

Safety Warning Notice No 4

Fall-Back Protection on Vertically Moving Doors

This document applies to vertically acting, industrial doors, domestic garage doors and commercial shutters that people on foot have access to pass below, including fire/smoke resisting doors in normal day to day use (opened and closed daily). It is driven by the prosecution of a door company following an incident where their door fell back and killed two adults. The incident in question happened in 2013 at the G-Live venue in Guildford, the prosecution followed in 2016. In the summing up, the judge identified that:

- a) the failure of one drive/support chain (there were two) was not visible to the users
- b) there were no sensors to detect failure of drive chains or suspension cables
- c) when one chain failed, there was nothing to prevent the door from continuing to be used on the remaining chain.

Whilst these findings were related to a specific door design, they do have relevance to many other door systems currently in use, particularly those that employ a suspension system in which failure of a critical component may not be evident to users, e.g. spring balanced powered shutters that employ a drive that has enough torque to operate the door normally when the spring has failed. In such designs, the door is perfectly safe whilst drive and spring are sound but can become dangerous if the spring has failed and the door continues to be used.

The applicable standard EN 12604:2000 and its recent revision EN 12604:2017 do not universally prevent suspension system designs where critical component failure can go unnoticed. Because of this, the UK version of the recently revised standard BS EN 12604:2017 is published with a warning in the foreword and DHF is offering this warning notice to guide industry.

The standard requires vertically acting doors to be balanced such that they remain static in the fully open position and that, if they do not remain static in any other position, they must only exert a **very** light force. It also requires that they are also protected against failures in the balancing system that could cause them to fall-back due to gravity.

Balancing system

The door must remain static in the fully open position and only exert a very light (15kg maximum) weight if it does tend to drift downwards from any other position.

This is achieved by one or more of the following design features:

- a) Balancing spring or counter weight system
- b) Gearbox design (non-reversing gears), with or without a drive chain or gears
- c) Friction brake on the electric motor (operational brake - not to be confused with integral fall back protection)
- d) Supporting cables

Balance system failure

The standard requires that the balancing system must be protected against failure of vulnerable components that are subject to normal wear and tear and fatigue such as springs cables; chains and gears. Other elements of the door structure, such as barrels, shafts, key steels, plates and fixings, can be suitably proportioned to prevent failure without additional protection. A functional friction brake on the motor cannot be used as a balance system failure device.

The required protection can be achieved by integral design features or by application of a device that will stop the door if it is subject to failure.

Protection against any single failure of a vulnerable suspension component must be protected such that either:

- A. the door is so light that it will only exert a low static weight of 20kg maximum when measured at the leading edge, in the least favourable position (usually almost closed) with single balancing system components failed, e.g. one single spring, cable, chain or drive unit disconnected, or,
- B. the door will not travel more than 300mm at the point of failure and be prevented from further use.

Acceptable measures include one or a combination of the following measures:

- Very light effective static curtain weight at the point of failure (option A)
- Combinations of spring balancing and non-reversing gears (protects against spring or drive failure)
- Torque limiting systems (protects against further use following spring failure)
- Separate centrifugal safety brake (protects against spring or drive failure)

- Integral fall-back protection within the drive unit (protects against drive failure only). *Note: not all direct drives have integral fall-back protection, check with the manufacturer*
- Spring failure jamming device (protects against spring failure)
- Cable failure jamming device (protects against cable failure)
- Cable failure stop switch (protects against further use following cable failure)

Doors bearing CE marking post July 2013

Since July 2013, virtually all vertically acting doors (not produced by a micro enterprise) are required to be type tested by what is termed a Notified Test Laboratory, be supplied with a Declaration of Performance and be CE marked for (amongst other things) the essential characteristic listed as “SAFE OPENING” which relates to the fall-back protection. All vertically acting doors covered by EN 13241, placed on the market since July 2013, must bear a CE label listing at least the criteria below.

COMPANY NAME		COMPANY ADDRESS	
CE	<u>(EU) 305/2011</u> 2006/42/EC	Year of manufacture	
		PRODUCT DESCRIPTION	
		SERIAL OR MODEL NUMBER	
Essential Characteristics		Declared Performance	Harmonised Standard
Dangerous substances		NONE	<u>EN 13241</u>
Resistance to wind load		CLASS 1-5	
<u>SAFE OPENING</u>		<u>PASS</u>	
Definition of geometry of glass components		PASS	
Mechanical resistance and stability		PASS	
Operating forces		<u>PASS</u>	
Type testing by:	<u>NOTIFIED BODY NAME AND FOUR-DIGIT REFERENCE NUMBER</u>		
Intended use:	Description		

The “operating forces” and “2006/42/EC” references are mandatory for powered doors but are not required or significant on manually operated doors.

