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April 2011

## European Guideline No 2:2011



# Controlled Door Closing Devices and Systems

*Guidelines for the choice, the installation and the  
maintenance*

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## Foreword

The European Federation of Associations of Lock and Builders Hardware Manufacturers (ARGE) have decided to produce common guidelines in order to achieve similar interpretation in European countries and to give examples of acceptable solutions regarding the choice, the installation and the maintenance of Building Hardware Products.

The following recommendations contained in these guidelines do not bind ARGE. The decision of the choice belongs to the specifier, according to the situation and of the type of risk to be prevented.

January 2011

Read more: [Why this Guide?](#)

## THE EUROPEAN FEDERATION OF ASSOCIATIONS OF LOCKS AND BUILDERS HARDWARE MANUFACTURERS



ARGE is the European Federation of Associations of Lock and Builders Hardware Manufacturer and therefore ARGE is the roof organisation of the European Builders Hardware Industry. Members of ARGE are the National Associations in 16 European countries and ARGE is today covering about 70 – 75 % of the whole European Builders hardware production.

For many decades Manufacturers knew only their National Technical Standards. With increasing globalisation, international Standards, based on performance standards became necessary. International Standards eliminate trade barriers and contribute to easier exchange of products from country to country. International Standards like CEN are harmonised and tested according to common rules. Mutual recognition is also required.

Requirements from the market for high quality products continuously increase. Manufacturers have taken advantage of this development and have created a range of appropriate new product solutions.

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## Introduction

### Type of products covered by this guideline

This guideline cover building hardware intended to be installed on doors or fire doors, which have to be CE marked and therefore comply with harmonized standards, regulations or guides:

- EN1154 Controlled door closing devices
- EN1155 Electrically powered hold-open devices for swing doors
- EN1158 Door coordinator devices
- CEN/TR15894 Building hardware door fittings for use by children, elderly and disabled people in domestic and public buildings- a guide for specifiers
- Equality Act 2010, BS 8300:2009+A1:2010 UK (England and Wales only)
- Document M, access to and use of building, Building regulations UK (England and Wales)
- EN14637 Electrically controlled hold open systems for fire/smoke door assemblies – Requirements, test methods, application and maintenance

### The needs for ease of opening of door and secure fire closing

During the last years the needs of children, elderly and disabled people have to be taken care of when new buildings are planned or old buildings are renovated. By using modern technology and innovative products both ease of opening and fire closing demands can be achieved.

### Finding the Best Solution

The easy opening of door and secure fire closing need not to be mutually exclusive. You do not have to sacrifice security (resistance to forced entry) to achieve safety for people who need to escape from an emergency or life-threatening situation. New solutions using mechanical or electromechanical door closing systems can provide ease of opening of a door including a secure building.

## 1. Background

### Basic rules about ease of access, safety and security

When designing a building, ease of access, safety and security are normally considered in terms of ease of use of the door, fire regulation and prevention of unauthorised use of the doors. However, the European regulations of CE marking only stipulate Standards for safety. These requirements are mandatory in most counties and best practice in others and must be followed. In this document, we focus on the issue of ease of access and fire closing demands.

When designing equipment for fire doors on escape routes, you should always ask the question: is there any chance that a panic situation may arise? Often, of course, building regulations and fire safety requirements will give you formal guidance or will even require the use of special hardware.

However, the designer should take all possible measures to reduce the consequences of potential risks that may occur in the lifespan of a building. Technical solutions to deal with fire situations and with 'ordinary' emergencies are different. It is therefore important to define what type of situation is likely to arise.

### The role of Door closing hardware

In a building the role of controlled closing hardware is vital to make sure that the doors close properly; for example in case of fire, hard weather conditions or ventilation etc. But also the closing hardware must be adjustable in such a way that even a child or elderly person can open the doors. These two cases must be always considered when choosing these hardware products.

### Always consider the local regulations.

Preference should always be made to building codes and regulations from National and Fire Authorities regarding exit hardware where such codes exist, when considering the use of new European Standards for door closing hardware.

Each country has its own Fire and Life safety requirements. Although considerations by Fire Authorities are similar in all European countries and each national code has basically similar requirements, many differ in detail.

### Important considerations

#### **Doors**

The number of doors and the location, weight and width of each door are all important considerations.

A fire-resistant door that is designed to contain a fire must use a locking device designed to keep the door closed during the fire. The latch bolt must be engaged and close but not lock the door each time it is used.

Note: Certain test houses conduct fire testing with the latch bolt in an unlatched position, and this is accepted in the United Kingdom.

Door closers and electro mechanical door coordinators must be CE marked if the doorsets are fire or smoke resisting. Single axis hinges must be CE marked if they are installed on these doors. (This is best practice in the United Kingdom, Ireland and Sweden until 1 July 2013)

However, local regulations (eg France), may force the use of CE marked products, even if the doorsets are not fire resisting.

### CE Mark, Construction Products Directive (CPD), Regulation (CPR) and Quality Mark

The Construction Products Directive (Directive 89/106/EC) establishes a single market in construction products, enabling products that satisfy harmonised technical specifications to bear the CE mark.

In addition to this mandatory CE Mark, in some countries, some voluntary quality labels may ensure a higher level of quality and product control

Read more: The Construction Products Directive (CPD) and Regulation (CPR)

### Other European Directives

The CE marking implies the conformity to all Directives applicable to the product. Therefore, other Directives can apply to electrically controlled door closing devices, which include:-

EU Directive 89/336/EC and 2004/118/EC (EMC)  
EU Directive 73/23/EEC (Low Voltage)  
EU Directive 2002/96/EEC (WEEE) and 2002/95/EEC (ROHS)

### Avoiding discrimination against the disabled.

Most European countries have published additional regulations or technical requirements covering discrimination against the disabled or people with impaired mobility.

Typically, controlled door closing devices offer good solutions for allowing the young, the elderly and the handicapped to use public buildings. The informative Technical Report CEN TR 15894 covering accessibility was published in 2009.

### Liability and responsibility

All individuals and corporate organisations have a 'duty of care' in all matters affecting people and property. This 'duty of care' may be defined as responsibility and failure to exercise it can lead to civil or criminal liability.

A criminal act in the subject of door closing will be some act or omission to act, which has endangered life and property, and results in action in the criminal courts.

A civil liability is again a failure to act or to act incorrectly which causes damage to structures or people of a lesser degree than criminal acts and is subject to the civil law of the country. The interpretation of this is within National Laws.

### The responsibility for the various stakeholders

If the regulations and the standards define obligations or recommendations to be followed, it is important to point out the responsibility of the various parties in the manufacture, the marketing, the choice, the installation and maintenance, but also the correct use of door closing systems. All of these parties are indeed concerned, at various levels, during the lifespan of a door closer or system:

Read more: [The responsibility of the various stakeholders](#)

### Conclusion

Planning a good operating door environment to take care both of easy entrance to the building and secure fire closing aspects, is achievable. It needs a lot of knowledge of different standards, regulations, and the technical details of the products available.

## 2. The products available on the market

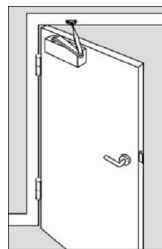
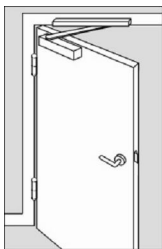
### Different types of door closers available on the market

**Door closer** is the term for the different types of hydraulically controlled devices intended for controlled closing of single and double action swing doors, such as devices being mounted on or in the frame, on or in the door, or in the floor. The main purpose for the use of door closer is to make doors self-closing, meaning that an open door will return into its closed position without human intervention and with hydraulic control. The selection for door closers should be made in accordance to the level of safety, security and convenience.

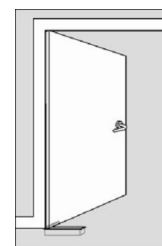
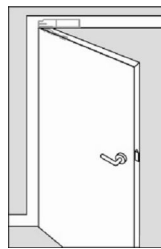
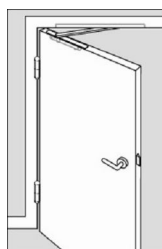
### Door closers according to EN 1154

There are basically four different categories of door closers identified in the standard:

- Overhead door closer
- Concealed door closer
- Transom door closer
- Floor spring



Overhead door closer, surface mounted, pull side, left-handed door



Overhead concealed door closer,  
mounted in the door leaf

Transom door closer,  
mounted in the door frame

Floor spring, mounted in the floor

*Read more: EN 1154 - Building hardware – Controlled door closing devices – Requirements and test methods*

**Hold-open device** is the common term for equipment that allows a self-closing door to remain open at a preset angle until released. Basically there are two different types of hold-open units:

1. Mechanical hold-open units (not for fire and smoke check doors)
2. Electrically powered hold-open devices (for fire and smoke check doors)

In case of particularly large and heavy doors, or doors in which the hold-open point exceeds the specifications of integrated electromechanical devices, hold-open magnets should be used.

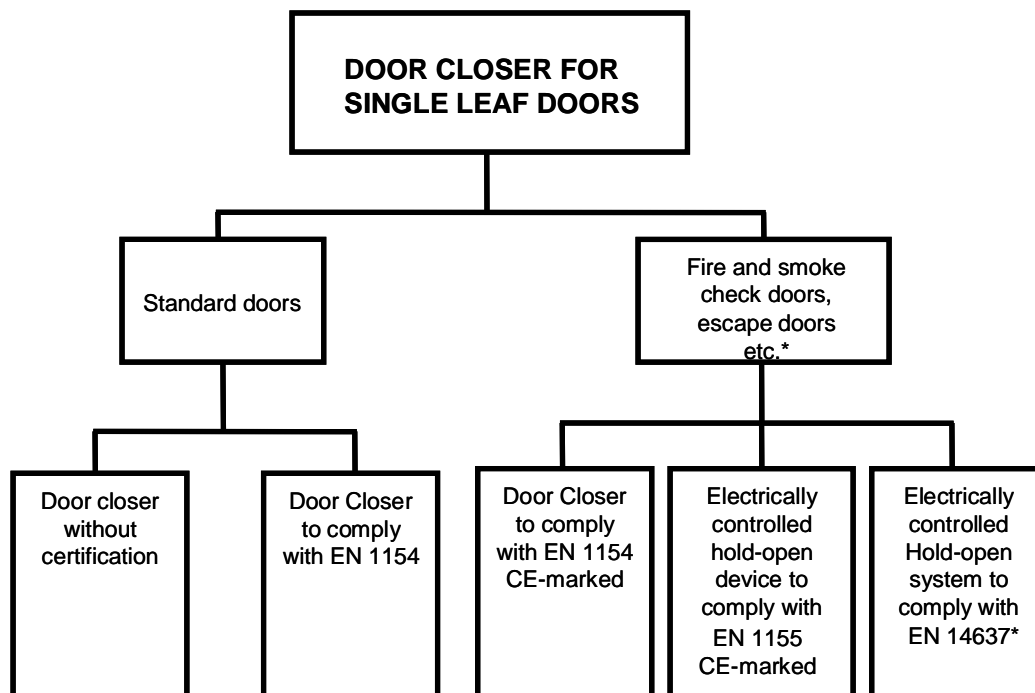
For electrically powered hold-open devices with a release moment in excess of 120 Nm, a push button for release has to be fitted. Electrically powered hold-open devices can be used as a component of a hold-open system (see below), or in connection with external fire detection and alarm systems.

*Read more: EN 1155 –Building hardware – Electrically powered hold open devices for swing doors – Requirements and test methods*

**Hold-open system** is the term for an electrically controlled combination of components intended to hold fire and smoke check doors open in daily use, and to make sure in case of fire or power failure that these doors will be released for self-closing.

Normally hold-open systems are designed as stand-alone systems to safeguard one doorset only. For use in connection with external fire detection and alarm systems, always consider your national regulations.

