects and clarifies the requirements of the various applicable standards and represents the state-of-the-art.

The state-of-the-art is a concept required by recital 14 of the Machinery Directive. It is the level of safety required and described in current product specific standards and other readily available relevant documents. The state-of-the-art represents the minimum level of safety permitted by the Directive. The state-of-the-art also reflects the "reasonable and practicable measures" required by health and safety legislation.

This risk assessment process should be conducted for the design of a new door, installation of a complete door supplied by a 3rd party, upon modification of an existing door and prior to taking on any reactive or planned maintenance of a door for the first time.

The risk assessment process should be split into seven distinct steps, described below in 2.1 to 2.7. and recorded as per 2.8.

2.1. Describe the door, environment and users

Describe the door type, number of leaves, size, nature of users, topography, environment, activation methods, duty cycle, etc.

2.2. Identify and make a numbered list of all significant hazards associated with the door, including those arising from foreseeable misuse

Make a list of all hazards associated with the door, eg structural failure, electrical faults, control system or safety system failure, misuse, moving parts, wear and tear, etc. This part is simply a numbered list of all the things that could present a hazard in normal use and under foreseeable misuse. This section should not be confused with describing specific "faults" with a given door; it is simply a list of potential hazards that must be controlled.

2.3. Resolve or reduce as many hazards as possible by application of, or checking for, existing safe design principles

Attempt to resolve or reduce as many of the hazards listed in step 2 by improving the design (or conducting safe design checks and making design change proposals) to eliminate or reduce the hazard, or make the hazard inaccessible, eg by providing (or checking for) structural integrity, safe design hinge areas, or providing guards or enclosures etc.

2.4. Apply, or check for existing, state-of-the-art control measures for the remaining hazards

Consider all remaining hazards and apply (or propose) control measures that conform to the state-of-the-art, eg hold-to-run, inherent force limitation, safe edge force limitation, non-contact presence detection, electrical safety measures, monitoring of safety devices, in accordance with the requirements for safety part of this code. In all cases, the state-of-the-art is the absolute minimum acceptable level of safety.

2.5. Identify and review the remaining residual hazards

Residual hazards must be very minor with a low degree of harm potential and not be controllable by state-of-the-art means; if the hazard can be controlled by state-of-the-art means then it must be, rather than be treated as residual.

Identify all residual hazards, consider user vulnerability (eg high numbers of children, persons with mobility/sight/hearing/learning limitations) and if necessary, consider reducing the hazard further. For example, apply even lower force, additional photo beams, non-contact technology or re-design etc. Finally, list the remaining residual hazards.

2.6. Provide appropriate residual hazard controls

Apply appropriate residual hazard control measures based on likelihood of occurrence and user vulnerability.

2.7. Provide/review operation and maintenance instructions & user training

Provide a (or review the existing) detailed operation, maintenance and user training manual. It should explain the residual hazards, provide user instructions & training, including how to isolate and use the door in manual and what to do in the event of a fault. Planned preventative maintenance instructions should be included that will enable the door to be kept in a safe condition in future service. The PPM instructions should describe the: inspections; cleaning; lubrication; adjustment; parts replacements; and testing necessary for the various maintenance tasks.

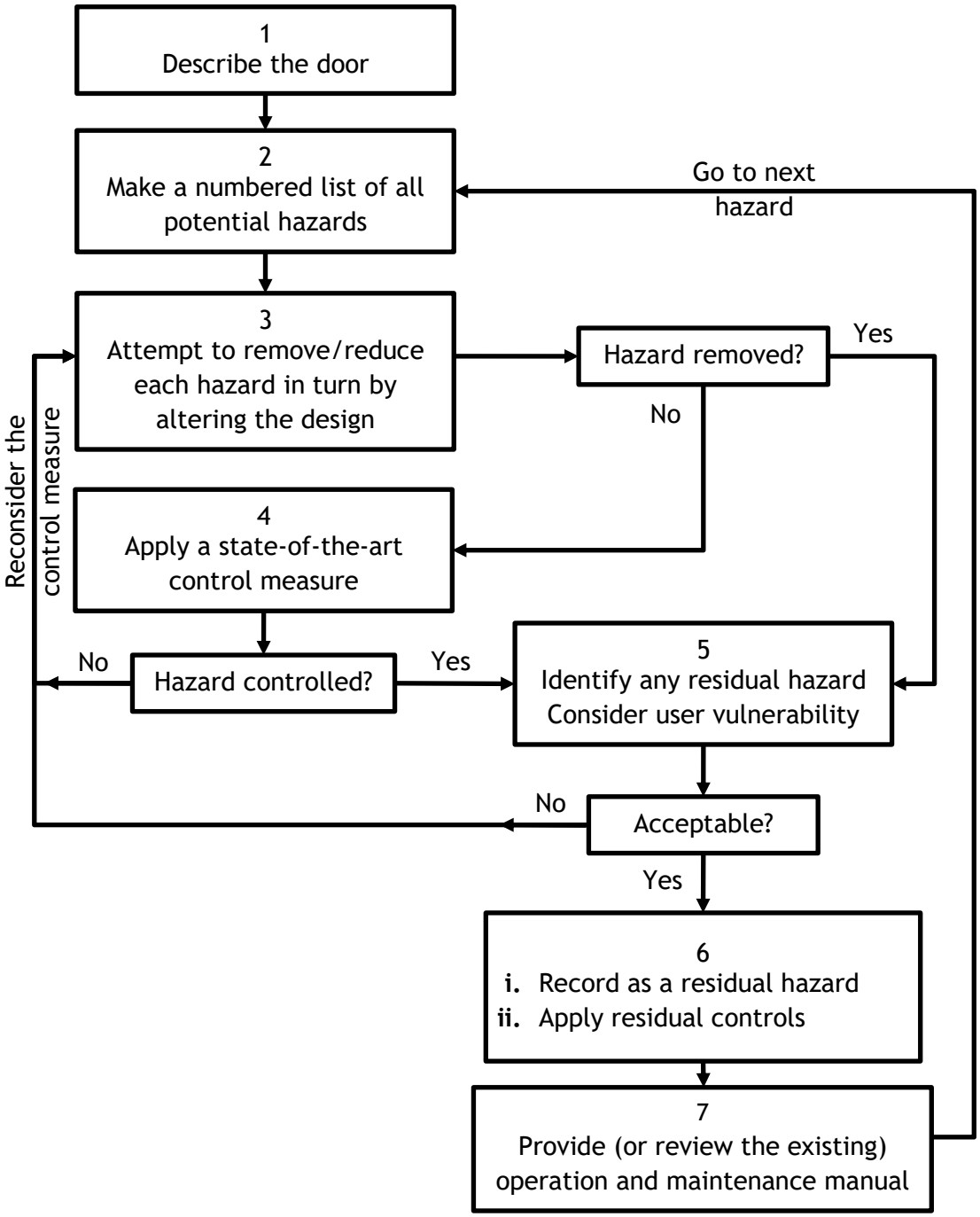
They should also prescribe the frequency, skills, qualification and experience necessary for each task.

2.8. Record the process

Record all seven steps and retain them for inclusion on the relevant technical or maintenance file.

Annex A sets out one possible way of executing and recording this process. If this system is not used, any alternative method must achieve the same level of safety and clearly document all seven steps.

2.9. Risk assessment process flow diagram



3. Commissioning process

The commissioning process is a series of inspections, checks and tests conducted to ensure a door is functioning correctly and safely prior to placing into service or returning to service following maintenance, repair or modification. The actual steps necessary will be dictated by the exact nature of the door in question but should in any case ensure it is safe before leaving in service.

The commissioning process is a combination of following manufacturer's installation instructions and checks to ensure that all hazards present have been identified, prevented, controlled or reduced correctly and that nothing has been missed. The commissioning process should ensure that the requirements for safety outlined in section 1 of this COP are achieved.

The process should cover at the very least the following areas:

(i) structural integrity

(ii) electrical safety

(iii) control & safety system function checks

(iv) safety system performance tests

(v) warning devices, signage and markings

(vi) user instructions & user training documentation

(vii) confirm that the risk assessment is suitable and sufficient.

4. Legal compliance - new and extensively modified doors

4.1 Machinery Directive 2006/42/EC

Compliance with the Machinery Directive (currently 2006/42/EC) is mandatory for the company or person who manufactures or brings a powered door into service for the first time due to the:

(i) Supply of Machinery (Safety) Regulations 2008 in the UK

(ii) European Communities (Machinery) Regulations 2008 in the Republic of Ireland.

Previous versions of the Directive have been in force without any significant change to the safety requirements.

4.1.1 Responsibility for compliance

The company or person responsible for compliance is whoever first creates a powered door within the European Economic Area, or who first imports it into the European Economic Area (EEA) if in has not been CE marked by the manufacturer.

The following activities create a responsibility for legal compliance with the Directive:

(i) importing a complete automated door, not already CE marked by the manufacturer, into the EEA from outside the EEA (importer)

(ii) manufacturing a complete automated door within the EEA (manufacturer)

(iii) adding a drive unit to an existing manually-operated door (manufacturer)

(iv) modify a complete powered door prior to or during installation in a way not permitted in the manufacturer's instructions (manufacturer)

(v) make an extensive modification to an existing powered door (manufacturer) that alters the way it operates eg:

- changing from shutter to sectional
- changing from chain drive to direct drive
- changing from a sprung barrel to an unbalanced door.

(vi) assembling components from more than one manufacturer to make a complete door (assembler), either on site or in your own workshop:

- construct a door and install a drive unit from a 3rd party supplier (assembler)
- install a door supplied by one manufacturer with a drive unit from another (assembler)
- buy a collection of components from a supplier not certified by them as a complete automated door (assembler).