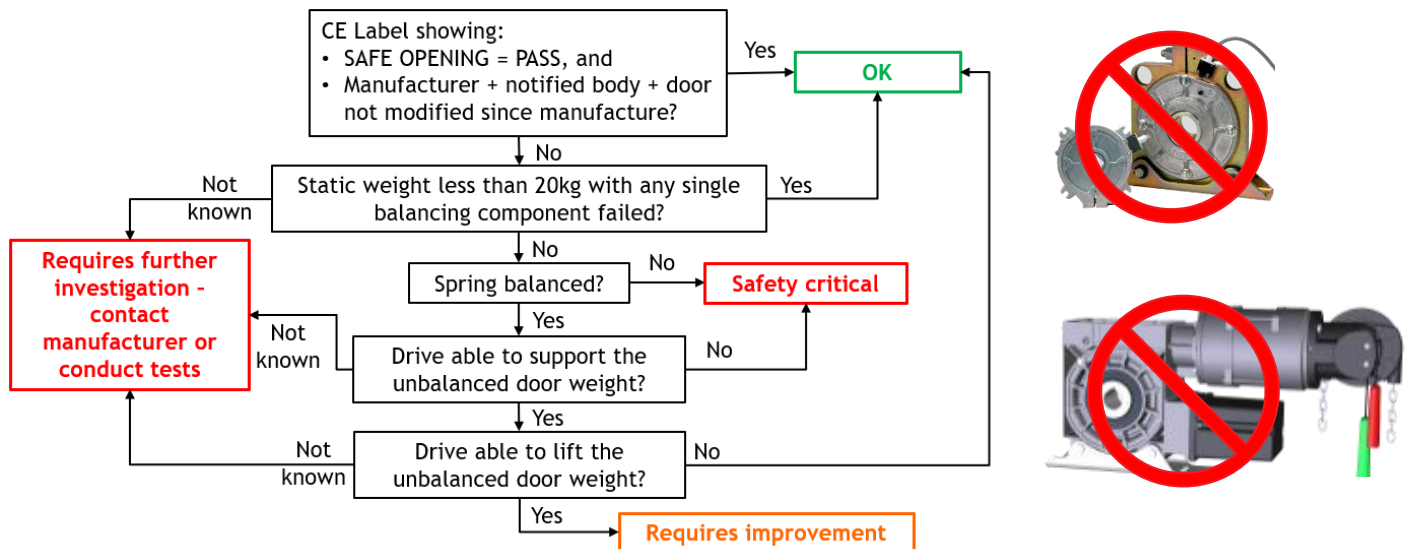
The information underlined in red capitals on the label are mandatory and central to the subject of fall-back protection. Where all the underlined information is present on the CE label, and it is known that the door has not been modified in any way since it was manufactured by the company indicated, it can be assumed that the door is safe from a fall-back protection point of view. Where this is not present, or is incomplete, or it is suspected that the door *has* been modified, e.g. cut down in size or had a drive unit fitted, then further investigation will be necessary (see right).

Doors without complete “post July 2013” CE labelling

Due to the complexities of transmission, spring and cable combinations possible on varying door designs, it is not always possible to make a simple “at a glance” diagnosis of adequate fall-back protection on an existing door. To assist with this potentially problematic process, DHF has developed a series of flow charts to assist with on site assessment.

Doors classified as “**safety critical**” should not be returned to service by a maintenance company but doors classified as “**requiring improvement**” may be returned to service following maintenance, providing the client, owner or manager agrees.