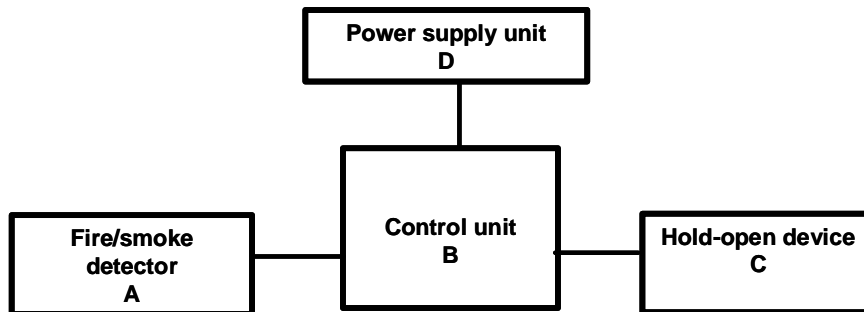
*Read more: EN 14637- Building hardware – Electrically controlled hold-open systems for fire/smoke door assemblies – Requirements, test methods, application and maintenance*



\* in accordance with the local building regulations



Door closers, hold-open devices and hold-open systems according to the European Standards



## Basic system components with essential functions according to EN 14637

Always be sure to consider your national regulations when setting up hold-open systems!

*Read more: EN 14637- Building hardware – Electrically controlled hold-open systems for fire/smoke door assemblies – Requirements, test methods, application and maintenance*

## Free-swing door closers

Free-swing door closers are hydraulically controlled devices that make self-closing doors freely operable, as if there was no door closer installed. The door can be operated without any resistance until electrically or manually released for self-closing. Depending on the version, free-swing door closers can be used as hold-open systems. A manual release switch is always required for free swing door closers.

*Read more:*

*EN 1155 – Building hardware – Electrically powered hold-open devices for swing doors – Requirements and test methods*

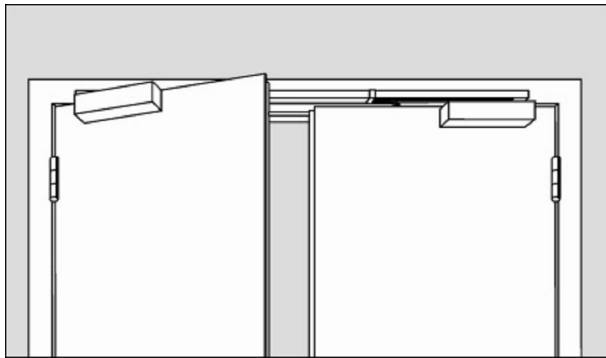
*EN 14637- Building hardware – Electrically controlled hold-open systems for fire/smoke door assemblies – Requirements, test methods, application and maintenance*

**Door coordinators according to EN 1158**

All these systems can also be used on double-leaf doors. For example on rebated double-leaf doors it is essential to ensure the correct closing sequence.

There are four types of door coordinators:

- incorporated in door closers
- incorporated in door closers with electrical hold-open devices.
- concealed door coordinators
- can be mounted separately

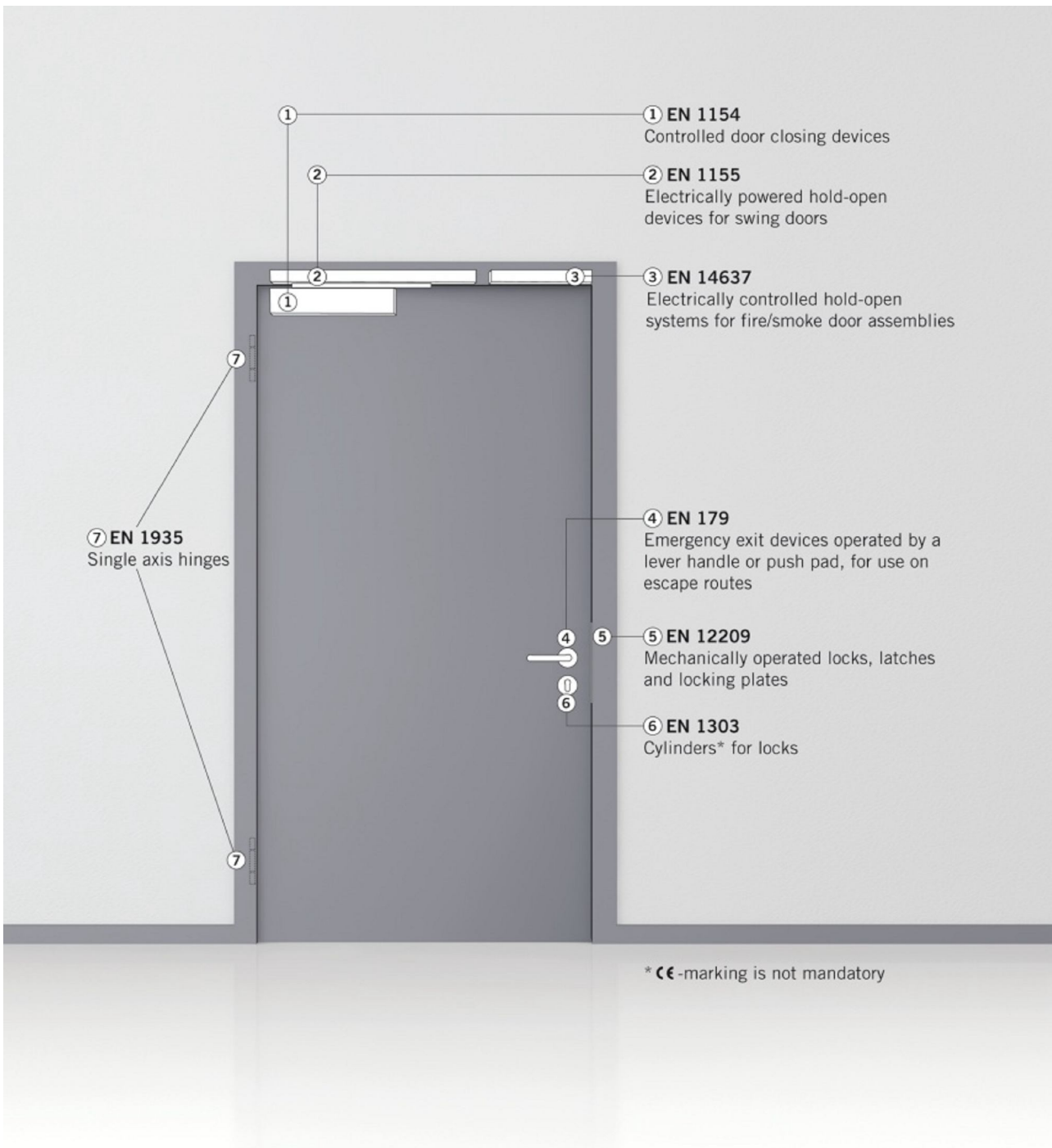


Example: Coordinator incorporated in a door closing device

**Note:** Door coordinator devices manufactured to this European Standard shall enable correct coordination of the door leaves from any angle to which they can be opened, if necessary by the use of a carry bar.

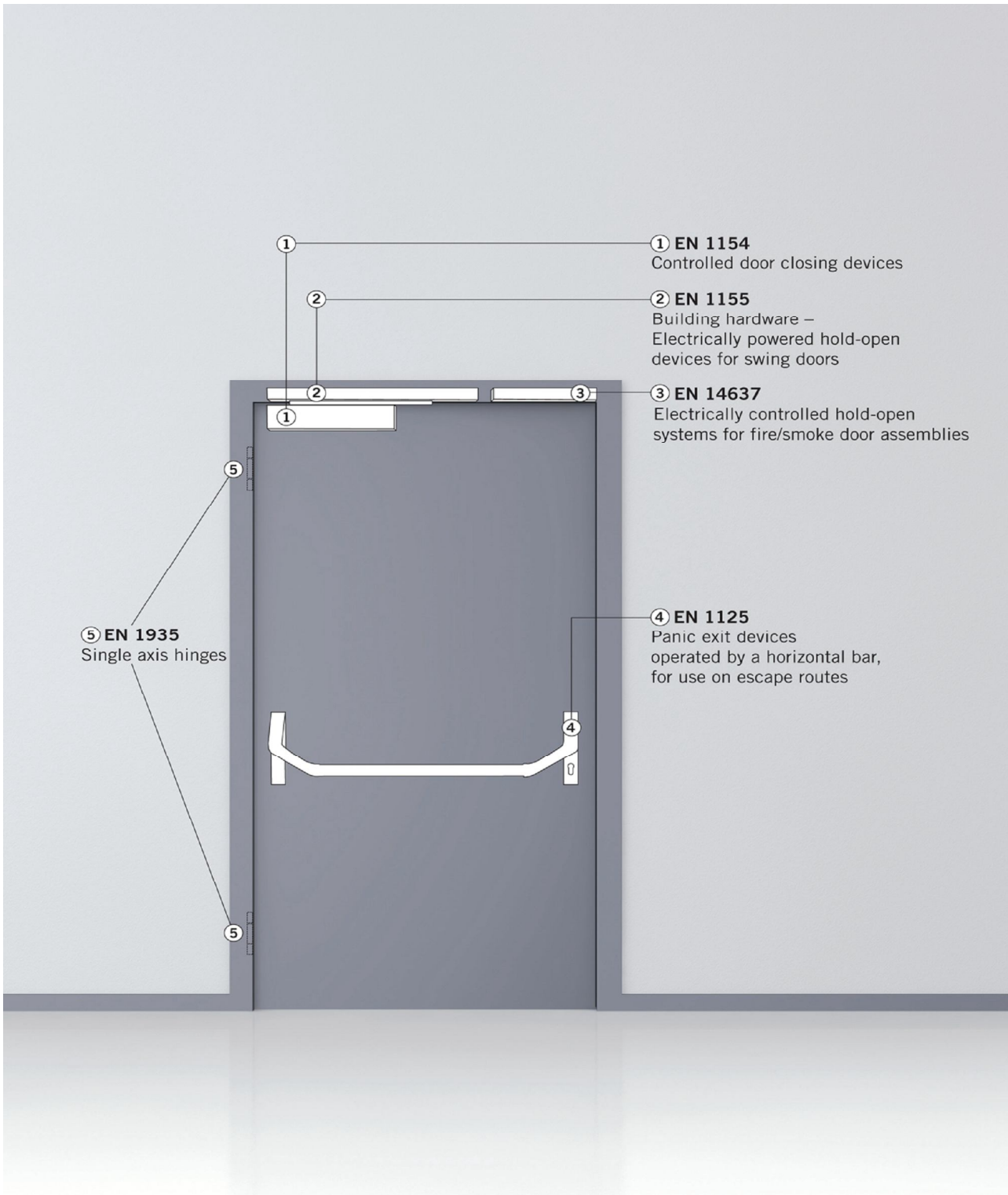
*Read more:*

*EN 1158 – Building hardware – Door coordinator devices – Requirements and test methods*