4.1.2 Harmonised European standard

A harmonised standard is a European standard (EN) which is recognised by the European Commission as conferring a presumption of conformity with legislation on a product complying with the standard. At the time of writing this code, the current Machinery Directive harmonised standard for doors covered by this code is EN 13241. This standard is currently listed on the European Commission official journal with a warning that it does not currently achieve full harmonised status despite recent improvements.

The long-term intention for products covered by this code is for EN 12453 to become the MD harmonised standard. This standard has recently been improved but still not to a standard that would allow harmonisation. The UK version of EN 12453, BS EN 12453:2017, is published in the UK with a warning not to rely on it entirely for MD compliance. Please also note the warning in the foreword on page 2 of this code; primarily that EN 13241 and its referenced standards (eg EN 12453 and EN 12604) do not currently fully achieve the levels of safety required for Machinery Directive. For this reason, in some areas the requirements for safety in DHF TS 012:2019 go beyond the requirements of the current harmonised standard.

4.1.3 Essential Health and Safety Requirements and the state-of-the-art

A new or extensively modified powered door must conform to the Essential Health and Safety Requirements (EH&SR) set out in Annex 1 of the Directive, taking into account the current "state-of-the-art" (via recital 14). This will mean achieving or in some cases exceeding the level of safety prescribed in current product specific standards (**EN 12453/EN12604**) when satisfying the EH&SR. The Directive is written such that the state-of-the-art can change as standards improve without the need for revision of the Directive itself. See also the warnings in relation to the state-of-the-art and current standards on page 2.

The applicable EH&SR from Annex 1 of the Directive, together with likely control measures are set out below:

1. Foreseeable misuse
Must be considered and provided for in the risk assessment.

1.1.2. Principles of safety integration
The door must be designed in the following order: safe design used wherever possible to eliminate hazards; safety systems/devices must be applied for hazards that cannot be designed out; warnings must be provided for the residual hazards.

1.1.3. Materials & products
All materials must be suitable for use and environment, oils and other hazardous substances must be properly contained.

1.1.5. Design of machinery to facilitate handling
Manufacturers of "supply only" complete doors must provide a lifting plan for the installer.

1.2.1. Safety & reliability of control systems
Control system manufacturers must supply a DoI. The relevant installation manual must be followed. Manufacturers must type test any self-manufactured system.

1.2.2. Control devices
Must be safely placed and activate a safe response.

1.2.3. Starting
Should not be possible when a safety device is activated, if that would result in dangerous movement.

1.2.4. Stopping
There must be no automatic re-start after stop command; stop must override all other commands.

1.2.5. Mode selection
Where a control system switches automatically from impulse close mode to hold-to-run mode on the occurrence of a safety device fault, this should not allow untrained user access to the hold-to-run controls; the controls should be protected by key switch or similar.

1.2.6. Failure of power supply
Loss of power must not present danger to users, eg provision of manual release, battery backup or non-locking drives. Use of the door in manual must be safe and the system must be safe if power is restored unexpectedly.

1.3.1. Stability of foundations
Foundations, supporting structures, fixings, leaves, guides, rollers, tracks, stops, hinges, plates, shafts, barrels etc should be designed to withstand 2 x their actual load without permanent distortion.

1.3.2. Risks of break up during operation
Foundations, supporting structures, fixings, leaves, guides, rollers, tracks, stops, hinges, plates, shafts, barrels etc should be designed to withstand 3.5 x actual loading without failure.

1.3.4. Risks due to surfaces, edges or angles
All sharp edges and hooking hazards should be removed or protected.

3.5. Risks related to combined machinery
Control system integrity must be maintained when combining systems (eg doors and dock leveller systems) from differing manufacturers.

1.3.6. Risks related to variations in operating conditions
Doors must be able to withstand their expected wind load.

1.3.7. Risks related to moving parts
All moving parts hazards must be listed in the risk assessment.

1.3.8. Choice of protection against moving parts hazards
All hazards identified 1.3.7. must be controlled in line with the state-of-the-art.

1.3.9. Risks of uncontrolled movements
Any single spring, rope, chain or gear failure should not allow a vertically moving door to fall-back.

1.4.1. General requirements of guards
Mesh size and horizontal clearances should be appropriate, securely fixed and made anti-climb.

1.4.2.1. Special requirements for fixed guards
Only removable by key or tool, fixings must be retained on the guard when it is removable for maintenance.

1.4.3. Special requirements for protective devices
Safety component manufacturers must supply a DoC. The relevant installation manual must be followed. The device must only fail to safe, sensitive devices should be in conformity with EN 12978 and achieve category 2/3 as installed.

1.5.1. Electricity supply
The supply should be provided, tested and certified to ET 101 or BS 7671/ET 101. All cabling wiring and earthing should be provided and tested by a competent person to the state-of-the-art eg EN 60204-1.

1.5.4. Errors of installation
Instruction manuals should be followed by competent, trained, skilled fitters. All work should be inspected and tested on completion.

1.5.14. Risk of being trapped
Manual release should be provided as appropriate.

1.5.15. Risk of slipping, tripping or falling
Should be identified and controlled; residual hazards must be highlighted and explained in the user warnings.

1.6.1. Machinery maintenance
Detailed maintenance instructions must be specified in the planned preventative maintenance instructions, including the required maintenance frequency.

1.6.2. Access to operation position & servicing points
Access for maintenance in safety must be possible.

1.6.3. Isolation of energy sources
An electrical isolator must be provided within sight of the door or made lockable on the off position. Isolators must be "all pole" design switching line and neutral conductors.

1.7.1. Information and warnings
Warning signs & markings must be provided as appropriate to the residual risk.

1.7.1.2. Warning devices
Flashing lights, traffic lights and sounders etc should be provided as appropriate to the residual risk.

1.7.2. Warning of residual risks
Must be explained in the user instructions and warnings.

1.7.3. Marking of machinery
The door must be marked visibly, legibly and indelibly with the following minimum particulars: business name and full address of the manufacturer; CE mark and 2006/42/EC; serial number; year of manufacture/installation.

1.7.4. Instructions
Instructions and warnings must be carefully compiled and passed to the client along with the required user training.

Finer detail on how to achieve these requirements in accordance with the state-of-the-art is described in section 1 of this code.

4.1.4 Risk assessment

Key to Machinery Directive conformity is hazard identification and control:

(i) the nature of the door, its environment and its intended use must be assessed

(ii) an assessment must be conducted to identify and lists all potential hazards present and identifies which of the Essential Health and Safety Requirements are applicable

(iii) an attempt must then be made to eliminate as many of the identified hazards as possible by making design modifications to eliminate or reduce the hazard wherever possible

(iv) any hazard that cannot be eliminated or adequately reduced by design changes must be reduced with a measure that achieves the current state-of-the-art

(v) minor residual hazards must then be identified and listed; hazards that can be eliminated or controlled by state-of the-art means cannot be declared as residual hazards

(vi) residual hazard controls must then be put in place based on the needs of vulnerable users and the likelihood of occurrence, eg non-contact solutions, even lower force, signage, warning device etc

(vii) detailed installation (supply only doors), operation and maintenance instructions must then be compiled to explain the residual hazards, how to use the door and the steps needed to maintain it.

An example risk assessment document can be seen in Annex A.

4.1.5 Partly completed machine

The Directive defines a partly complete machine (PCM) as: *"An assembly which is almost machinery, but which cannot itself perform a specific application. A drive system is partly completed machinery. Partly completed machinery is only intended to be incorporated into or assembled with other machinery or other partly completed machinery or equipment, thereby forming machinery"*.

The manufacturer of partly completed machinery must CE mark their component under all applicable safety Directives, except the Machinery Directive, eg Low Voltage, Electro Magnetic Compatibility and Radio Equipment Directives.

Components in this category include drive unit & control panel combinations and powered headgear assemblies. It is not possible to supply a complete machine minus safety components under a Declaration of Incorporation to avoid full compliance; such a machine would in fact be a complete machine without adequate safety. PCM manufacturers should consult Article 13 of the Machinery Directive, the EC Guide to the Machinery Directive, and all applicable product specific standards such that the finished machinery can achieve the state-of-the-art.

The manufacturer of partly complete machinery must supply it with a Declaration of Incorporation (DoI) under the Machinery Directive, and comprehensive installation and maintenance instructions (for the PCM only). The instructions must be detailed enough that the manufacturer/assembler incorporating the PCM into a finished door can achieve overall compliance with the Machinery Directive Essential Health & Safety Requirements and applicable standards to meet the state-of the-art and enable them to produce an adequate operation and maintenance manual for the finished door.

Assemblers and manufacturers using 3rd party supplied PCMs should ensure that they are receiving a DoI under the Machinery Directive and that they follow the installation manual.

4.1.6 Safety component

The Directive defines a safety component as: *"A component which serves to fulfil a safety function, which is independently placed on the market, the failure and/or malfunction of which endangers the safety of persons, and which is not necessary in order for the machinery to function, or for which normal components may be substituted in order for the machinery to function"*.

The manufacturer of a safety component must CE mark the device under the Machinery Directive and ensure that it is in full conformity with all applicable Essential Health and Safety Requirements. They must supply it with a Declaration of Conformity (DoC) with the Machinery Directive and also ensure that it is in full conformity with all other applicable Directives, eg Electromagnetic Compatibility and Radio Equipment Directives. Further guidance is available in article 12 (3 or 4) of the Machinery Directive and in the EC Guide to the Machinery Directive.

Components in this category are: safe edges & non-contact presence detection devices (and control relay); safety brakes; spring break devices; and cable slack or cable break devices.

As sensitive components for the detection of people are listed in Annex iv of the Directive, they must either be manufactured in full conformity with the relevant type C harmonised standard (EN 12978) or be subject to type testing by a test laboratory, notified by the European Commission to test safety components under the Machinery Directive.

The manufacturer of the safety component must supply it with comprehensive installation and maintenance instructions (for the safety component only). The instructions must be detailed enough that the manufacturer/assembler incorporating the safety component into a finished door can achieve overall compliance with applicable standards and enable them to produce an adequate operation and maintenance manual for the finished door.