1. Rolling shutter without safety brake or drive with integral fall-back protection

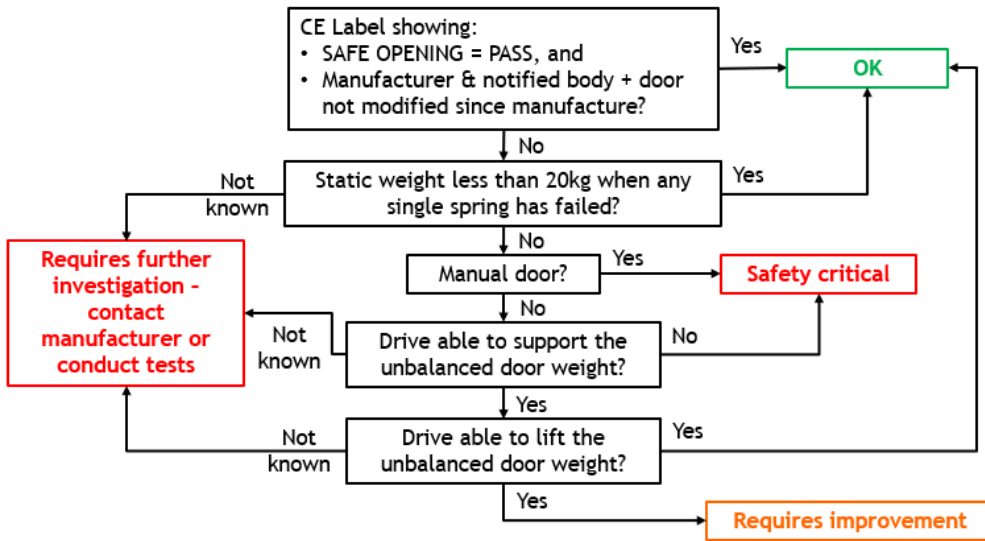


If switching to manual mode with a failed spring would cause the door to fall-back catastrophically, the door must be classified as safety critical. Where a safety brake manufacturer requires the use of a stop switch, but it is not connected, this would be classified as requiring improvement.

Requires further investigation could mean one or more of:

- Assess the static weight of the door with one spring disconnected and then with the drive disconnected but the spring tension restored (less than 20kg)
- **SAFELY** disconnecting the drive from the barrel to assess balance
- Comparing the unbalanced weight of the curtain with rated torque of the drive
- Assessing the ability of the gearbox/chain/belt or bracket assembly to **SAFELY** support/move the door under failed spring conditions
- Assessing the ability of the drive to open the door under failed spring conditions (continued use potential)
- Assessing the stability of the door with the manual release activated under failed spring conditions
- Contacting the door manufacturer for written assurances/type test evidence

2. Spring balanced sectional door without spring break jamming devices installed

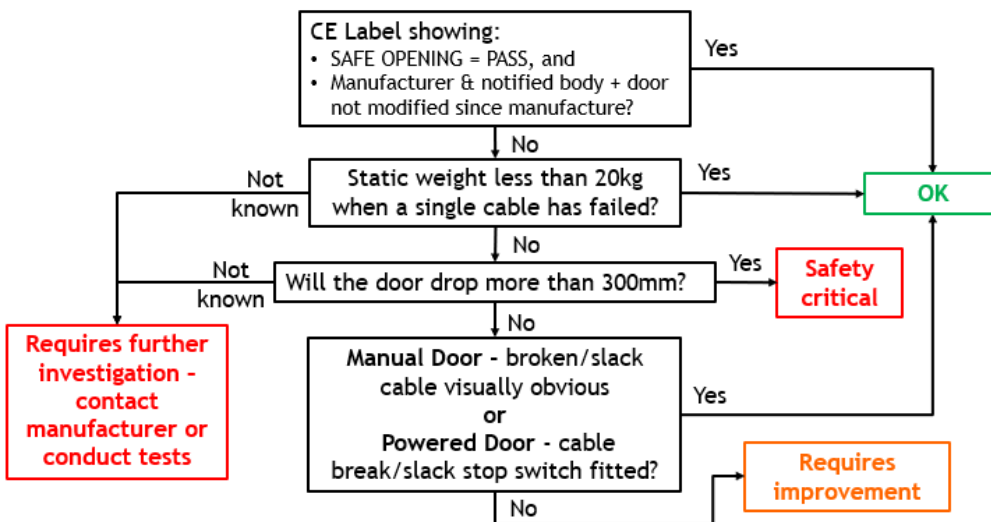


If switching to manual mode with a failed spring would cause the door to fall-back catastrophically, the door must be classified as safety critical.