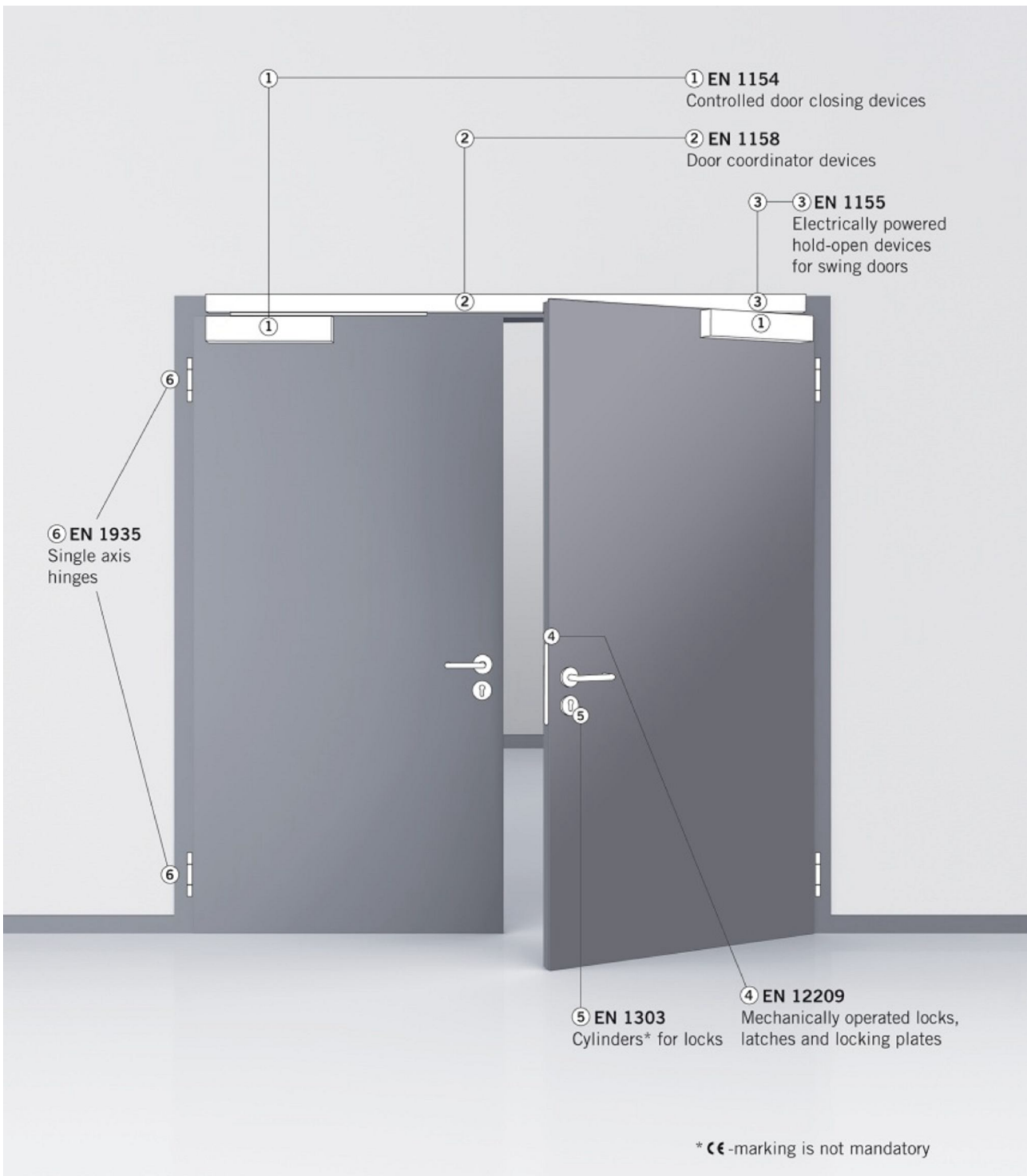


**\*Note:** EN1303 is currently not a harmonised standard so cylinders are **not** CE marked.

Should the door be classed as an Emergency Exit Door, the lock, lever handle or push pad, should be tested to EN179.



In some countries the Building Regulations require panic devices on escape routes as well as on final exits. In other countries they are required on panic exits only.



**\*Note:** EN1303 is currently not a harmonised standard so cylinders are **not** CE marked.

*Read more: EN 1154 – Building hardware – Controlled door closing devices – Requirements and test methods*

*EN 1155 – Building hardware – Electrically powered hold-open devices for swing doors – Requirements and test methods*

*EN 1158 – Building hardware – Door coordinator devices – Requirements and test methods*

*EN 14637 – Building hardware – Electrically controlled hold-open systems for fire/smoke door assemblies – Requirements, test methods, application and maintenance*

*EN 12209 – Building hardware – Mechanically operated locks, latches and locking plates – Requirements and test methods;*

*EN 1303 – Building hardware – Cylinders for locks – Requirements and test methods*

*EN 179 – Building hardware – Emergency exit devices operated by a lever handle or push pad, for use on escape routes – Requirements and test methods*

*EN 1125 – Building hardware – Panic exit devices operated by a horizontal bar, for use on escape routes – Requirements and test methods*

*EN 1935 – Building hardware – Single-axis hinges – Requirements and test methods*

### **3. Guidance for choosing the appropriate controlled door closer, hold-open devices and coordinators**

#### **3.1 The source of information**

##### **Product information**

##### **Manufacturers' solutions**

Manufacturers will provide you with a number of technical solutions to suit different needs. It is important to select the product designed for the right application and which meets the national regulations or other technical (including fire, life and insurance company) requirements.

##### **Claims of compliance**

When choosing the correct product from a manufacturer's catalogue, it is always necessary to question claims of compliance with the Standards, of quality and of product marking.

##### **Insurance requirements**

Insurance companies have their own requirements for risk analysis of safety and security which are usually in addition to national Life Safety codes. Check always your particular Insurance requirements!

## 3.2 Criteria for the choice of door closers

The type of door closer should be selected according to an analysis of all factors concerning the door and its users.

Various conditions can influence the choice of the appropriate door closer such as:-

Preventive fire protection

User group, e.g. children, mothers with prams, elderly people

Easy opening (as described e.g. in CEN/TR 15894, Article R111-19-3 and 6 (France), BS 8300 (United Kingdom), DIN 18040-1 and 2 (Germany))

Door widths and door weight

Environmental conditions like external or internal door, wind loads, corrosion (minimum resistance class 3 according to EN 1670 recommended)

Max. angle for controlled closing. The EN 1154 defines two categories: fully controlled hydraulic closing from  $\geq 105^\circ$  and up to and including  $180^\circ$ .

National regulations influence on the criteria must always be checked.

Read more: CEN/TR 15894 – Building hardware – Door fittings for use by children, elderly and disabled people in domestic and public buildings – a guide for specifiers

EN 1670 – Building hardware – Corrosion resistance – Requirements and test methods

Article R111-19-3, R111-19-6 (France) - Construction and Housing Code, subsection 4 (Code de la construction et de l'habitation, Sous-section 4 : Dispositions applicables lors de la construction ou de la création d'établissements recevant du public ou d'installations ouvertes au public)

BS 8300 (United Kingdom) - Design of buildings and their approaches to meet the needs of disabled people – Code of Practice

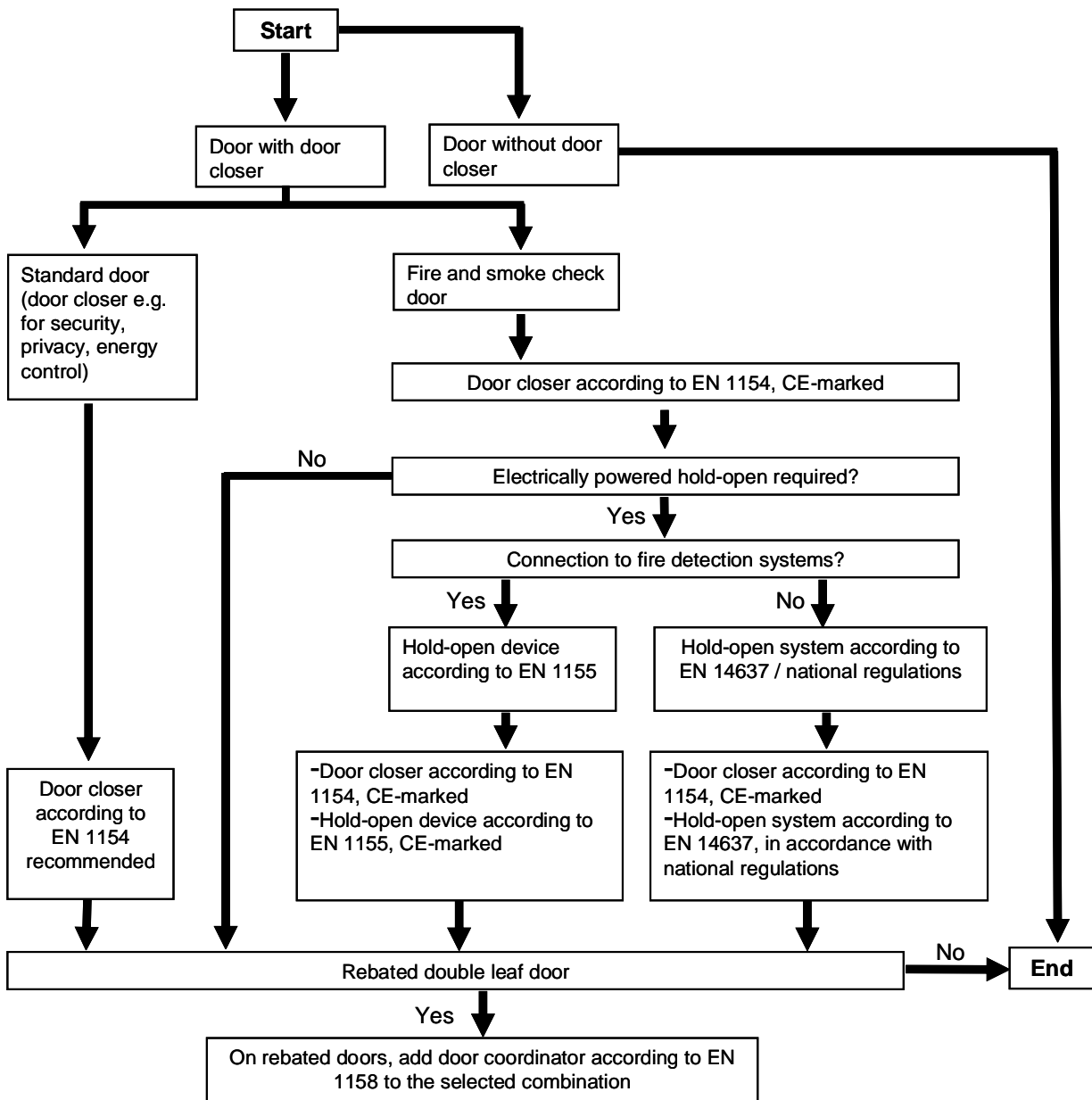
DIN 18040-1 (Germany) – Construction of accessible buildings – Design principles – Part 1: Publicly accessible buildings (Barrierefreies Bauen – Planungsgrundlagen – Teil 1: Öffentlich zugängliche Gebäude.)

DIN 18040-2 (Germany) – Construction of accessible buildings - Design principles – Part 2: Dwellings (Barrierefreies Bauen – Planungsgrundlagen – Teil 2: Wohnungen.)

## 3.3 ARGE guidance for the choice of door closer

For fire and smoke check doors it is always possible to supplement a door closer with an electrically powered hold-open device or electrically controlled hold-open system according to European Standards.

## 3.3.1 How to choose a door closer? Recommendations by ARGE professionals illustrated by a decision tree:



Note: For fire and smoke check doors, the door closer has to meet EN size 3 at the minimum. Door closers with adjustable closing force must be adjusted to min. EN 3.

Read more: *EN 1154 – Building hardware – Controlled door closing devices – Requirements and test methods*

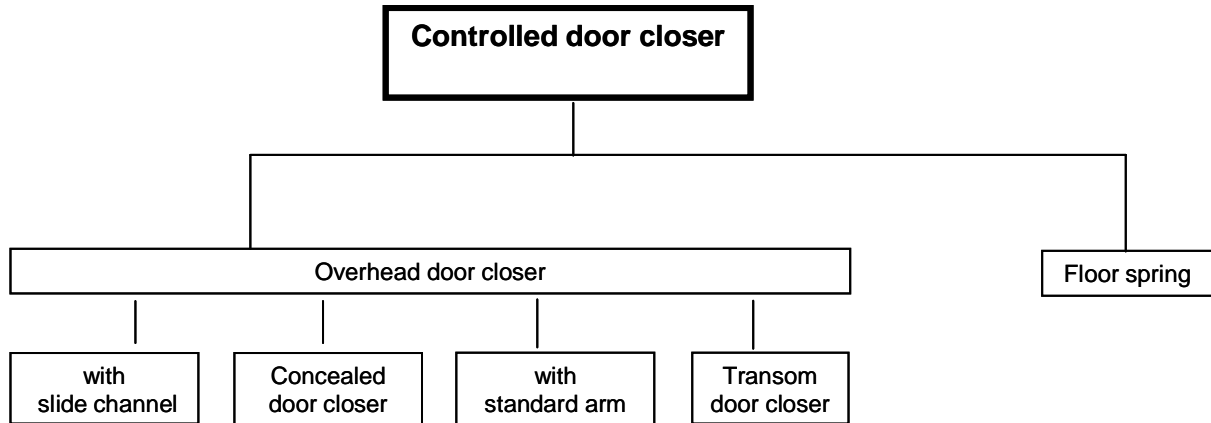
*EN 1155 – Building hardware – Electrically powered hold-open devices for swing doors – Requirements and test methods*

*EN 1158 – Building hardware – Door coordinator devices – Requirements and test methods*



EN 14637 – Building hardware – Electrically controlled hold-open systems for fire/smoke door assemblies – Requirements, test methods, application and maintenance

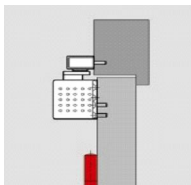
### 3.3.2 Choice between different types of door closers



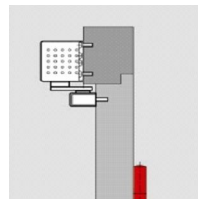
The mode of installation of a door closer is different depending on the closer model, door set and door material. Further it is necessary to select a door closer according to the door location, frequency of use, user group, use as single or double action door.