Assemblers and manufacturers using 3rd party supplied safety components should ensure that they are being supplied with a DoC under the Machinery Directive and that they follow the installation manual.

4.1.7 Instruction manuals

The door must be supplied with detailed installation instructions (supply only systems), and a comprehensive O & M manual; drawn up by the manufacturer or assembler of the system.

The operation part of the manual must identify and explain the residual hazards and how to safely use the door. In particular the manual must explain: how to electrically isolate the door; how to use any manual door release; what to do in the event of power failure; how to identify when a safety system (including fall back protection) has activated; what to do and when professional technical support is required. It must also explain what user training is required.

The maintenance section of the manual must describe in detail the steps necessary to keep the door in a safe condition:

(i) inspections, and

(ii) cleaning & lubrication, and

(iii) adjustments & parts replacements, and

(iv) safety testing (eg force or non-contact presence detection testing).

The maintenance instructions must specify the qualifications, skills and experience needed to execute the various maintenance tasks and set out the required frequency for each element. A log book must be provided to the client so that they can record the completed maintenance tasks.

4.1.8 Technical file

The company or person responsible for compliance of a new or extensively modified powered door must compile a technical file to document the entire compliance process and retain it unchanged for at least 10 years after manufacture, or manufacture of the last unit in serial production. The file must be assembled and provided, upon reasoned request from the relevant national authorities (such as HSE, Trading Standards, Environmental Health or the Police). There is no requirement to share the technical file with the client. This file must not be confused with a maintenance file, see section 5.

The technical file must contain at least:

(i) Technical drawings and specifications for the structure, foundations and safety critical elements such as hinges, guides, wheels, barrel, end plates, stops, fixings and calculations for loadings

(ii) The risk assessment including:

- the list of hazards and a description of the measures implemented to either eliminate the hazard or reduce the risk to acceptable levels
- the list of residual hazards, and the measures implemented to reduce or control them

(iii) a copy of the Declaration of Incorporation for any partly complete machine components used

(iv) a copy of the Declaration of Conformity for any safety components used

(v) a copy of the installation manuals for all components used

(vi) force test report (where force limitation is used), presence detection test report (where presence detection is used)

(vii) electrical test certificates and reports

(viii) a copy of the user warnings, safe use instructions and planned preventative maintenance instructions (O & M)

(ix) the Declaration of Conformity

(x) detailed instructions for installation and commissioning, including the testing required (where others will install the door, eg supply only).

The person who assembles the technical file must also be the person who signs the Declaration of Conformity because legal compliance cannot legally be declared until the file is complete.

Companies involved in serial production must operate and maintain a factory production control system; the system need not be independently certified (eg to ISO 9001) but must be comprehensive, documented and maintained.

Companies involved in repeat use of components (eg PCMs and safety devices) must maintain a similar system to ensure that compliance and documentation keeps pace with any supplied product changes. See Annex F.

4.1.9 Declaration of conformity

The client must be supplied with a Declaration of Conformity (DoC) that declares conformity with the Machinery Directive, and all other relevant Directives. The DoC must include the name and address of the responsible person, who must be the person responsible for assembling the technical file and hence has completed the overall compliance process. An example declaration can be seen in Annex D.

4.1.10 CE mark

The door must bear a CE plate that includes: the manufacturer's or assembler's name and address; a product designation or serial number; 2006/42/EC; the year of manufacture and be mounted visibly and indelibly on the door.

New doors will require additional information to satisfy the requirements of the Construction Products Regulation, see below. Examples of CE labels can be seen in Annex D.

4.2 Construction Products Regulation EU 305/2011

Since July 2013, all new manual and powered doors covered by a harmonised standard must comply with the Construction Products Regulation EU 305/2011. The door must be type tested and have performances declared for the essential characteristics relevant to the product. Requirements for compliance are set out in Annex ZA of EN 13241 which has been harmonised under the regulation since 2004 and states which characteristics must be tested, by whom, and which clause of EN 13241 must be applied to demonstrate compliance.

4.2.1. Responsibility for compliance

New manual and powered doors must comply with the Construction Products Regulation (EU) 305/2011 (CPR). The company or person responsible for conformity is the one who first creates the complete door within the European Economic Area or who first imports it into the European Economic Area (EEA). The following activities create a responsibility for legal compliance with the CPR:

(i) importing a complete door into the EEA from outside the EEA

(ii) manufacturing a complete door within the EEA

(iii) modifying a complete door prior to or during installation in a way not permitted in the manufacturer's instructions

(iv) assembling components from more than one manufacturer to make a complete door, either on site or in your own workshop, for example if you:

- fabricate a door and install a drive unit from a 3rd party supplier
- install a door supplied by one manufacturer with a drive unit from another
- buy a collection of components from a supplier not certified by them as a complete door
- buy components from multiple sources which you assemble.

Continued over page.

Scenario	Responsible person
Product made by manufacturer within EEA and sold under the manufacturer's brand	The manufacturer
Product not CE marked and made outside EEA, imported into the EEA	The importer
Product made for a distributor based in the EEA under the **distributor's own** brand	The distributor
Product created by distributor in the EEA using components from various suppliers	The distributor
Product created by an assembler using components from more than one supplier	The assembler

A "product" can be a complete finished door or a kit of parts, provided it is complete.

Companies involved in serial production must operate and maintain a factory production control system, the system need not be independently certified (eg ISO 9001) but must be comprehensive, documented and maintained.

4.2.2. Essential characteristics

Some characteristics must be tested by a test laboratory authorised (notified) by the European Commission and some can be tested by the company or person responsible for compliance. Some characteristics must be declared (mandatory), others may be left as "no performance declared" (NPD).

Essential Characteristics Requirements	Clause from EN13241	Result	Testing by
Watertightness	4.4.1	Class or NPD	Notified test laboratory
Release of dangerous substances	4.2.9	None/details (mandatory)	Notified test laboratory
Resistance to wind load	4.4.3	Class (mandatory)	Notified test laboratory
Thermal resistance	4.4.5	U-value or NPD	Notified test laboratory
Air permeability	4.4.6	Class or NPD	Notified test laboratory
Safe opening for vertically moving doors	4.2.8	Pass/fail (mandatory)	Notified test laboratory
Definition of geometry of glass components	4.2.5	Pass/fail (mandatory)	Manufacturer
Mechanical resistance and stability	4.2.3	Pass/fail (mandatory)	Manufacturer
Operating forces for power powered doors	4.3.3	Pass/fail (mandatory)	Notified test laboratory
Durability of watertightness, thermal resistance and air permeability against degradation	4.4.7	Values or NPD where NPD is clamed for the characteristic	Notified test laboratory

Information taken from table ZA 1 from EN 13241

4.2.3. Factory production control

Production of doors must be controlled by a documented factory production control process to ensure that actual production remains relevant to the essential characteristic type tests that are completed. The factory production control process does not need to be certified and independently audited (as per ISO:9001) but must be detailed and thorough such that any changes in supply of components, materials or production methods ensure constancy of the declared performance. If significant changes in materials, manufacture or components significantly change the essential characteristics, testing will need to be repeated (by the notified test laboratory as appropriate) to verify the change.

4.2.4. Cascaded type test evidence (Article 36)

To avoid the need for repeated testing of components it is possible via Article 36 of the regulation for the manufacturer of a component to have the component tested by a notified test laboratory and then cascade test evidence to their clients. Any company or person wishing to make use of this evidence for compliance of their product must gain written authority and details of the limitations (height, width, weight, speed, type of safe edge etc) of the test evidence from the component manufacturer.

Cascaded type test evidence can be used under Article 36 for the following product groups:

(i) lath/panel, guide and seal assemblies (resistance to wind load, air permeability and watertightness)

(ii) drive unit/control panel/hold-to-run device combinations (operating forces for powered doors)

(iii) drive unit/control panel/safe edge combinations (operating forces for powered doors)

(iv) drive unit/control panel/light grid or laser scanner combinations (operating forces for powered doors)

(v) fall-back protection systems (safe openings for vertically moving doors).

4.2.5. Micro-enterprises (Article 37)

Micro-enterprise manufacturers (fewer than 10 employees and less than €2m turnover per annum) may dispense with the need to use a Notified Test Laboratory, provided they can demonstrate that they have conducted the required testing in full conformity with EN 13241. This will prove difficult in some circumstances as complex test rigs are needed for some of the testing; it may prove advantageous to purchase components that come supplied with Article 36 authority from the supplier instead (see 4.2.4).

4.2.6. Bespoke products (Article 38)

Manufacturers of one off or bespoke products for very specialist one off applications may also dispense with the need to use Notified Test Laboratory, provided they can demonstrate that they have conducted the required testing in full conformity with EN 13241. This would not apply to one off sizes of a particular type of door (eg sectional door or rolling shutter); it must be a completely bespoke type or design and not be part of any type of serial production.

4.2.7. Declaration of performance

The company or person responsible for compliance must draw up and issue a Declaration of Performance against the Essential Characteristics, stating the notified test laboratory used and listing any cascaded test evidence (Article 36 authority) used as "appropriate technical documentation". An example declaration can be seen in Annex D.

4.2.8. CE mark

The company or person responsible for compliance must apply a permanent CE marking plate (see Annex D) to the door that includes at least the following:

(i) manufacturer's name and address.

(ii) a product designation or serial number

(iii) the essential characteristics and performances

(iv) the notified test laboratory and reference number

(v) the harmonised standard(s) used (EN 13241)

(vi) the year of manufacture and intended use.

The essential characteristic and notified test laboratory information must match that on the Declaration of Performance. Powered doors must not bear individual CE plates for CPR and MD; information relevant to both pieces of legislation must be included on a single plate.