Requires further investigation could mean one or more of:

- Assessing the static weight of the door with one spring disconnected (less than 20kg)
- **SAFELY** disconnecting the drive from the shaft to assess balance
- Comparing the unbalanced weight of the curtain with rated torque of the drive
- Assessing the ability of the drive/chain/belt/bracket assembly to **SAFELY** support the door under failed spring conditions
- Assessing the ability of the drive to open the door under failed spring conditions (continued use potential)
- Assessing the stability of the door with the manual release activated under failed spring conditions
- Contacting the door manufacturer for written assurances/type test evidence

3. Sectional door without cable break or cable slack jamming devices installed



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

Requires further investigation could mean one or more of:

- Assessing the static weight of the door with one cable disconnected (less than 20kg)
- Assessing how far the door sags with one cable disconnected (less than 300mm)
- Assessing that the cables are rated at 6 x load (check weight and cable rating)
- Assessing the potential for further attempted use of the door under failed cable conditions
- Contacting the door manufacturer for written assurances/type test evidence

4. Maintenance instructions, safe use instructions and user and checks

All doors, whether automated or manual must be supplied with suitable and sufficient safe use instructions and maintenance instructions. This means that clients should be in possession of, and be following, the requirements of a comprehensive operation and maintenance manual. The manual must reflect (include), but not rely solely on, instructions supplied by the drive unit or safety device manufacturer. Where the client/site is not in possession of an O&M manual, or the O&M manual proves to be defective or incomplete, the maintenance company must offer to source, compile and provide one (note that this could be chargeable if the maintainer is not also the manufacturer).

The maintenance company must always stress the importance of following an O&M manual and the need for user training to the client. All door systems are reliant on an adequate O&M manual being followed, both in terms of user training and checks and regular suitable and sufficient planned maintenance conducted by a competent maintainer.

Evidence of the lack of, or a lack of following, a suitable and sufficient operation and maintenance manual should be raised as a “requires improvement” defect with the client via an unsafe system notice. The O&M manual need not be physically at the door but necessary user instructions should be at the door or being followed as appropriate to the site, its users and the door.

5. Legislation

There are various pieces of criminal legislation that affect both the owner and maintainer of the door depending on the nature of the site and the local jurisdiction.

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 suitable and sufficient system of maintenance (owner or 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 systems in their care are safe (e.g. landlords, workplace managers, owners, managing agents, facilities managers and maintenance contractors).

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 suitable and sufficient system of maintenance (owner or 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 systems in their care are safe (e.g.

landlords, workplace managers, owners, managing agents, facilities managers and maintenance contractors).

Republic of Ireland

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

If the system 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.

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

All areas of UK and Ireland

Any person, maintenance contractor, owner or 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 system, 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 system 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 system and its location.

6. Mitigating action where a door does not have adequate fall-back protection

When an existing door has been diagnosed as having insufficient fall-back protection and the client is resistant to making the necessary improvements, it may be possible, in some cases, to conduct a risk assessment and arrive at a safer system of work that could perhaps go some way towards mitigating the risk. Steps a) to e) below highlight the main questions that any such risk assessment must consider.

a) Do people pass under the door?

If there is no pedestrian traffic possible, the risk is lower but how are pedestrians to be eliminated, as both normal use and foreseeable misuse must be accounted for?

It is extremely rare to find a site where there really is no potential for pedestrian traffic and sole reliance on signage, markings and railings etc is rarely sufficient.

b) What traffic does pass under the door?

Could vehicles passing under the door really withstand the impact of a falling door without causing further hazards or even more catastrophic damage to the door or vehicle?

It is doubtful that this will be possible unless the vehicles that use the door have comprehensive crush protection and that forward movement can be stopped immediately to prevent further, more catastrophic, structural hazards being generated.

c) How high and how heavy is the door?

Essentially, what force would the failing or falling door exert and would an operator or user be able to catch or support the door under suspension component failure conditions without harm?

If the door fails during manual movement, would the operator be able to safely support the sudden additional load?

d) Can the door be safely propped or pinned when open?

Is it possible that the door could be operated by a trained operative from a place of safety and then be pinned in the open position before traffic or pedestrians are permitted to pass under it?

Please note that the use of a hand chain cleat cannot be considered a valid safety or securing device but pin locks through the guides or some form of stable propping might be acceptable.

Conclusion of the risk mitigation assessment

If the risk mitigation assessment indicates that the hazard cannot be safely controlled, then the conclusion must be that the door cannot be considered safe and must be updated to make it safe and to address the legal obligations of the maintainer/repairer and the owner/manager/user.

Doors of this type are subject to high levels of near miss accidents and, on occasion, very serious injuries and death followed by criminal prosecution. It is far better to resolve a hazardous situation before it occurs because if it does go wrong, the question that will be asked of the owner, manager, maintainer or user is ...

What steps did you take to prevent the accident?

Contact us for more information

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