#### Overhead door closer with slide channel

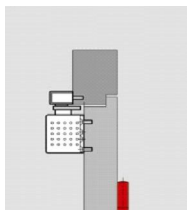
There are four mounting applications for overhead door closers with slide channel. The mode of installation should be selected according to the design of the door and frame, and also take into consideration aesthetic appearance. Installers should always verify that the selected mode of installation will provide the desired opening angle.



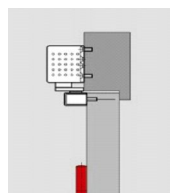
Door leaf fixing on the pull side



Transom fixing on the push side



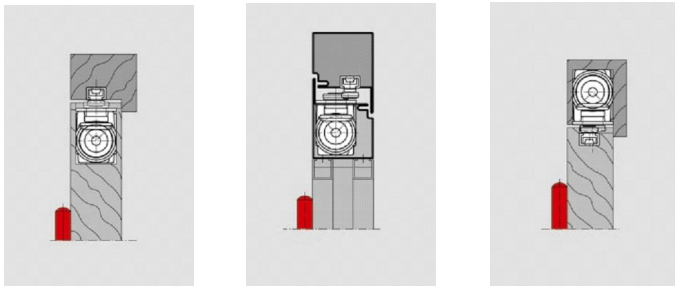
Door leaf fixing on the push side



Transom fixing on the pull side

## Concealed door closer

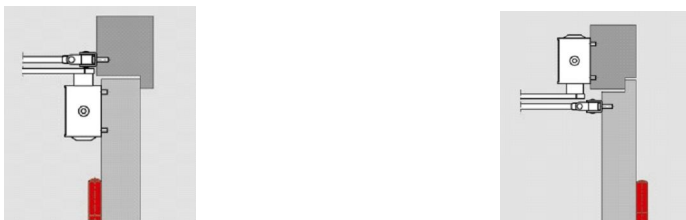
Concealed door closers are typically mounted in the door leaf. Transom installation is also possible. This type of door closer is used for fulfilling design requirements; it is well-protected against vandalism and corrosive environment. Certain concealed door closers can be used in double-action applications. Always consider the manufacturer's statements about the minimum door thickness.



Mounting in a timber door, aluminium framed door, and transom mounting

## Overhead door closer with standard arm

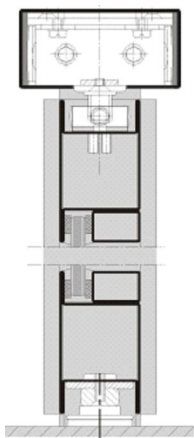
There are two mounting applications for overhead door closers with standard arm. The mode of installation should be selected according to local circumstances. For example, the door closer should not be mounted on the outward side of external doors, where it is exposed to environmental influences.



Door leaf mounting on the pull side, transom mounting on the push side

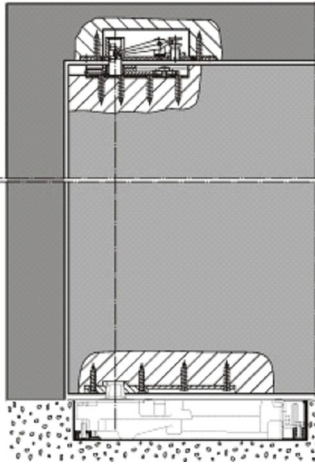
Further performance information is given in FAQ's.

## Transom door closer



Basically this type of door closer offers the same functionality as floor springs. The difference is that no floor preparations are necessary, because the transom door closer is mounted in the frame. This aspect makes the transom door closer ideal for the use with doors in moveable walls, e.g. in shopfitting.

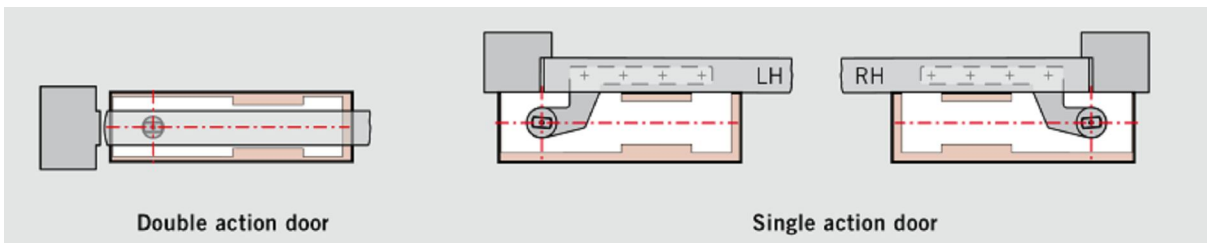
Transom door closer with floor pivot



### Floor springs

There are two mounting application for floor springs. The mode of installation should be selected according to the type of door, single action or double action. This type of door closer is especially made for heavy doors up to 300 kg. Floor springs and transom door closers (apart from certain closers concealed in the top rail of the door) are the only door closers which are designed for double action.

Floor spring with pivot bearing



Note: For highly frequented double-action doors, manufacturers can define limited warranty.

### 3.3.2.1 Choice of the appropriate door closer according to EN 1154

Door Closer power size	Recommended door leaf width mm max.	Recommended door mass kg
1	< 750	20
2	850	40
3	950	60
4	1100	80
5	1250	100
6	1400	120
7	1600	160

NOTE 1: The door widths given are for standard installations. In the case of unusually high or heavy doors, windy or draughty conditions, or special installations, a larger power size of door closer should be used.

NOTE 2: The recommended door masses shown are only related to door closer power sizes for the purpose of the test procedure. These recommended door masses are not intended to indicate maximum values for actual use.

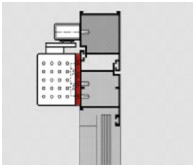
NOTE 3: Always consider the door manufacturer's documentation.

*Read more: EN 1154 – Building hardware – Controlled door closing devices – Requirements and test methods*

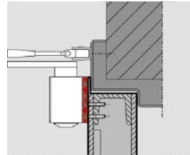
## Accessories

For each type of door closer manufacturers provide the suitable accessories for possible assembly situations. For example:

1. **Mounting backplate** with universal hole system ensures ideal fixing whatever the conditions and irrespective of the door type are.

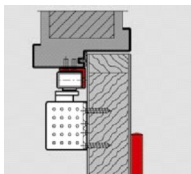


Mounting backplate for  
overhead door closer with slide channel



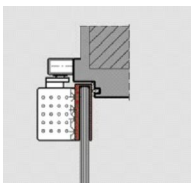
Mounting backplate for  
overhead door closer with standard arm

2. **Angle bracket** – for attaching the door closer or slide channel to door frames with a deep-set frame reveal when fixing on the push side. This assembly needs a control of the head clearance, e.g. 204 cm, in accordance with local regulations.

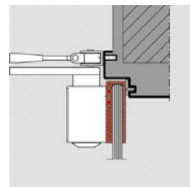


Angle bracket for overhead door closer with slide channel

3. **Glass door shoe** – For attaching the closer so toughened glass doors – no glass preparation e.g. cutting and drilling, required.

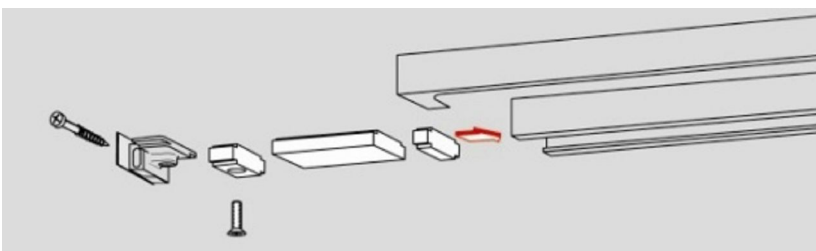


Glass door shoe for  
overhead door closer with slide channel



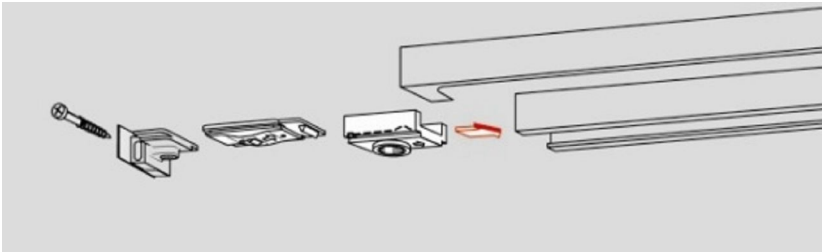
Glass door shoe for  
overhead door closer with standard arm

4. **Cushioned limit stay** – For preventing the door from hitting the adjacent wall.

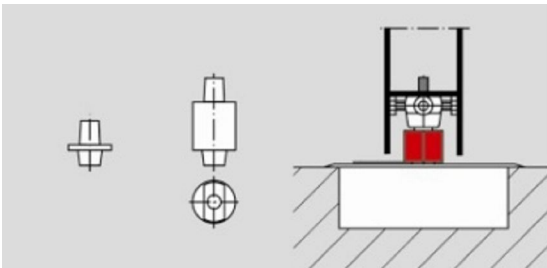


NOTE: This is not a heavy-duty protective device and in many applications cannot substitute for a doorstop.

5. **Hold-open unit** – enables standard doors to be securely held at the required opening position, but not for fire and smoke check doors.

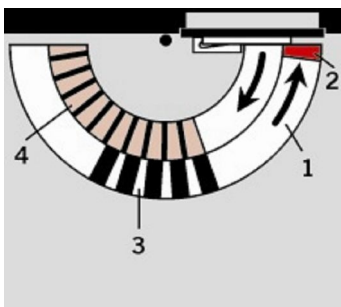


6. **Spindles (Axles)** – A range of interchangeable spindles is available to provide greater floor clearance if required (e.g. doors with thresholds, carpeted floors etc.).



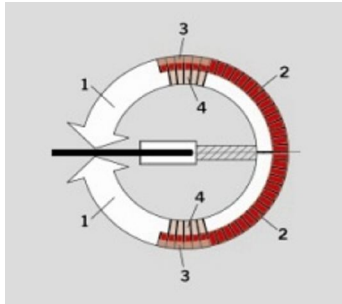
*Read more: EN 1154 – Building hardware – Controlled door closing devices – Requirements and test methods*

### Hydraulic functions of door closers



1. Fully controlled closing action with adjustable speed
2. Adjustable latch speed or adjustable second closing range, according to EN 1154.
3. The delayed action feature retards the closing cycle in a certain area, for example between 90° and 65° (as recommended in EN 1154). The extra time allowed for passage through the doorway can be essential for mothers with prams, disabled people, hospital beds and people with luggage or bulky items.
4. The backcheck feature ensures the safe deceleration and restraint of a door which has been flung open or caught by a gust of wind. This effectively reduces the danger of the door and adjacent wall being damaged. Backcheck is available as adjustable hydraulic backcheck (e.g. in overhead door closers) or fixed mechanical backcheck, e.g. in floor springs.