Where a new manual door is combined with a 3rd party power unit at the point of installation, the CE marking for the manual door must be removed and replaced by a new CE plate by the company or person responsible for automating the door. Examples of CE labels can be seen in Annex D.

4.2.9. Technical file (Construction Products Regulation)

The company or person responsible for compliance must retain a technical file that contains at least:

(i) type test reports from notified test laboratories (system 3 test reports)

(ii) test reports detailing type testing done by the manufacturer (eg micro-enterprises and bespoke products)

(iii) test reports for structural type testing and details of glazing materials assessed by the manufacturer

(iv) written authority to use cascaded test evidence (Article 36) from component suppliers where used

(v) the original Declaration of Performance, installation manual and user manual from the manual door manufacturer where a manual door has been powered

(vi) the risk assessment for powering a manual door (see also Machinery Directive).

(vii) a copy of the Declaration of Performance.

Some items in this list could be shared by numbered reference, with documents in the Machinery Directive technical file for a powered door.

4.3. National statutes applicable to new doors

4.3.1. England, Scotland and Wales

Section 3 of the Health and Safety at Work Act 1974 requires that employers and the self-employed as part of their work ensure that doors they install are safe. Section 6 requires that doors for use at work must be manufactured to be safe. Section 7 requires that employees take reasonable steps to ensure the safety of themselves and others who may be affected by their work – *continued over page*.

The Electricity at Work regulations 1989 require that electrical systems are installed to prevent electric shock and fire due to electrical faults. The regulations also dictate that electrical work is only conducted by persons who possess the knowledge or experience or are working under such degree of supervision as may be appropriate, to prevent harm. Live working must be avoided wherever possible.

4.3.2. Northern Ireland

Article 5 of the Health and Safety at Work (Northern Ireland) Order 1978 requires that employers and the self-employed as part of their work ensure that systems they install are safe. Article 7 requires that systems for use at work must be manufactured to be safe. Article 8 requires that employees take reasonable steps to ensure the safety of themselves and others who may be affected by their work.

The Electricity at Work regulations NI 1991 require that electrical systems are installed to prevent electric shock and fire due to electrical faults. The regulations also dictate that electrical work is only conducted by persons who possess the knowledge or experience or are working under such degree of supervision as may be appropriate, to prevent harm. Live working must be avoided wherever possible.

4.3.3. Republic of Ireland

Where a door is installed by a person engaged in a trade, business or other undertaking (whether for profit or not), then that person will have duties under the Safety, Health and Welfare at Work Act 2005 to ensure the resulting door is safe.

The Safety, Health and Welfare at Work (General Applications) Regulations 2007 also require that electrical systems are installed to prevent electric shock and fire due to electrical faults. The regulations also dictate that electrical work is only conducted by persons who possess the knowledge or experience or are working under such degree of supervision as may be appropriate, to prevent harm. Live working must be avoided wherever possible.

In appropriate cases, a charge of reckless endangerment under the Non-Fatal Offences Against the Person Act 1997 may be considered.

The lists of applicable legislation are not exhaustive; other criminal legislation may well apply at any given location dependent on the precise details of the door and its location.

4.3.4. Negligence

Any company or person who by their action or inaction causes injury to persons or property could be pursued in the civil courts for damages. This would include the manufacturer, distributor, importer, owner, manager, landlord of a door.

5. Legal compliance - existing doors - repair, maintenance and modification

Persons or companies with legal responsibilities in the field or repair maintenance and modification of existing doors fall into two distinct groups:

(i) maintenance contractors; this group includes any company or person maintaining, repairing or modifying an existing door

(ii) owners and managers, this group includes: owners; workplace managers; landlords; managing agents; facilities managers; consultants; these people are generally the client in any maintenance contract.

Companies or persons in these groups have various criminal and civil legal obligations depending on the environment and national jurisdiction that the door exists in.

5.1. England, Scotland and Wales

Regulations 5 and 18 of the Workplace (Health, Safety and Welfare) Regulations 1992 require that doors at workplaces are safe and subject to a system of maintenance (system manager responsibility).

Section 3 of the Health and Safety at Work Act 1974 requires that employers and the self-employed as part of their work ensure that doors in their care are safe (eg landlords, workplace managers, owners, managing agents, facilities managers and maintenance contractors).

The Electricity at Work regulations 1989 require that electrical systems are maintained to prevent electric shock and fire due to electrical faults. The regulations also dictate that electrical work is only conducted by persons who possess the knowledge or experience or are working under such degree of supervision as may be appropriate, to prevent harm. Live working must be avoided wherever possible, this will mean at the very least that electrical systems are electrically isolated prior to maintenance for basic electrical checks.

5.2. Northern Ireland

Regulations 5 and 18 of the Workplace (Health, Safety and Welfare) Regulations (Northern Ireland) 1993 require that doors at workplaces are safe and subject to a system of maintenance (system manager responsibility).

Article 5 of the Health and Safety at Work (NI) Order 1978 requires that employers and the self-employed as part of their work ensure that doors in their care are safe (eg landlords, workplace managers, owners, managing agents, facilities managers and maintenance contractors).

The Electricity at Work regulations NI 1991 require that electrical systems are maintained to prevent electric shock and fire due to electrical faults. The regulations also dictate that electrical work is only conducted by persons who possess the knowledge or experience or are working under such degree of supervision as may be appropriate, to prevent harm. Live working must be avoided wherever possible; this will mean at the very least that electrical systems are electrically isolated prior to maintenance for basic electrical checks.

5.3. Republic of Ireland

If the premises are a workplace, there are specific duties to maintain the door in a safe condition under the Safety, Health and Welfare (General Applications) Regulations 2007 (system manager responsibility).

If the door is controlled by a person engaged in a trade, business or other undertaking (whether for profit or not), then that person will have duties under the Safety, Health and Welfare at Work Act 2005. This may, for example, include landlords, managing agents, workplace owners/managers, facilities managers and maintenance contractors. Landlords of rented houses will additionally have duties under the Housing (Standards for Rented Houses) Regulations 2008.

The Safety, Health and Welfare at Work (General Applications) Regulations 2007 require that electrical systems are maintained to prevent electric shock and fire due to electrical faults. The regulations also dictate that electrical work is only conducted by persons who possess the knowledge or experience or are working under such degree of supervision as may be appropriate, to prevent harm. Live working must be avoided wherever possible; this will mean at the very least that electrical systems are electrically isolated prior to maintenance for basic electrical checks.

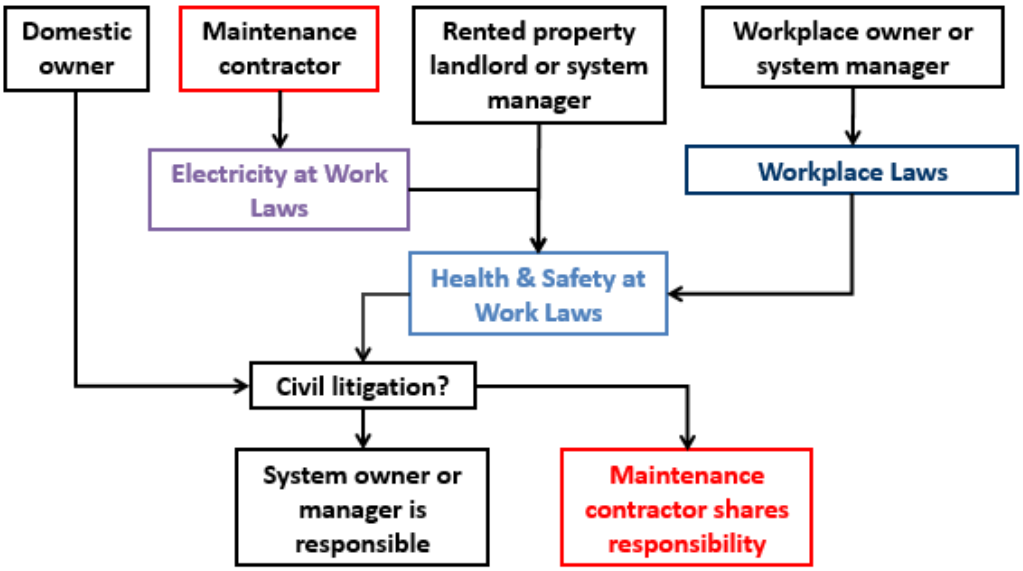
In appropriate cases, a charge of reckless endangerment under the Non-Fatal Offences Against the Person Act 1997 may be considered.

5.4. All areas of UK and Ireland

Any person, maintenance contractor or system manager, may be subject to civil claims for negligence if something they do, or fail to do, results in injury or damage to the property of a 3rd party.

It must be understood that, in the event of an incident with a door, the ensuing investigation will assess the input and actions of all parties associated and no guarantee of the outcome can be given. The investigation will ask who did what, what did those involved know about the condition of the offending door, and then what action could they have reasonably taken, or did they take to prevent the occurrence?

The lists of applicable legislation are not exhaustive; other criminal legislation may well apply at any given location dependent on the precise details of the door and its location.



Flow diagram indicating the responsibilities of duty holders

5.5. The management of the maintenance process

A system manager or person with ownership/management responsibilities for a door has various criminal and/or civil legal responsibilities for its safety, depending on the nature of the site. A maintenance contractor working on a door has criminal and civil legal responsibilities both during maintenance, repair or modification work and on completion of the works (see 5.1 to 5.4).

Health and safety law requires that reasonable and practicable steps are taken to provide safety; this level of safety is generally accepted to be that described by current product specific standards and other publicly available information.

There will always be some discussion about just how unsafe a given door actually is and the conversation often gets steered towards the likelihood of occurrence of an incident. Where children or untrained persons are potentially affected, the emphasis of the risk assessment must be on degree of harm rather than likelihood of occurrence. In many cases, it is foreseeable that children could play on or around doors or that untrained persons might encounter them. The current range of standards and codes of practice covering industrial doors and domestic garage doors have generally dealt with this element and therefore a door is either safe or not safe in accordance with the relevant standard or code.