Certified door closers will ensure the proper hydraulic functionality even for extreme environmental conditions, e.g. temperatures of -15°C to +40°C (as defined in EN 1154).



Hydraulic functions as defined above are also available with door closers for double-action doors, such as floor springs:

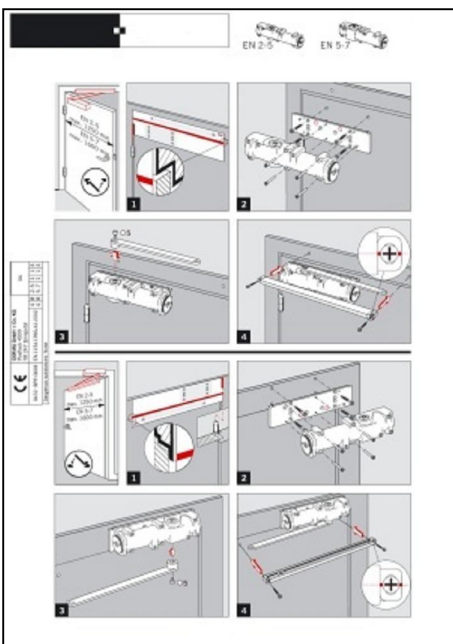
- 1) Adjustable closing speed
- 2) Hold-open range or delayed action range
- 3) Adjustment range – point at which hold-open begins, or end of delayed action range
- 4) Backcheck

*Read more: EN 1154 – Building hardware – Controlled door closing devices – Requirements and test methods*

## 4. Guidance for installation of controlled door closers and associated items

### 4.1 General

Each controlled door closer system and the accessories are placed on the market with detailed instructions for the installation and the maintenance which should be passed on to the building manager or to his authorized representative.



According to EN 1154, EN 1155 and EN 1158 the door closer has to be marked with the following:

- a) the manufacturer's name or trademark, or other means of identification
- b) product model identification
- c) the classification key
- d) the number of this European Standard
- e) the year and week of manufacture

Furthermore it is necessary to mark a hold open device according to EN 1155 with its power consumption and rated voltage, e.g. 24 V DC  $\pm$  15%.

For door closers, hold open devices, and door coordinators, manufactured according to the above mentioned European Standards, the manufacturers provide an EC Certificate of Conformity and EC Declaration of Conformity.

Products for the use on fire and smoke check doors must be marked with the CE mark.

The EC Certificate of Conformity entitles the manufacturer to affix the CE marking on the product.

It is always recommended to use products which are marked according to the European Standards. These products are controlled by the manufacturers and notified bodies. By using these products installers can be sure that the scope of the Construction Products Directive (CPD, 89/106/EEC) is fulfilled. All CEN members' countries have introduced national implementations of the CPD which make the above-described marking mandatory for all existing and new construction products, according to local building regulations.

Manufacturers provide the documents of conformity, e.g. on their internet pages.

Example: Mounting instruction including the CE mark according to EN 1154.

*Read more: EN 1154 – Building hardware – Controlled door closing devices – Requirements and test methods*

*EN 1155 – Building hardware – Electrically powered hold-open devices for swing doors – Requirements and test methods*

*EN 1158 – Building hardware – Door coordinator devices – Requirements and test methods*

### 4.2 Recommendations to consider before fitting a door closer

Door closers should be selected according to 3.3.1.

Installers should bear in mind the following points:

1. Check that the door is in a good working condition (e.g. hinges are aligned, not sliding on the floor, proper operation of the lock and fittings, floor clearance etc.).
2. Read and follow the installation instruction provided with the product or supplied by the manufacturer.

Installers should always make sure that only components are used which are approved in this combination.

Products should only be installed according to manufacturer's instructions, no on-site modifications or other changes are allowed, otherwise the products will lose their approval.

### 4.3 Recommendations to consider after fitting a door closer

Check the correct adjustment of closing power, the correct operation of hydraulic functions, and all functions of the accessories, as described in the European Standards, e.g. EN 14600 for fire and smoke check doors.

*Read more: EN 14600 – Doorsets and openable windows with fire resisting and / or smoke control characteristics – Requirements and classification*

### 5. Guidance for maintenance of controlled door closers and hold-open systems

Each controlled door closer and system components are placed in the market with detailed instructions for the installation and the maintenance which should be passed on to the building manager.

Always consider the manufacturer's maintenance instructions. The door, including all components, is a functional element of the building. To avoid injuries of the user and damage of the building, it should regularly be inspected by the building manager. The building manager should instruct authorized personnel, e.g. service technicians of the manufacturer, or specialists certified by the manufacturer.

The scope and frequency of inspection will depend on the type, frequency or use, and operating conditions of the door closer system involved.

Under conditions of normal usage however, manufacturers consider at least an annual inspection by an authorised person. For some products, e.g. hold-open systems and smoke detectors, an inspection and maintenance more often than once a year, regular legal inspections, or regular product exchanges may be necessary.

Door closers must always be exchanged when oil leakage appears. The leaking closer should be set out of operation at once!

Some products like smoke detectors offer a dynamic service display which helps the operator to fulfil the maintenance schedule.



Status Display



Service Display for maintenance

Read more: *EN 14637\* – Building hardware – Electrically controlled hold-open systems for fire/smoke door assemblies – Requirements, test methods, application and maintenance*

*\*in accordance with national building regulations.*

*EN 54-7– Fire detection and fire alarm systems. Smoke detectors. Point detectors using scattered light, transmitted light or ionization*



### **Main testing requirements**

The requirements of the European Standards have been developed and based on extensive practical tests. Some of these tests are:

#### **Opening test with minimum effort**

Focus on the opening and closing forces required by the EN 1154, and on additional requirements as stated in barrier-free standards or guidelines, e.g. CEN/TR 15894.

#### **Best possible efficiency**

As far as possible, the energy which was applied for opening the door should not get lost by friction, but be stored for reliable closing.

#### **Closing time**

Door closers manufactured according to EN 1154 shall be capable of adjustment to 3 s or less, and 20 s or more, from a door opening angle of 90° depending on the environmental temperature.

#### **Performance of hydraulic functions**

Focus on safety and comfort. For example, the backcheck must stop doors before an opening angle of 90° (depending on the environmental temperature) to protect the user and the building.

#### **Marking requirements**

To give evidence of conformity of the product and to differentiate applications.

### 6. Disclaimer

The purpose of this document is to draw attention to the existence of the European Standards Number EN 1154, EN 1155, EN 1158 and EN14637 on the supply and installation of controlled door closing devices and the fact that many countries also have their own regulations. It attempts to provide general guidance on the use of such components but it is not definitive and not specific to any country. It is the responsibility of the reader to ascertain the precise regulations applicable to the country in which the component is to be used.

Neither ARGE nor the authors of this document accept any liability for any loss, injury or death arising from the incorrect selection or installation of components in reliance upon the general guidance contained in this document. Users must rely upon their own experience or obtain independent expert advice or guidance from the relevant authorities in the particular country.

### 7. Conclusion

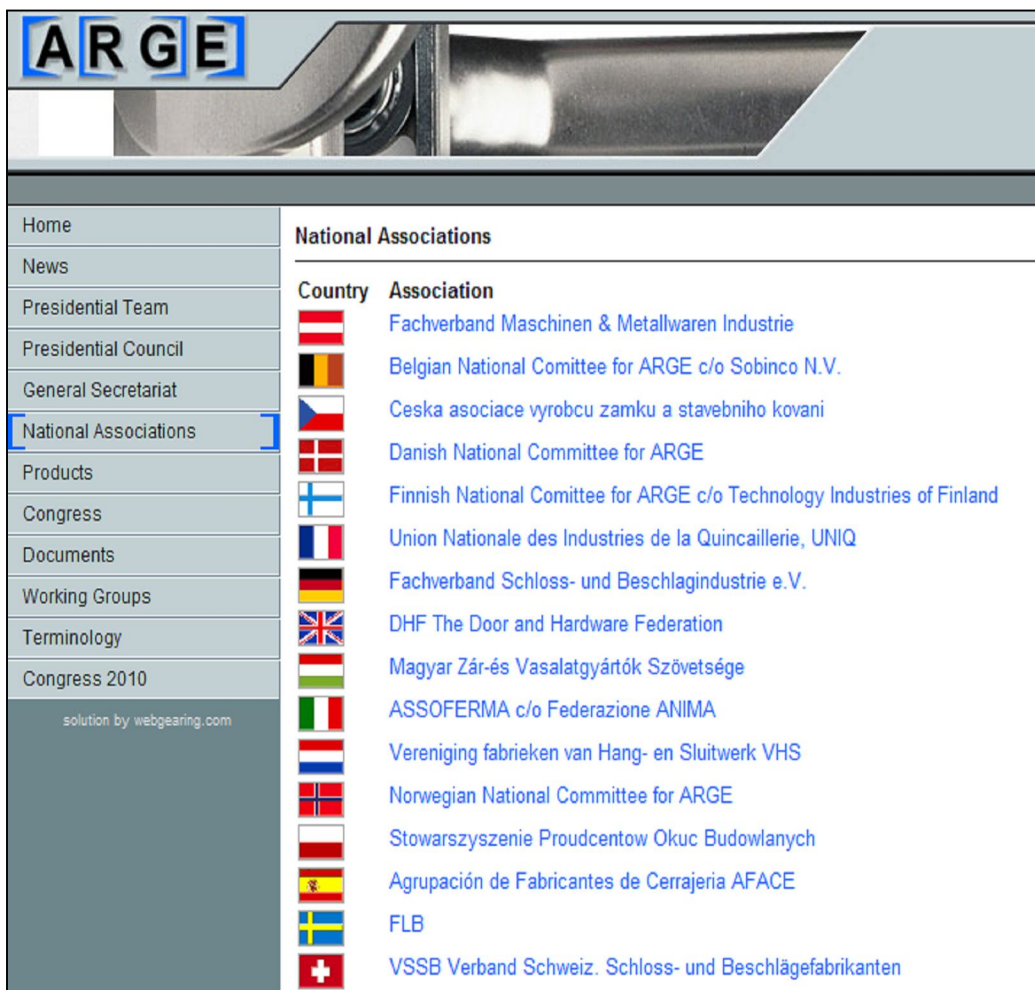
There are many reasons why a door should not be left open. The main aspect is of course fire protection. Further important points are for example security, avoidance of environmental influences like noise, energy control, and privacy. Controlled door closers and door closer systems are the most economic way to fulfil all these requirements, as all common applications can be achieved with a small number of basic components. The use of CE-marked products according to the European standards like EN 1154 is mandatory for fire and smoke doors. For standard doors, the use of certified products is also recommended, because they are subject to a continuous surveillance and quality control. If used according to the manufacturers' specifications, they will assure safe and correct functionality of your doorset for a long time.

















## Acknowledgements

This document has been prepared by ARGE Working Group C “Standardisation”

## Links to Building Hardware National Associations

Please see ARGE website [www.arge.org](http://www.arge.org) to get national associations links



Country	Association
	<a href="#">Fachverband Maschinen &amp; Metallwaren Industrie</a>
	<a href="#">Belgian National Committee for ARGE c/o Sobinco N.V.</a>
	<a href="#">Ceska asociace vyrobcu zamku a stavebniho kovani</a>
	<a href="#">Danish National Committee for ARGE</a>
	<a href="#">Finnish National Committee for ARGE c/o Technology Industries of Finland</a>
	<a href="#">Union Nationale des Industries de la Quincaillerie, UNIQ</a>
	<a href="#">Fachverband Schloss- und Beschlagindustrie e.V.</a>
	<a href="#">DHF The Door and Hardware Federation</a>
	<a href="#">Magyar Zár-és Vasalatgyártók Szövetsége</a>
	<a href="#">ASSOFERMA c/o Federazione ANIMA</a>
	<a href="#">Vereniging fabrieken van Hang- en Sluitwerk VHS</a>
	<a href="#">Norwegian National Committee for ARGE</a>
	<a href="#">Stowarzyszenie Proudcentow Okuc Budowlanych</a>
	<a href="#">Agrupación de Fabricantes de Cerrajería AFACE</a>
	<a href="#">FLB</a>
	<a href="#">VSSB Verband Schweiz. Schloss- und Beschlägefabrikanten</a>

## APPENDIX 1

### Why this guide?

#### New Standards create higher demands

European Standards for building hardware have been published over the years. Others are still in preparation by the CEN committees. Harmonised Standards have been mandated by the European Commission to meet the essential requirements of the Construction Product Directive. Accordingly, products complying with these Standards are entitled to carry the CE marking. The new regulations are still new to most of us and may seem difficult to understand. Demands for information and clarification are growing.