Despite this, it is possible to discriminate to some degree and not all hazards will necessarily result in a door needing to be taken out of service:

(i) where a hazard is classified as “safety critical”, the door should not be returned to service by a maintenance contractor or, for that matter, by a system manager

(ii) where a hazard is classified as “requiring improvement”, the door could possibly be left in service at the discretion of the maintenance contractor and the system manager.

Examples of hazards classified as “safety critical” or “requiring attention” are listed in 5.5.11.

In either case, the system manager must be fully informed and an unsafe system notice (see Annex C.1) issued. Where a hazard has been classified “requiring attention” and the door is left in service, the system manager remains potentially liable to criminal prosecution or civil legal action in the event of a near miss or injury incident and hence must be given the opportunity to take the door out of service.

DHF recommends the following 4 step process to manage maintenance, repair and modification works.

5.5.1. Step 1 - Inform the client

Before going to site, the maintenance contractor should explain to the client that:

(i) as a duty of care to themselves, the door will need to be taken out of service for initial electrical and structural safety checks prior to the actual work or assessment process

(ii) if during maintenance or assessment work the door proves to have safety critical defects, it will not be able put back into service in that condition.

5.5.2. Step 2 - Assess the work

Upon arrival at the work site:

(i) the maintenance contractor should assess the door for safety before starting work, in so far as is possible in its current condition

(ii) the maintenance contractor should also assess the extent of work requested to be done by the client in terms of its likely impact on the safety of the door

(iii) if assessment is not possible in safety due to lack of safe access, a System Safety Unknown (see Annex C.2) notice should be issued.

If steps (i) & (ii) reveal that the door will be safe on completion of the proposed work, then the maintenance contractor can continue with the contracted work. If it subsequently becomes obvious during the work that the door will have safety critical defects on completion, the maintenance contractor should not put the door back into service.

Where step (ii) reveals that the proposed work will not result in a safe door:

(i) the maintenance contractor should explain to the client what diagnostic work (if any) might be necessary to properly assess the hazards; it may prove necessary to replace or adjust drive units, control boards or other components, before a thorough assessment is possible

(ii) the maintenance contractor should also explain all uncontrolled hazards to the client (and the users on site where appropriate) and explain to the client what steps will be necessary to address them.

The maintenance contractor should then request clearance from the client to complete both the contracted work and the required safety upgrade work.

5.5.3. Step 3 - Complete the work

If the client requires that the maintenance contractor only completes the diagnostic or contracted work (some client organisational, procurement, tendering or contractual issues may dictate this), then the maintenance contractor should proceed as requested by the client. In this case, it would be reasonable for the contractor to assume that the outstanding safety upgrade work is intended to be undertaken later.

The maintenance contractor should not however leave a door with “safety critical” defects in service, and only leave a door with “requiring improvement” defects in service with written permission from the client. The maintenance contractor must explain to the client (and the users on site where appropriate) how the door has been isolated or secured (eg explain where the switch is or how it has been secured against collapse).

The maintenance contractor should inform the client in writing (using an Unsafe System Notice) about the outstanding safety defects and that there could be legal consequences for them in the event of an incident involving the door if it is returned to service in its current state. It is strongly advised that the unsafe system notice is delivered in a traceable and recordable manner, eg by email with delivery and read receipt requests, regardless of whether or not it is appropriate or even possible to issue a paper copy on site.

As the users of the door on site are very often not the client, it will be helpful in many cases to place a warning sign on the affected door to inform users. Where a warning sign is used, it should bear the contact details of the maintenance contractor who places it.

DHF advise making a photographic record of the isolation, securing and warning signs employed on site.

5.5.4. Step 4 - Subsequent visits

If, on a subsequent visit, the maintenance contractor finds the door is still in service in an unsafe condition, the process must be repeated and the client re-informed in writing of the hazards present and of the potential consequences, using the unsafe system notice. The maintenance contractor should not be the person who puts the door back into service with safety critical defects at any stage.

5.5.5. Mitigating action

Although a maintenance contractor must never put a potentially dangerous door back into service, in many cases, a door could revert to manual use or be controlled in hold-to-run in order to maintain security at the site. This cannot of course be achieved where the problem is potential structural failure.

5.5.6. Conclusion of the process

It must be understood that, in the event of an incident with a door, the ensuing investigation will assess the input and actions of all parties associated and no guarantee of the outcome can be given. The investigation will establish who did what, what did those involved know about the condition of the offending door and then what action could they have reasonably taken, or did they take to prevent the occurrence? Clearly, it will be very important that those with a responsibility to inform (primarily the maintenance contractor) have done so in a very clear and precise manner.

It is advised that, when informing about defects affecting a door, this information is not confused with a quote to improve it; hence it will be better if these two functions are contained in two separate documents. The unsafe system warning document should be just that, and not be ambiguous in any way.

It should also be noted that if a maintenance contractor continues to arrive at a site repeatedly to find that the door is still in use with safety critical defects, at some point it will begin to look as if the system manager and the maintenance contractor are colluding to maintain an unsafe condition. In order to avoid this, and in the overall pursuit of safe doors, DHF would advise that if, at the third or fourth visit to the site, the system manager is still resisting safety improvements, then the maintenance contractor will have to consider in greater detail the risks involved in their continued involvement. It will be advisable at this stage to request a formal meeting with the system manager to discuss their ongoing intentions for safety of the door and to explore the possibility of staged improvements or other hazard mitigation strategies. DHF can offer its members support and guidance at this stage on a case by case basis.

Ultimately, if a system manager is clearly refusing to have a site made safe, then DHF would advise that the relationship may need to be ended and that the relevant authorities (eg HSE, HSA or Local Authority Environmental Health Department) be informed. DHF again can offer considerable support to members at this very final and ultimately undesirable stage.

5.5.7. Maintenance file

Differing from, and not to be confused with, a technical file, the maintenance file is a record of completed maintenance and alterations to a door throughout its life. Where a maintenance file is located in the same place as a technical file, care must be taken to avoid any confusion between the two records.

The maintenance file must include the following:

(i) a copy of the maintenance contract or service agreement

(ii) a copy of the current Planned Preventative Maintenance instructions (where PPM is contracted)

(iii) the risk assessment for initial take-over of maintenance or reactive first visit.

(iv) the risk assessment for any alteration.

(v) the maintenance log (or a copy of it where it is retained by the system manager).

(vi) Declarations of Conformity or Incorporation for safety device or partly complete machine component replacements

(vii) a copy of installation manuals for component replacements (where they differ from the original)

(viii) a copy of updated user instructions issued as a result of alterations

(ix) a copy of all unsafe system notices issued

(x) a copy of the certificate of compliance issued

(xi) copies of any other relevant communications with the client.

5.5.8. Disclaimer documents

A lot of time and expense has gone into obtaining good solid legal advice on this subject but there is no legal precedent for such a document in this environment. Even if the system manager agrees to take responsibility, there is no guarantee that the maintenance contractor's culpability will be assured.

Such a document would be attempting to transfer the ***criminal*** responsibilities of one party (the maintenance contractor) to another (the system manager) by means of a ***civil*** contract; this is not possible in criminal law.

5.5.9. Maintenance frequency and content

Maintenance frequency and content should in the first instance be specified by the manufacturer or assembler of the door. In the absence of a specified frequency and content or if the specified schedule of maintenance proves inadequate, the maintenance contractor should design a maintenance schedule that is judged suitable to keep the door in a safe condition.

Planned preventative maintenance should check at least the following areas:

(i) structural integrity and fall-back protection

(ii) adjustments, cleaning and lubrication

(iii) electrical safety

(iv) operating system and safety function checks

(v) safety system performance tests

(vi) warning devices, signage and markings

(vii) user documentation

(viii) confirm that the risk assessment was suitable and sufficient.

Where the system manager disputes or refuses a revised schedule, this should be treated as a "requires improvement" hazard and notified to the system manager with an Unsafe System Notice.

Hold-to-run, force limitation and non-contact presence detection should be performance tested at least annually but need not be tested at every maintenance visit throughout the year (providing that function is checked), unless changes are made that might alter performance eg:

(i) when safety devices are replaced with a different type or size

(ii) when a drive unit or control panel that has torque or speed adjustment is replaced

(iii) when non-contact presence detection device is replaced

(iv) when changes are made that could affect performance or alignment.

5.5.10. Certificate of compliance

When repair, modification or maintenance is complete, and the door is deemed to be safe and in compliance with DHF TS 012:2019, a certificate of compliance should be issued to the client. An example of the TS 012 certificate can be found in Annex B. A certificate of compliance is a DHF inspired document to inform the client that the door or barrier is safe in situations where a Declaration of Conformity and CE mark are not appropriate, primarily where the maintenance company have not created the door.
An example certificate of compliance can be seen in Annex B.

5.5.11. List of hazards classified as 'Safety Critical' or 'Requires Improvement'

Safety Critical Do not return to service	**Requires Improvement** Could be left in service with system manager agreement
Structural failure imminent	Minor structural improvement necessary
Crush, shear, draw-in or impact hazard not protected below 2.3m above permanent access level	Crush, shear, draw-in or impact hazard not protected but between 2.3m and 2.5m above a permanent access level
Force or time limits over maximum by more than 25%: – 400N (crush, shear and draw-in hazard) = 500N or more – 1400N (impact hazard) = 1750N or more – 150N exceeded (all hazards) for 1 second or more 25N exceeded (all hazards) for more than 10s	Force and time limits over maximum by less than 25%: – 400N (crush, shear and draw-in hazard) = up to 499N – 1400N (impact hazards) = up to 1749N – 150N exceeded for up to 0.99 second 25N exceeded (all hazards) between 5s and 10s
Rolling grille without hood, protective beam or force limitation to prevent lifting	Safe edge/light grid installed, performance is correct but does not achieve category 2 or 3
Headgear of vertically acting door not accessible for inspection	Hinge strength unknown but judged to be safe currently
Vertically acting door without adequate fall-back protection	Two hinge swing/folding door with inverted top hinge, but appears structurally sound
Hold-to-run in use but some hazards not visible	Hold-to-run by radio fob
Hold-to-run with overtravel exceeding 125mm	Hold-to-run with overtravel up to 125mm
Sliding door without adequate travel stops	Swing door without travel stops
Structural failure due to wind probable	Wind strength unknown but appears safe
Safety fence provided but easily defeatable (reach over/through)	Safety fence mesh size/clearance not to ISO 13857 but only defeatable by extreme action
Wicket door without cut out switch wired to stop circuit	Safety brake, cable break device or slack cable device not wired to stop circuit as required in the device instructions
Safe edge fails test piece test and is more than 140mm from moving leaf at a sliding door draw-in hazard	Safe edge fails test piece test but less than 140mm from moving leaf at sliding door draw-in hazard
Door protected solely by horizontal photo beams (no force limitation, light grid/laser scanner etc or hold-to-run)	Vertically moving door with multiple spring suspension, appears to be in balance but unable to positively verify all springs present
Suspension element of vertically moving door terminally worn or damaged (chain, rope or strap) eg steel wire rope with broken strands	Insufficient photo beams to supplement force limitation
	Vertically moving door, suspension element fault would not be immediately obvious to users.
	Danger of vehicle impact or impact to vehicle
	Insufficient visibility in darkness
	Insufficient signage or ground markings
Electrical	
Class 1 electrical equipment not earthed	Class 1 electrical equipment, wiring, earthing and fuse all suitable, RCD required but not fitted
Exposed live conductors	Unprotected cable in good condition
Damaged cabling - safety or power circuit	IP rating incorrect but appears safe currently
Disconnection time at earth fault beyond safe limits	

This list is not exhaustive, other hazards may well be present, they must be assessed and classified using a similar ethos to those listed in the tables.

Annex A. Example industrial door & domestic garage door risk assessment document

Step 1 - Describe the system, environment and users

Job reference: .....

Site address: .....

Postcode: .....

Assessment conducted by: .....

☐ Machinery Directive applicable (new or extensively modified door)

☐ Machinery Directive not applicable (existing powered door)

☐ New ☐ Reactive repair ☐ Planned maintenance ☐ Modification

☐ Rolling shutter ☐ Sectional ☐ Folding ☐ High speed ☐ Sliding ☐ Wicket door

Other .....

Number of leaves ..... Leaf 1 width ..... Leaf 2 width .....

Material ..... Height ..... Weight .....

Percentage infill ..... Expected operations per day .....

Weather conditions:

What weather conditions will the door be exposed to?

☐ Inside location ☐ Outside location ☐ Sheltered ☐ Exposed

Estimated maximum wind gust speed: .....

Other .....

Users and others who may encounter the door:

☐ No untrained persons present ☐ Untrained persons could be present

☐ High numbers of vulnerable persons present

(eg young children, physical disabilities, sight impairment, frail, elderly)

Nature of vulnerable persons .....

Reason/location for vulnerable persons .....

MS Word versions of this document are available from the DHF website.

Step 2 - Make a list of all potential hazards

Generic hazards present with all doors are shown, the other more door specific hazards must be added. Some guidance is shown in brackets, users of this document should edit the fields as required.

No.	Hazard description and location
1	**Failure of the building structure supporting the door** (masonry, structural steelwork etc)
2	**Door system structure and fixing failure** (end plates, brackets, bracing and fixings etc)
3	**Barrel, shaft, curtain or bearing failure** (barrel structure, barrel location, bearings, keys, grub screws, set screws, curtain attachments etc.)
4	**Fall-back due to balancing system component failure** (spring, gear, chain, rope, transmission etc)
5	**Structural failure due to wind load** (lath, panel, track, guide, wind lock etc)
6	**Electrical faults causing shock or fire** (earthing, insulation, earth loop, RCD, cable protection etc. BS 7671/ET 101 & EN 60204-1)
7	**Control system faults causing loss of safety** (safe edge, light grid, laser scanner etc, door switch, limit switch, cable break, safety brake circuit control and system response)
8	**Crush at the leading edge** (horizontally and vertically moving doors)
9	**Impact in the swept area** (horizontally moving doors)
10	**Lack of maintenance** (faults or loss of safety caused by corrosion, wear and tear, vandalism, accidental damage etc)
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

MS Word versions of this document are available from the DHF web site.

Steps 3 & 4 - Improve/check the design & apply/check control measures

Use the hazard numbers from the hazard list and describe how the hazard has been eliminated or reduced (safe design) or controlled by state-of-the-art means, giving priority where possible to safe design.

No.	Hazard control measure applied - S = safe design C = control measure	S	C
1		☐	☐
2		☐	☐
3		☐	☐
4		☐	☐
5		☐	☐
6		☐	☐
7		☐	☐
8		☐	☐
9		☐	☐
10		☐	☐
11		☐	☐
12		☐	☐
13		☐	☐
14		☐	☐
15		☐	☐
16		☐	☐
17		☐	☐
18		☐	☐
19		☐	☐
20		☐	☐

MS Word versions of this document are available from the DHF website.

Steps 5 & 6 - List the residual hazards & apply/check control measures

No.	Residual hazard description	Control measure
1	*The door will become unsafe if not correctly maintained.*	*Provide/check the suitability of existing, planned maintenance instructions.*
2	*Users may not be aware of residual hazards and may not know how to use the door safely.*	*Provide/check the suitability of the user warnings and user instructions.*
3		
4		
5		
6		
7		
8		
9		
10		

Step 7 - Provide/check suitable operation and maintenance instructions

☐ **User warnings and instructions suitable**

☐ **Maintenance instructions suitable**

Declaration

Applicable Machinery Directive Essential Health and Safety Requirements complied with.

This section only needs to be completed where the Machinery Directive applies (new or extensively modified doors). An explanation of the EH&SRs can be found in 4.1.3.

☐1. Foreseeable misuse
☐1.1.2. Principles of safety integration
☐1.1.3. Materials & products
☐1.1.5. Design of doors to facilitate handling
☐1.2.1. Safety & reliability of control systems
☐1.2.2. Activation devices
☐1.2.3. Starting
☐1.2.4. Stopping
☐1.2.6. Failure of power supply
☐1.3.1. Stability of foundations
☐1.3.2. Risks of break up during operation
☐1.3.4. Risks due to surfaces, edges or angles
☐1.3.5. Risks related to combined machinery
☐1.3.6. Risks related to variations in operating conditions
☐1.3.7. Risks related to moving parts
☐1.3.8. Choice of protection against risks from moving parts
☐1.3.9. Risks of uncontrolled movements
☐1.4.1. General requirements of guards
☐1.4.2.1. Special requirements for fixed guards
☐1.4.3. Special requirements for protective devices
☐1.5.1. Electricity supply
☐1.5.4. Errors of installation
☐1.5.14. Risk of being trapped
☐1.5.15. Risk of slipping, tripping or falling
☐1.6.1. Machinery maintenance
☐1.6.2. Access to operation position & servicing points
☐1.6.3. Isolation of energy sources
☐1.7.1. Information
☐1.7.1.2. Warning devices
☐1.7.2. Warnings
☐1.7.3. Markings
☐1.7.4. Instructions

Completed by: ..... **Signature:** ..... **Date:** .....

Verified by: ..... **Signature:** ..... **Date:** .....

MS Word versions of this document are available from the DHF website.

Annex B. Example certificate of compliance

Certificate of Compliance

Job reference: .....

Site address: .....

Postcode: .....

Reason for issue:

☐ Maintenance ☐ Repair ☐ Modification

Assessment conducted by:

Structural integrity

☐ Foundations, supports, barrels, shafts, bearings, welding and fixings are provided secure and resilient

☐ Guides, tracks, rollers and hinges are secure, aligned and resilient

☐ Steel wire ropes properly aligned, correct specification and undamaged

☐ Travel stops secure, properly aligned and resilient

☐ Fall-back protection provided (vertically moving doors)

☐ Resistance to wind load correct for environment

☐ Safety distances to prevent crush hazards correct

☐ Fencing is secure and has the correct safety clearances

Electrical safety

☐ Earth connections correct and secure

☐ Wire terminations correct and secure

☐ Enclosures and cable entries sealed

☐ Supply conforms to BS 7671/ET 101

☐ Isolation is functional

☐ Safety devices achieve category 2 or 3 as installed

☐ Cabling is secure and protected mechanically

☐ Cable sizes and specifications correct

☐ Dangerous voltage labels in place

☐ Conductive metalwork continuity to earth is tested

☐ Electrical tests completed

Functional tests and settings

☐ Limit switch/system properly set

☐ Safety device function and system response correct

☐ Operating logic correct for safety in use

☐ Photo beam function and response correct

☐ Fall-back protection devices issue a stop command on deployment (as per device instructions)

☐ Wicket door switches operate the stop function

☐ Loop detectors operate the correct command

☐ Intercoms, keypads, key switches, buttons, transmitters etc operate the correct command

☐ The door operates as designed

Safety performance tests

☐ Hold-to-run overtravel measured

☐ Light grid or laser scanner etc tested ☐ Force limitation tested

☐ Force test results assessed and indicate safe force at all hazards protected by force limitation

Warning devices, signage and markings

☐ Warning devices, signage and markings provided as per the risk assessment

☐ Warning lamps function correctly ☐ Audible warning devices function correctly

☐ Road markings in place and visible ☐ Warning signs in place, visible and comprehensible

☐ Pedestrian railings in place and secure ☐ Pedestrian routes marked and visible

Risk assessment

☐ All hazards identified ☐ All hazards correctly controlled

☐ Residual hazards correctly identified ☐ User warnings explain residual hazards

☐ Safe use instructions reflect the residual hazards

Maintenance

☐ Maintenance instructions adequate ☐ Maintenance interval adequate

☐ Maintenance tasks completed Maintenance interval …… months

User information

☐ User training completed ☐ User warnings provided and explained

☐ User instructions provided and explained ☐ Maintenance instructions provided and explained

☐ Maintenance log provided (new doors)

☐ Maintenance log updated (existing doors)

☐ Declaration of Conformity provided (new doors)

☐ CE label fitted (new doors)

On the date indicated, this door is in full compliance with DHF TS 012:2018, is safe to use and at that time satisfied the legal obligations of both the owner and the maintaining company.