#### European and National Standards

These European Standards are (or will be) implemented in all member countries of the European Union. This means they are (will be) published as National Standards. All existing National Standards that conflict with them have been (or will be) withdrawn or amended.

#### Guidelines, not a rulebook

This handbook gives guidance to stakeholders in the choice, the installation and the maintenance of equipments for fire doors and doors situated on escape routes. Within the membership of ARGE there is a vast amount of expertise in the area of controlled door closing devices and their application in many countries throughout the world. Our aim with this document, is to share this expertise with you to help you to find a path through the complex rules and regulations surrounding this critically important subject.

This handbook is not intended as a rulebook, rather as a practical help in finding a good solution. The final choice remains the responsibility of the decision maker

#### A tool for better Design Specification

This handbook is intended to be used when writing design specifications, installing or maintaining components. It will give practical guidance as well as information about formal regulations. If you have any of the following roles, this document has been prepared especially with you in mind:-

- Architect and specifier
- Security manager
- Fire officer
- Safety officer
- Government official
- Insurance assessor
- Police officer
- Security consultant
- Distributor
- General contractors
- Installer
- Maintenance company
- End user

However, our expectation and hope is that anyone with an influence on the selection of hardware for fire doors and escape routes will find this document an invaluable source of information. ARGE members are at your disposal to bring you, if necessary, any additional information.

## APPENDIX 2

### The Construction Products Directive (CPD) and the Construction Products Regulation (CPR)

The Construction Products Directive (Directive 89/106/EC) was adopted in 1989 and became law following national implementation in 1991. It established a single market in construction products, enabling products that satisfied harmonised technical specifications to bear the CE mark. The CE mark creates the legal presumption that a product bearing it complies with the health and safety requirements of the relevant directive. Such products are automatically granted access to the market in all member states. In the case of construction products, although a CE marked product can lawfully be offered for sale anywhere in the EU, local building regulations will determine whether it can be used in a particular application.

In the majority of member states it is unlawful to place a construction product on the market without the CE mark once the harmonised technical specification has been published and the date for withdrawal of conflicting national standards has passed.

#### Technical specifications

##### Performance requirements

The harmonised technical specifications lay down the performance requirements to be achieved by the products in order for the construction works in which they are to be installed to achieve the six "Essential Requirements". These performance requirements are outlined in mandates for product families issued by the European Commission to CEN and other European standards organisations. Performance requirements may be expressed in levels or classes to enable the user to select the appropriate performance level for a specific application. In some cases, technical specifications contain extra requirements, in addition to those in the mandate, but compliance with these is not required for CE marking. (A list of harmonised standards can be found at: <http://ec.europa.eu/enterprise/newapproach/nando/>)

The six essential requirements are:

1. Mechanical resistance and stability
2. Safety in case of fire
3. Hygiene, health and the environment
4. Safety in use
5. Protection against noise
6. Energy economy and heat retention

##### Evaluation of conformity

As well as performance requirements, the standards detail how the conformity of the product is to be evaluated. This involves:

1. An initial type test (ITT) carried out on one or more samples of the product

2. Factory production control (FPC) to ensure that the products actually sold achieve the declared performance, which is based on the ITT. A quality system certified to ISO 9000 by an approved certification body will meet this requirement.

Attestation of conformity                      The products in this document are to system 1

The CPD also establishes four levels of “attestation of conformity”, describing the attestation process required to support the CE mark and its associated declaration of conformity. The highest level, intended for safety-critical products, requires an approved certification body to be involved in surveillance and assessment of the factory production control and of the product itself. The lowest level allocates these responsibilities to the manufacturer:

	<b>Factory Production Control</b>	<b>Initial Type Test</b>
System 1 (highest)	Notified Body	Notified Body
System 2	Notified Body	Manufacturer
System 3	Manufacturer	Notified Body
System 4 (lowest)	Manufacturer	Manufacturer

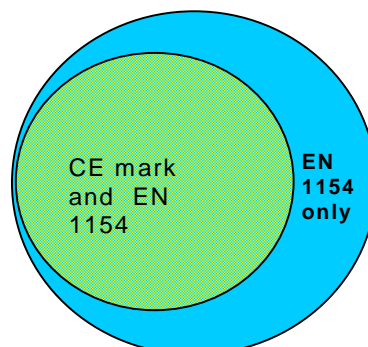
System 1 includes, optionally, audit testing of production samples by the notified body. System 2 includes an option for testing of production samples by the manufacturer. Which system and option applies to a particular product or application is decided by the European Commission and laid down in the mandate. This information is then included in an informative annex (annex Z) to the harmonised technical specification. In addition, this annex details the clauses within the standard with which compliance is essential to permit CE marking.

Notified bodies are test houses and certification bodies which have been designated by member states to carry out conformity assessment for particular product areas; a list can be found at <http://ec.europa.eu/enterprise/newapproach/nando/>.

The harmonised technical specifications may include levels or classes of performance for particular product attributes. This is to accommodate, inter alia, differences in national regulatory requirements.

It is important to note that compliance with a European standard, and compliance with the harmonised clauses of that standard, are not necessarily the same thing:

In EN 1154 (controlled door closing devices), all the performance requirements in the standard are relevant to the product’s ability to close and retain a fire-resisting door in position. Consequently, a CE marked product must both comply in full with the standard and with the requirements of EN 1154 Annex Z. However, a product complying with the standard but not Annex Z could not carry the CE marking:



## Responsibility

The person responsible for compliance with the CPD is whoever first places the product on the EU market. Typically this will be the manufacturer, but, for a manufacturer based outside the EU, it may be an importer or agent, depending on circumstances. A retailer or distributor may be responsible if the product is marketed under their name.

## Applying the CE mark

The responsible person must provide a declaration of conformity (or, where an approved certification body is involved, obtain a certificate of conformity) for the product. That person may then apply the CE marking to the product, to an attached label or to accompanying documentation as detailed in the relevant harmonised standard.

The CE mark is a statement that the product complies with all relevant directives; electrically-powered products may also need to comply with the Low Voltage Directive, the Electro-Magnetic Compatibility Directive and the Machinery Directive.

## Future developments – the Construction Products Regulation

The Construction Products Directive will be replaced in July 2013 by the Construction Products Regulation. EU regulations are directly enforceable in member states; there will be no requirement for national implementation as there was in the case of the existing directive. This means that interpretation and enforcement should be more uniform across the EU.

Other changes in the draft document include:

- There will be a seventh essential requirement: “Sustainable use of natural resources” which requires recyclability of construction works, materials and parts, durability of works and use of “environmentally compatible raw and secondary materials”. This requirement will only apply in a country when the necessary legislation has become law in that country.

It will be an offence in all member states to place on the market a construction product without the CE marking where the product is covered by a harmonised standard.

- Obligations of manufacturers, representatives, importers and distributors are explicitly stated.
- Simplified procedures are described for micro-enterprises and individually manufactured products.

Attestation of conformity is altered slightly.

<b>New system</b>	<b>Equivalent under existing system</b>
1	1 With audit testing by notified body
2	1 Without audit testing by notified body
3	2 With testing of production samples by manufacturer
4	3
5	4

The existing system 2 option “without testing of production samples by the manufacturer” has disappeared.

## Factory Production Control (FPC)

### 1 General

The product standard requires the manufacturer to maintain a FPC system to ensure that the hardware components actually sold achieve the declared performance, which is based on the results of the Initial Type Test (ITT).

The system consists of:

- Written procedures;
- Regular inspections;
- Tests and/or assessments;
- Use of the results to control raw materials, components, equipment, production process and product;
- Records of the inspections, tests, assessments and any action taken.

Note that:

- ❖ Records must be stored in a secure and retrievable way for a minimum of 10 years after production of the hardware component in question has ended.
- ❖ The procedures must ensure that production tolerances allow for the hardware component to achieve the declared performance.
- ❖ The procedures must specify the action to be taken when control values or criteria are not met.
- ❖ The manufacturer must record the process of verification, including at least the following information:
  - identification of the hardware component tested,
  - the date of sampling and testing,
  - the test methods performed,
  - the test results,
  - person responsible for the verification.

### 2 Personnel

The responsibilities of staff managing or performing work affecting product conformity must be defined in the written procedures. This is particularly important for those responsible for preventing non-conformities or responsible for action to be taken in the event of non-conformities. Staff must be competent to perform the work involved and records must include relevant details of individuals' skills, training and experience.

### 3 Equipment

Weighing, measuring and testing equipment must be calibrated and all equipment used in testing and production must be regularly inspected and maintained to ensure consistency in the manufacturing process. This process must be carried out in accordance with the written procedures and the results recorded.



### **4 Design process**

The written procedures must include descriptions of the various stages in the design process, who is responsible at each stage and what checks are to be carried out. All such checks must be recorded, including results and action taken; records must be sufficient to demonstrate that the design process and all the checks have been satisfactorily completed.

### **5 Raw materials and components**

The procedures must include specifications for incoming materials and also details of the inspection scheme for ensuring their conformity.

### **6 Production process control**

The procedures must identify the key stages during the production process, the checks to be carried out and who is responsible. Results of tests must be recorded, as must any corrective action taken. The aim is to ensure that only products which have passed the intermediate controls are dispatched.

### **7 Traceability and marking**

The procedures must include regular checking of traceability codes and markings.

### **8 Non-conforming products**

The procedures must document how non-conforming hardware components are dealt with. Any such events must be recorded and the records retained for the specified period.

### **9 Corrective action**

The procedures must instigate action to eliminate the cause of nonconformities in order to prevent recurrence.

### **10 Handling, storage, packaging**

The procedures must provide methods of product handling and storage to prevent damage or deterioration.

## APPENDIX 3

### The responsibility of the various stakeholders

If regulations and the use of a product define obligations and recommendations which have to be respected, it is important to point out the responsibility of the various stakeholders in the manufacture, marketing, choice, installation and maintenance, but also the use of doors controlled door closers. Everyone is concerned, at various levels, during the lifespan of a controlled door closer.

#### **The responsibility for those who manufacture or design (The Manufacturer)**

The industrialist (designer or manufacturer) and also the distributor (importer, or assembler) who puts a product on the market is directly concerned and must respect the regulations and the standards.

The legal risk is significant, with sometimes an obligation to withdraw products from the market.

In particular it is advisable to provide necessary information on the products:

- Markings
- Conformity to the standards produced
- The declaration of conformity and CE marking
- Certifications
- Validated configurations (statement on fire)
- Notes on use, installation and maintenance
- Limits of use of the products offered

The sales contract:

- Details of the products offered for sale
- Additional service complementary to the sale
- General conditions of Sale

#### **The responsibility for those who specify and define the choice (The Specifier)**

The specifier, architect, engineering and design department, quantity surveyor generally defines the choice of the suitable product in the schedule of conditions of a project. Other stakeholders, general contractors, sub-contractors, carpenters and metal workers may also be involved either to specify the choice, or to propose alternatives during the specification process. All have a responsibility.

It is particularly advisable to take into account the following:

- To carry out a preliminary analysis of risks
- To define the regulation of the schedule of conditions according to this analysis
- To respect the schedule of conditions
- To avoid changing or degrading a regulation of the schedule of conditions by taking into account only the economic criterion, with the detriment of the safety of the people.