Completed by: …… **Signature:** …… **Date:** ……

Verified by: …… **Signature:** …… **Date:** ……

MS Word versions of this document are available from the DHF website.

Annex C.1. Example unsafe system notice

Unsafe System Notice

Date: .....

Dear: ..... **Job reference number:** .....

Door type: .....

Reference: .....

Location: .....

In our opinion, the above door is currently not safe for operation.

Continued use of this system may result in damage to property or injury to users or members of the public generally.

Overleaf is a list of faults we consider necessary to be rectified before the system can be regarded as safe in operation.

We also attach an estimate of the cost of this work if undertaken by us.

You are reminded that, as the system manager, you have a legal duty of care to users and to visitors to the premises (including trespassers). If the system is not maintained in a safe condition, any party whose property is damaged, or who is injured by the door is likely to be able to sue for damages. If you have insurance covering such risks, your insurance contract is likely to oblige you to disclose material facts to your insurer such as, in this case, the fact that the door is not considered safe.

Depending on location and use, there may well also be responsibilities for the system manager under health and safety law (see over for details). Failure to meet duties imposed by health and safety legislation could result in criminal proceedings.

Due to our own responsibilities under criminal law as a system maintainer, we are unable to leave a system with "safety critical" defects in service. Where a system has lesser safety issues that are rated as "requiring improvement", we may leave the system in service at your discretion. Where a system with defects requiring improvement is left in service, there may well still be legal liabilities for the system manager in the event of an incident resulting in damage to property or injury. We strongly advise that all safety related defects are resolved with immediate effect to protect the interests of both the system manager and users of the system.

The system has been left: .....

(e.g. *"switched off", "set to hold-to-run control", "as found", "secured against collapse" etc*)

Yours faithfully: ..... **Signature:** .....

Applicable Legislation

The actual document used will contain a list of applicable legislation at this point (as indicated in section 5 of this code), for efficiency the list has not been replicated here. Complete document templates are available from the DHF website.

Exposed system hazards: SC = Safety Critical; RI = Requiring Improvement

1. SC/RI: .....

2. SC/RI: .....

3. SC/RI: .....

4. SC/RI: .....

5. SC/RI: .....

6. SC/RI: .....

MS Word versions of this document are available from the DHF website.

Annex C.2. Example system safety unknown notice

System Safety Unknown Notice

Date: .....

Dear: ..... **Job reference number:** .....

System Type: .....

Reference: .....

Location: .....

We are unable to gain access to some safety critical elements of your system.

As part of routine maintenance, repair or modification works we need to gain access to the safety critical areas of your system for inspections, adjustments, cleaning, lubrication or testing. Without this access we are unable to ascertain the safety of your system and hence are unable to determine whether or not it is safe to use.

Continued use of the system could result in damage to property or injury to users or members of the public generally. You are reminded that, as the system manager, you have a legal duty of care to users and to visitors to the premises (including trespassers).

If the system is not maintained in a safe condition, any party whose property is damaged, or who is injured by the system is likely to be able to sue for damages. If you have insurance covering such risks, your insurance contract is likely to oblige you to disclose material facts to your insurer such as, in this case, the fact that safety of the system could not be ascertained.

Depending on location and use, there may well also be responsibilities for the system manager under health and safety law (see over for details). Failure to meet duties imposed by health and safety legislation could result in criminal proceedings.

Due to our own responsibilities under criminal law as a system maintainer, we are unable to leave a system in service where we cannot ascertain its safety. If a system is left in service where the safety of it cannot be ascertained, there may well be legal liabilities for the system manager in the event of an incident resulting in damage to property or injury. We strongly advise that you arrange for structural alterations that will make routine access for maintenance of your system possible with immediate effect to protect the interests of both the system manager and users of the system.

We would be happy to advise what access is necessary.

The system has been left: .....

(e.g. *"switched off", "set to hold-to-run control", "as found", "secured against collapse" etc*)

Yours faithfully: ..... **Signature:** .....

Applicable Legislation

The actual document used will contain a list of applicable legislation at this point (as indicated in section 5 of this code), for efficiency the list has not been replicated here. Complete document templates are available from the DHF website.

MS Word versions of this document are available from the DHF website.

Annex D.1. Machinery Directive Declaration of Conformity

New powered doors and retrospectively powered doors

Declaration of Conformity

Company name: .....

Company address: .....

Description & unique identification: .....

The company above declares under its own authority that the door above is in full compliance with:

- 2006/42/EC – Machinery Directive

The company additionally declares under its own authority that the system is also in full compliance with the following Directives:

- 2014/30/EU – Electromagnetic Compatibility Directive (EMC)
- 2014/53/EU – Radio Equipment Directive (RED)

Place and date of declaration: .....

Name & signature of the responsible person: .....

MS Word versions of this document are available from the DHF website.

Annex D.2. Construction Products Regulation Declaration of Performance - all new doors

Declaration of Performance

(EU) 305/2011

Company name: .....

Company address: .....

1. Unique identification code of the product type: .....
2. Intended use: .....
3. System/s of AVCP: **Systems 3 and 4**
4. Harmonised standard: **EN 13241-1:2003 + A2:2016**
5. Notified bodies: .....
6. Declared performances:

Essential Characteristic	Declared Performance	AVCP System	Harmonised Standard
Water tightness	.....	3	EN 13241: 2003 + A2:2016
Dangerous substances	.....	3	
Resistance to wind load	.....	3	
Thermal resistance	.....	3	
Air permeability	.....	3	
Safe opening	.....	3	
Definition of geometry of glass components	.....	4	
Mechanical resistance and stability	.....	4	
Operating forces	.....	3	
Durability of water tightness, thermal resistance and air permeability against degradation	.....	3	

6. Appropriate Technical Documentation (Article 36 authority)

....	....

The performance of the product identified above is in conformity with the declared performances. This declaration of performance is issued under the sole responsibility of the manufacturer identified above.

Name, date & signature of responsible person: .....

NOTE 1: Manual doors do not require the operating forces reference

NOTE 2: Horizontally moving doors do not require the safe opening reference

NOTE 3: Section 6 is only required when Article 36 evidence is being used

MS Word versions of this document are available from the DHF website.

Annex D.3. Machinery Directive CE mark - retrospectively powered doors only, not new doors

Company:	Address: .....
CE 2006/42/EC	**Year:** ..... **Description:** ..... **Unique identification no:** .....

Annex D.4. Construction Products Regulation CE mark – all new doors

Company:		Address:	
CE	(EU) 305/2011 & 2006/42/EC	**Year:** ..... **Product type:** ..... **Unique identification no:**	
Essential Characteristic		**Declared Performance**	**Harmonised Standard**
Water tightness		.....	**EN 13241:2003 + A2:2016**
Dangerous substances		.....	
Resistance to wind load		.....	
Thermal resistance		.....	
Air permeability		.....	
Safe opening		.....	
Definition of geometry of glass components		.....	
Mechanical resistance and stability		.....	
Operating forces		.....	
Durability of water tightness, thermal resistance and air permeability against degradation		.....	
Type testing by:	.....		
Intended use:	.....		

NOTE 1: Manual doors must not bear the Machinery Directive 2006/42/EC or operating forces references

NOTE 2: Characteristics declared as NPD do not need to be included on the CE label

NOTE 3: Information on the CE label must match that on the DoP

MS Word versions of this document are available from the DHF website.

Annex E. Factory production control (FPC) checklist

This section highlights some of the areas for consideration when designing a Factory Production Control system as an alternative to a full ISO 9001 system. An FPC system is needed wherever manufacture of doors occurs.

General

Are written procedures/work instructions issued to the shop floor?

Are they "controlled" so that updates can be consistently applied?

Identify the documents relevant to the product(s) being CE marked.

Do you directly control the machinery used to manufacture the product?

If not, and you use a sub-contractor, what controls are in place?

Personnel

Who is the management representative in overall charge of FPC and with responsibility for ensuring that its requirements are applied?

Are the personnel involved in production qualified and trained to operate and maintain the equipment and carry out production line duties?

Equipment

Is maintenance of the process machinery carried out to written procedures at regular intervals?

Are the results recorded?

Is the inspection equipment correctly maintained and calibrated to ensure constant accuracy of tests performed during FPC?

How is the frequency of calibration controlled?

Are records kept?

Design

Where relevant, are the responsibilities for the stages of the design process defined?

Do procedures contain details of any design checks to be carried out?

Raw materials and components

What are the procedures/routines covering the purchase of raw materials and components?

Do purchase orders detail specific requirements such as grade of steel or type of glass?

Are specifications agreed with certain suppliers?

Are any certificates of analysis or conformity requested from suppliers?

Are batches of raw materials or components traceable through the production process and in finished products?

If so, how is this traceability maintained?

Production process control

How is the flow of production controlled? Are job sheets or works orders raised for each batch/day/week of production?

How is progress recorded?

What records are generated?

Are all production processes and procedures recorded at regular intervals?

Who records the processes?

Is the recording automatic?

How is the documentation organised?

Is product testing carried out on site?

If not, then where?

Check test records for recent production. Do the results match the requirements of the technical specification?

Traceability and marking

How are product batches traceable through the production process and in finished products?

What records are maintained of where the finished products are shipped?

How is production batch number traceability maintained after dispatch to assist in traceability in the event of a complaint being received?

How long are records kept?

Non-conforming product

Is there a documented inspection system that allows detection of defects before delivery?

What proportion of products is inspected?

How are any non-conforming products identified and stored?

What records are kept?

Corrective action

Does the system include action to prevent future non-conformities?

Who is responsible for:

- Investigating the cause of non-conformities?
- Correcting non-conformities?

Is there an adequate documented system concerning complaints received about products and is the system integrated into the FPC?

How are customer complaints addressed?

Handling, storage and packaging

Are procedures in place for storing and handling raw materials, components and products to prevent damage and deterioration?

Annex F. Example residual hazard control signs

Door moves without warning

Keep clear
(Door moves towards you)

Trip hazard

Dangerous voltage within

Hazard tape

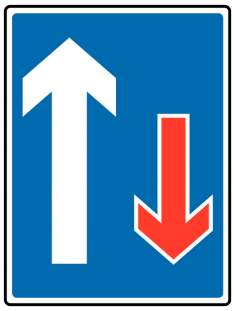
Hazard area

Stop

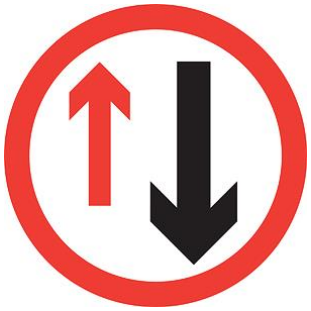
No entry

One way

Pedestrians



Priority over oncoming vehicles



Oncoming vehicles have priority

Annex G. Training and competency

The following training requirements are the minimum acceptable for the roles identified:

Unsupervised installer/maintainer:

(i) basic health and safety, CSCS or similar

(ii) manual handling certificate

(iii) DHF Industrial Door Safety Diploma (or Domestic Garage Door Safety Diploma for garage door work)

(iv) locating underground services (where ground is broken) certificate

(v) asbestos awareness certificate (when working in buildings)

(vi) work at height training – certificate (when working at height)

(vii) manufacturer's product training or company in house product training certificates

(viii) safe isolation (when working on electrical systems).

Supervised installer:

(i) basic health and safety, CSCS or similar

(ii) asbestos awareness certificate

(iii) manual handling certificate

(iv) locating underground services (where ground is broken) certificate

(v) work at height training certificate

(vi) DHF Industrial Door Safety Certificate/Award (or Domestic Garage Door Safety Diploma for garage door work)

(vii) manufacturer's product training or company in house product training certificates

(viii) safe isolation (when working on electrical systems)

Supervision does not need to be direct on site, it can be remote supervision that directs and verifies the reporting and documentation from site, the supervisor/verifier must be a current DHF Industrial Door (or Domestic Garage Door for garage doors) Safety Diploma and sign off all test reports, risk assessments and certificates of compliance.

Provision of electrical supply:

(i) BS 7671 C&G or ET 101 Republic of Ireland equivalent

(ii) NVQ 2 (UK) or NFQ 4 (Republic of Ireland).

Welding:

(i) NVQ 2 (UK) or NFQ 4 (Republic of Ireland) or employer's self-certification of competence.

On site surveyor:

(i) basic health and safety, CSCS or similar

(ii) DHF Industrial Door Safety Diploma (or Domestic Garage Door Safety Diploma for garage doors only)

(iii) product awareness, in-house proof

(iv) work at height training (where work at height is required) certificate.

Specifiers:

(i) DHF Industrial Door Safety Diploma (or Domestic Garage Door Safety Diploma for garage doors only)

(ii) product awareness – in-house proof.

Annex H. Complete new door non-compliance process

When an installation contractor buys in a complete door from a 3rd party supplier they must be careful to understand what they are being supplied with and the basis under which the collection of parts is being supplied. Is the assembly a disparate collection of parts, or a complete door? If the collection of parts is being supplied as a complete door, the supplier bears the responsibility for legal compliance, if not, the installation contractor must bear the ultimate responsibility for compliance.

There may be occasions where an installation contractor has been supplied with a complete door supported by a Declaration of Conformity with the Machinery Directive and a CE mark, but the door appears to have some hazards that are not protected in line with the state-of-the-art. If this happens, it is important to understand the various roles and responsibilities under criminal or civil law (see section 4):

(i) the supplier of the complete door is responsible for compliance

(ii) the installation contractor must follow the supplier's installation instructions

(iii) the installation contractor has a duty to report any apparent noncompliance to the supplier, and ultimately to the client if the supplier declines to respond

(iv) if the installation contractor makes safety improvements not authorised by the supplier, the installation contractor takes on responsibility for compliance and could suffer some loss of warranty cover

(v) the client has legal responsibilities if they choose to keep the door in service below the state-of-the-art.

There is potential for the installation contractor to bear legal liability when they fail to communicate any concern over the safety of a door to either the supplier or the client if they could reasonably have been expected to understand the issues at stake, e.g. they are qualified in door standards and legislation.

There are obvious conflicts of interest at stake when this happens. Considerable care will be needed to protect the criminal, civil and commercial interests of all concerned parties.

DHF offer the following advice:

(i) contact the supplier in writing explaining the apparent non-compliance, listing the exposed hazards and requesting a state-of-the-art solution.

(ii) if refused, contact DHF if you are a member, or if the supplier is a DHF member. DHF will assist with negotiations and attempt to achieve an amicable resolution.

(iii) where this action does not result in an acceptable solution the installation contractor has three remaining options:

- resolve the hazards with state-of-the-art modifications themselves and take over responsibility for compliance, or
- report the apparent non-compliance to the relevant national authority eg HSE, Trading Standards or Local Authority Environmental Health Officer (DHF will assist members with this), or
- inform the client of the apparent unprotected hazards and allow the client to decide how they wish to proceed.

Where a complete door does achieve the state-of-the-art when installed in line with the supplied instructions, but the installation contractor assesses that there are residual hazards that need further control measures to be applied, the installation contractor must apply them in line with their own onsite risk assessment. Such measures might include vehicle loop detectors, additional photo beams, traffic lights, signage, markings, pedestrian railings, lights or sounders etc.

Annex I. Worked wind class examples

BS 6375-1 describes a UK specific, abridged version of the Europe-wide method for calculating wind load described in EN 1991-1-4; it takes average expected wind speed information from across the UK and applies various multiplying factors to come up with a likely peak wind gust pressure for any location in the UK.

The factors are:

(i) proximity to built-up areas and the coast

(ii) altitude and door height

(iii) proximity to hills and slopes (orography)

(iv) sloping roof windows (dormer)

(v) wind tunnelling between buildings (funnelling).

As we are only considering doors and not windows here, we can discount the dormer (roof window) effect.

The multiplying factors are applied based on the proposed location for the door; below are four indicative worked examples using the maps and tables in BS 6375-1.

1. Rural Oxfordshire village, altitude 100m, door height less than 3m.

Map average wind speed	Terrain & location	Nominal load @ door height	Altitude factor	Orography factor	Funnelling factor
20 m/s	C	417 pascals	1.21	1	1
417 x 1.21 = 505 pascals = class 3					

2. Oxford suburban, altitude 50m, door height less than 3m.

Map average wind speed	Terrain & location	Nominal load @ door height	Altitude factor	Orography factor	Funnelling factor
20 m/s	F	417 pascals	1.10	1	1
458 x 1.10 = 503 = class 3 (although a 450 pascal class 2 door would probably suffice)					

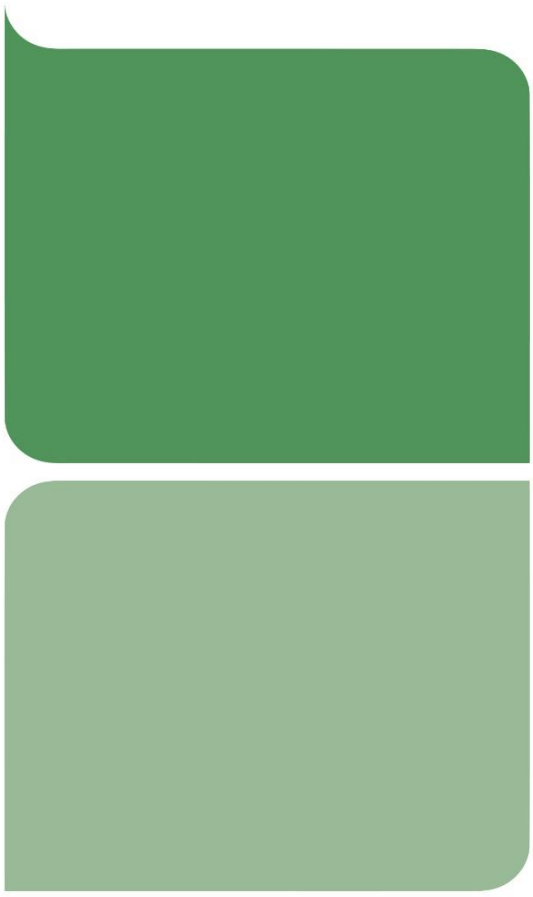
3. Blackpool airport, altitude 10m, door height less than 6m.

Map average wind speed	Terrain & location	Nominal load @ door height	Altitude factor	Orography factor	Funnelling factor
24 m/s	B	921 pascals	1.05	1	1.35
921 x 1.05 x 1.35 =1306 = class 5					

4. Aberdeen industrial site, altitude 66m, door height less than 6m.

Map average wind speed	Terrain & location	Nominal load @ door height	Altitude factor	Orography factor	Funnelling factor
23 m/s	E	769 pascals	1.15	1	1
769 x 1.15 = 884 = class 4					

The BS 6375-1 abridged and rounded up method used in these examples is conservative in nature and applying the more complex and detailed method described in EN 1991-1-4 may actually give a more accurate and potentially less conservative (lower) wind class at some sites.



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