## **The responsibility for those who distribute and sell (The Distributor)**

The distributor plays an important part in the choice of a product, either to specify the functionality or to propose an alternative “similar” or “equivalent” to his customer. It is important that he knows the products offered as well as the regulations and the standards in order not to sell an unsuitable or even dangerous product.

It is advisable to train the personnel who sell the product on the importance of respecting the schedule of conditions and the risks related to a change or the degradation of a specification or schedule of conditions.

## **The responsibility for those who install (The installer)**

Project management (general contractor who employs subcontractors), but also the fitter (carpenter, or metal worker), play an important part related to the objectives of the standards and regulations and schedule of conditions. They must also take careful note of the fixing instructions provided by the manufacturer to achieve good quality installation.

It is particularly appropriate to:

- use the tools recommended by the manufacturer
- choose compatible accessories validated by the manufacturer
- check the suitability of products for fire-resisting doors
- check the quality of installation, in particular on doors with two leaves.
- check the compatibility of other products on the doors
- take care of the qualification of the subcontractor (carpenters or metal workers in particular) and of the type-approval procedure of equipment
- give the building owner the maintenance instructions

## **The responsibility for the building owner and those who ensure maintenance**

The building owner (owner, or premises manager) who is responsible for the building, or the services, ensuring the safety of an establishment also has an important role because he is responsible (for fire doors, exit devices, e.g.) in the eyes of the law and must take care to maintain the conditions of operation of the building.

## **The responsibility for the end-user**

The user, tenant, employer, employee, and generally all the people occupying, even on a purely temporary basis, a building should not block the correct operation of exit devices; should not block fire doors; should not misuse door closers, for example bend hinged arms in a way, that the door closer will not close the door insofar as it can endanger him and also endanger the life of others.

It is particularly important to:

- Educate the personnel and the public about their rights and duties in respect of the operation of controlled door closers
- respect procedure rules in places of work

## APPENDIX 4

Frequently asked questions

1. CAN I USE A DOORCLOSER MARKED “0” IN 4<sup>TH</sup> DIGIT ON A FIRE DOOR?

No, this is not permitted. The 4<sup>th</sup> digit in the classification code according to EN 1154, EN 1155 and EN 1158 gives information about the “suitability for fire/smoke doors” as defined in EN 1634-1. Grade 0 is not suitable for the use on fire and smoke door assemblies.

2. IS IT NECESSARY TO HAVE DIFFERENT CE CERTIFICATES FOR CLOSERS FIXED ON THE PUSH SIDE (PARALLEL ARM) AS WELL AS THE PULL SIDE?

Yes, as the forces within the closers differ and need separate testing.

3. HOW CAN WE KNOW IF MY DOOR CLOSER CAN BE SUITABLE FOR MY FIRE DOOR?

The 4<sup>th</sup> digit in the classification code according to EN 1154, EN 1155 and EN 1158 must be “1”, meaning that the door closer is suitable for the use on fire and smoke doors as defined in EN 1634-1. The door closer should carry the CE-mark. Dependent on the doorset, an additional technical approval may be necessary – check with the manufacturer of the doorset.

4. SHOULD A DOOR CLOSER WHICH IS CE MARKED BE INCORRECTLY INSTALLED WILL THE CE COMPLIANCE BE INVALID?

Mounting instructions provided by the manufacturer have to be complied with. Otherwise the door closer may lose its approval, meaning that the whole doorset will no longer be compliant with European and/or national regulations.

5. IF A CLOSER HAS BEEN TESTED WITH A PROJECTING ARM AND BRACKET AND HAS THE BRACKET REPLACED WITH A POWER SHOE – WILL THE CE CERTIFICATION REMAIN?

By replacing the bracket with a power shoe, a new closer size will be generated. This mounting has to be explicitly tested and certified in the European certificates of conformity, and corresponding mounting instructions have to be provided by the manufacturer.

6. IS A CE MARK AND CLASSIFICATION CODE FOR THE PRODUCT AND FINISH IN THE TEST RESTRICTED TO THE FINISH IN THE TEST?

Surface finishes are for decorative purposes only. The finish of your door closer, e.g. silver, stainless steel etc. does not affect the CE and EN 1154 approval but a corrosion test to the requirement of the standard are necessary on different finishes.

### 7. DOES A CE CERTIFICATE ON A DOOR CLOSER WITH A PROJECTING ARM EXTEND TO DELAYED ACTION AND BACK CHECK VERSIONS?

In the European certificate of conformity, all certified door closer versions, configurations and accessories are explicitly mentioned. Always be sure to carefully check these documents, which are available from the manufacturer, e.g. on their websites.

### 8. ARE CE CERTIFICATES VALID IF THE DOOR CLOSER IS AN ELECTRO-MAGNETIC HOLD-OPEN?

To conform to the European Standards, applications of door closers must be mentioned in the certificate of conformity, and CE-marked mounting instructions shall be provided by the manufacturer.

### 9. CAN WE USE A MECHANICAL HOLD-OPEN UNIT MOUNTED ON A FIRE DOOR?

No, this is not allowed. Fire and smoke doors must be self-closing. A hold-open function is only permitted by using CE-marked hold-open devices according to EN 1155 or hold-open systems according to EN 14637 and/or national regulations.

### 10. WHEN DO WE NEED TO CE MARK THE DOOR CLOSER?

CE-marking of the door closer according to EN 1154 is mandatory for the use on fire and smoke check doors<sup>[S14]</sup>.

### 11. WHAT HAPPENS WHEN THE DOOR CLOSER DOESN'T WORK PROPERLY?

Check the correct function of the door without the door closer. Are the hinges, locks etc. working correctly? Make sure the door is not dragging on the ground. If the door works properly without a door closer, check the suitability of the door closer for your doorset, and make sure that the mounting and adjustment instructions of the manufacturer are fulfilled.

### 12. WHAT HAPPENS IF THE DOOR CLOSER LOOSES OIL?

The closer is likely to fail, thus endangering safety and should be replaced.

### 13. IF I INSTALL A CE DOOR CLOSER ON MY DOOR, WILL MY DOOR BECOME A FIRE DOOR?

No, it will not. The doorset must have a separate approval for its suitability as a fire door. Check the approval with the manufacturer of the doorset.

### 14. WHERE CAN I FIND CERTIFICATES OF CONFORMITY?

Certificates of conformity have to be provided by the manufacturer, e.g. on their websites.

### 15. GUIDELINE 2 IS WRITTEN IN TERMS OF HYDRAULIC DOOR CLOSING DEVICES. ARE THERE OTHER SOLUTIONS, WHICH ARE NOT HYDRAULIC RACK AND PINION STYLE, THAT HAVE BEEN SUCCESSFULLY TESTED TO THE CRITERIA OF EN1154?

There are but they are not included in Guideline 2 as they do not fit within the concept of systems associated with this document.

Further FAQ's can be answered through the ARGE Website

## APPENDIX 5

### Bibliography

#### EN Standards

- EN 1154: 1997 – Building hardware – Controlled door closing devices – Requirements and test methods
- EN 1155: 1997 – Building hardware – Electrically powered hold-open devices for swing doors – Requirements and test methods
- EN 1158: 1997 – Building hardware – Door coordinator devices – Requirements and test methods
- EN 14637: 2008 – Building hardware – Electrically controlled hold-open systems for fire/smoke door assemblies – Requirements, test methods, application and maintenance
- EN 14600: 2005 – Doorsets and openable windows with fire resisting and/ or smoke control characteristics – Requirements and classification
- EN 1634 – 1: 2009 – Fire resistance and smoke control tests for door and shutter assemblies, opening windows and elements of building hardware – Part 1: Fire resistance test for doors and shutter assemblies and opening windows
- EN 1634 – 2: 2009 – Fire resistance and smoke control tests for door and shutter assemblies, opening windows and elements of building hardware – Part 2: Fire resistance characterisation test and elements of building hardware
- EN 1634 – 3; 2005 – Fire resistance and smoke control tests for door and shutter assemblies, opening windows and elements of building hardware – Part 3: Smoke control test for door and shutter assemblies
- CEN/TR 15894: 2009 – Building hardware – Door fittings for use by children, elderly and disabled people in domestic and public buildings – a guide for specifiers
- BS 8300 - Design of buildings and their approaches to meet the needs of disabled people – Code of Practice
- Article R111-19-3, R111-19-6 (France) – Construction and Housing Code, Subsection 4 (Code de la construction et de l'habitation, Sous-section 4 : Dispositions applicables lors de la construction ou de la création d'établissements recevant du public ou d'installations ouvertes au public)
- DIN 18040-1 : 2010 (Germany) – Construction of accessible buildings – Design principles – Part 1: Publicly accessible buildings (Barrierefreies Bauen – Planungsgrundlagen – Teil 1: Öffentlich Zugängliche Gebäude.)
- DIN 18040-2 : 2010 (Germany) – Construction of accessible buildings – Design Principles – Part 2: Dwellings (Barrierefreies Bauen – Planungsgrundlagen – Teil 2: Wohnungen.)
- EN 1670: 2007 – Building hardware – Corrosion resistance – Requirements and test methods
- EN 13501 – 2: 2010 – Fire classification of construction products and building elements – Part 2: Classification using data from fire resistance test, excluding ventilation services
- EN 54 – 7: 2000 + A 1: 2002 + A 2: 2006 – Fire detection and fire alarm systems. Smoke detectors. Point detectors using scattered light, transmitted light or ionization

- EN 12209: 2004 – Building hardware – Mechanically operated locks, latches and locking plates - Requirements and test methods;
- EN 1303: 2005 – Building hardware – Cylinders for locks – Requirements and test methods
- EN 179: 2008 – Building hardware – Emergency exit devices operated by a lever handle or push pad, for use on escape routes – Requirements and test methods
- EN 1935: 2002 – Building hardware – Single-axis hinges – Requirements and test methods
- EN 1125: 2008 – Building hardware – Panic exit devices operated by a horizontal bar, for use on escape routes – Requirements and test methods- Terminology and definitions



## APPENDIX 6

### Technical terminology and definitions

Note: some of the following definitions are extracts from the EN 1154, EN 1155, EN 1158 and EN 14637 Standards.

#### **Controlled door closing device / door closer**

Any manually operated door closing mechanism where the energy for closing is generated by the user upon opening the door, and when released returns the door to the closed position, in a controlled manner. The term includes all arms, brackets, shoes, top centres, floor pivots and other parts supplied with the device and necessary for its installation and operation.

#### **Controlled door closer**

Door closer with closing action controlled by means of a liquid and valves.

#### **Overhead door closer surface mounted**

A door closer mounted at or near the door head, on the surface of the door or its transom.

#### **Overhead concealed / integrated door closer**

A door closer mounted within the thickness of the door or within the thickness of the transom.

#### **Floor concealed door closer – floor spring – floor pivots**

A door closer mounted within the floor, fitting to the turning axis of the door.

#### **Double action door closer**

A door closer which allows operation of a door in both directions.

#### **Single action door closer**

A door closer for use on doors which can open in one direction only and which close against a fixed stop.

#### **Closing moment**

The torque in Nm generated by the door closing device which acts upon the door leaf during the closing operation.

#### **Closing force / power size**

The force which is needed to close a door properly. According EN 1154 the door closing force is defined in steps of 1-7.

#### **Closing speed**

The adjustable speed a door closes by means of the door closer.

#### **Opening moment**

The torque in Nm generated by the user which acts upon the door leaf during the opening operation.

#### **Opening restriction**

Limitation of the door opening up to a certain angle, according to the building design.

## Backcheck

An inbuilt buffer which helps to prevent a door leaf being flung / thrown wide open.

## Delayed closing action

An inbuilt function that allows the door closing action to be delayed for an adjustable period of time before resuming controlled closing.

## Latching action

A speed control operable only during the last few degrees of door closing, to get over closing resistances as locking devices, carpets, wind resistances, etc.

## Efficiency

A ratio of the opening force applied to the door by the user, and the force available for closing the door, expressed as a percentage.

## Test cycle

A test cycle includes all operations of the test door, from the closed position, to opening to the required position and to closing back to the closed position.

## Hold-open

System or mechanism within or separate to a door closer which keeps the door open, electromechanically, electro hydraulically or mechanically, into either a preset or chosen angle until manually closed or electrically released.

## Electrically powered free-swing door closer

Door closer that allows a door, after an initial opening to a predetermined position, to swing freely anywhere from that position to its closed position without any resistance or damping. Upon removal of the electrical supply, the door returns to the closed position under the control of the door closer.

## Manual release

Action of pulling a door held open by a device to this European Standard, from its held position without removing the electrical supply, such that it will continue to the closed position under the control of the door closer.

## Release moment

Moment required to manually release a door from its held position.

## Rated supply voltage

Nominal voltage for which the device is intended.

## DIN-L and DIN-R

According to DIN standard specified hinge side, where the door closer position depends on. L=door hinge on left side of the door; R=door hinge on right side of the door.



DIN-L



DIN-R

## Guide rail

Rail to pilot the door closer lever, which can include additional functions.

## **Opening angle**

The angle of how wide a door can be opened.

## **Door stopper**

Stopping device within the door closer or guide rail or as independent floor stopper.

## **Extended spindle (axle)**

Extension of the drive axle, to get over longer mounting distances between door leaf and floor.

## **Doorset**

**A complete door element consisting of a hinged or pivoted door leaf, frame and other hardware.** A double doorset consists of two hinged or pivoted leaves within a single frame, closing plain or rebated.

## **Meeting stiles**

Two door leaves closing parallel without contact are closing plain. Two door leaves closing in an angled contact are closing rebated.

## **Active / moving leaf**

The first opening and last closing leaf of a rebated single swing double doorset.

## **Inactive / fixed leaf**

The last opening and first closing leaf of a rebated single swing double doorset.

## **Waiting position**

The opening angle to hold the active leaf to enable the inactive leaf to close first. The minimum waiting position is defined with the smallest opening angle the active leaf can be held, to enable the inactive leaf to close first.

## **Door coordinator devices**

To ensure effective fire compartmentation in buildings, it is essential that the individual leaves of pairs of doors with rebated meeting stiles close in the correct sequence. This sequential closing function, for a double leaf doorset, is to provide the closing of the inactive leaf before the active leaf. This will be achieved by holding the active leaf in waiting position, until the inactive leaf is closed, and finally closes the active leaf.

## **Gravity arm coordinators**

Devices consisting of simple gravity components such as flaps or roller arms, which are attached to the transom on the opening side of the doorset, and control the door leaves by blocking the last few degrees of return of the active leaf until the inactive leaf has closed into the frame.

## **Swing arm coordinators**

Consists of a simple spring controlled arm which is attached to the transom on the opening side of the doorset, and controls the door leaves in a similar manner to the gravity arm coordinator.

## **Double arm swing coordinator**

To minimise the possibility of single swing arm coordinators to abuse, versions are available which contain very short operating arms, to hold the inactive leaf from a position nearer to the hanging edge of the door leaf.

## **Integrated / incorporated coordinators**

These devices offer the most effective way of providing both, the closing function and the coordinating function in one device. They consist of a door closing device for each leaf and a

common track assembly or concealed cable which connects the two closers and provides the coordinating action.

### **Carry bar**

A component to assure that the active leaf is held in a waiting position, in case the inactive leaf has been opened first.

### **Door closing device with automatic opening**

A door closing device for swing doors which contains an opening mechanism operated by external energy.

NOTE: More can be found in the above-mentioned EN standards.

## **General terminology and definitions**

### **EU**

European Union

### **CEN**

European Standard Organisation (Comité Européen de Normalisation)

### **EN**

European standard (norm)

### **prEN**

Provisional European standard (not yet published)

### **Standard**

A non-mandatory technical specification approved by a recognised standard organisation.

### **Regulation**

A mandatory requirement issued by European or National authorities

### **Barrier free building**

Consideration of individual requirements without building up barriers at entrances or movement areas in rooms, as stairs, corridors, lifts, doors, etc.

### **Smoke and fire protection**

In case of fire the preventive measures which have been taken by means of door, window and exhaust air systems will leave the smoke out, the people inside of the building will survive and the fire fighters will come in to stop the fire.

### **Fire behaviour**

The grades of fire behaviour defined for door closing devices and electrically powered hold-open devices. (identified grades see EN 1154 + EN 1155)

### **Safety**

All door closers and electrical powered hold-open devices are required to satisfy the essential requirement of safety in use.

## APPENDIX 7

### EN 1154–Extracts

#### **Building hardware — Controlled door closing devices — Requirements and test methods**

Note: The complete document is available from your National Standard Organization

#### **Extracts:**

##### **Scope**

This standard specifies requirements for controlled door closing devices for swing doors, such devices being mounted on or in the frame, on or in the door, or in the floor.

The scope is limited to manually operated door closing devices where the energy for closing is generated by the user upon opening the door, such that when the door is released, it returns to a closed position, in a controlled manner.

Devices such as spring hinges, which do not exert a checking control during door closing, are outside the scope of this standard.

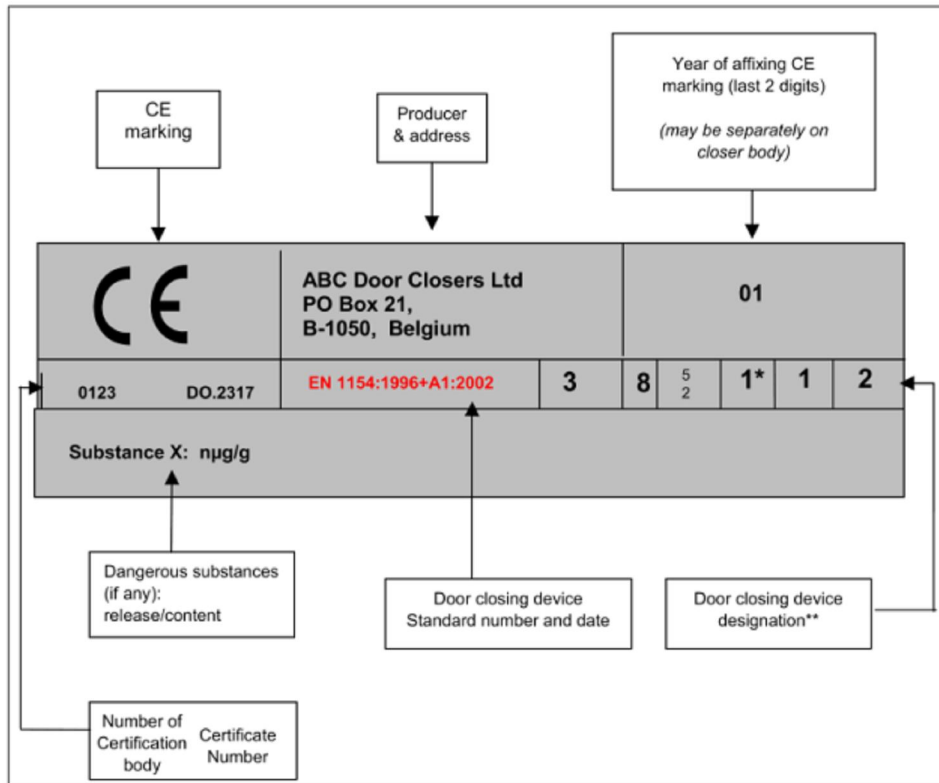
Door closing devices (door closers) manufactured in accordance with this standard are recommended for use wherever there is a requirement for reliable closing control of a door.

Door closers for use on fire/smoke doors need additional attributes in order to contribute actively to meeting the essential safety requirements in case of fire, either independently or as part of a complete door assembly.

These additional requirements for door closers for use on a fire/smoke door assembly are specified in normative Annex A.

Door closers incorporating electrically powered hold-open mechanisms, for use on fire/smoke door assemblies, are covered by EN 1155. Door closers incorporating door coordinator devices (with or without electrically powered hold-open devices) are covered by EN 1158.

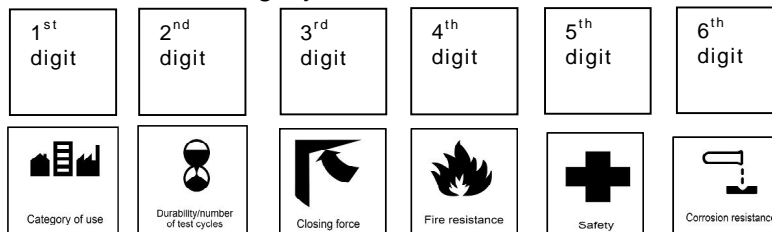
**Example of CE Marking for a door closing device:**



NOTE 1 The manufacturer should state the precise field of application for fire/smoke door use according to A.6 of Annex A.

NOTE 2 All or some of the digits may be substituted by NPD in the designation of products intended to be placed in markets where there are no legal requirements for self-closing or for any of the related characteristics. (A)

## Classification coding system



Read more: DHF graphic icons – Door and Hardware Federation

EN 1154 – Building hardware – Controlled door closing devices – Requirements and test methods

## EN 1155– Extracts

### Building hardware — Electrically powered hold-open devices for swing doors — Requirements and test methods

Note: The complete document is available from your National Standard Organization

#### Extracts:

#### Scope

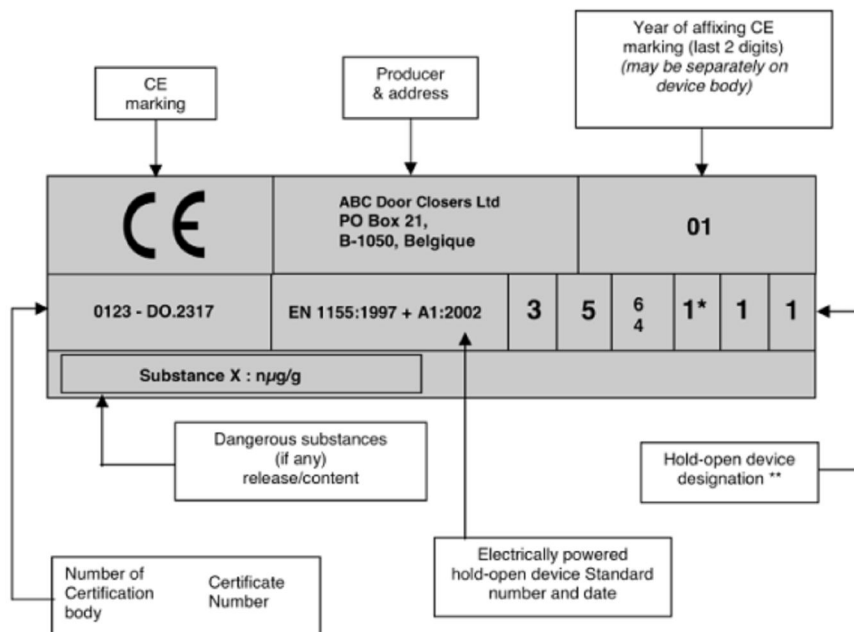
This European Standard specifies requirements for separate hold-open devices and also for hold-open mechanisms incorporated in a door closer intended to be used on fire/smoke compartmentation doors. Electrically powered hold-open devices for swing doors manufactured according to this European Standard can hold a swing door at a fixed position or can allow the door to swing freely. In each case interruption of the electrical supply will cause the controlled door to close positively.

Electrically powered hold-open devices manufactured in accordance with this European Standard are recommended for use wherever there is a requirement for reliable hold-open and release of self-closing fire/smoke door assemblies.

Whilst these devices can incorporate smoke or fire detection elements, the performance of those particular elements is outside the scope of this European Standard.

Door closing devices are covered by EN 1154.







**EXAMPLE 1** CE marking of a separate electrically powered hold-open device:



NOTE 1 The manufacturer should state the precise field of application for fire/smoke door use according to 5.2.13.

NOTE 2 All or some of the digits may be substituted by NPD in the designation of products intended to be placed in markets where there are no legal requirements for self-closing or for any of the related characteristics.

## Classification coding system

1 <sup>st</sup> digit	2 <sup>nd</sup> digit	3 <sup>rd</sup> digit	4 <sup>th</sup> digit	5 <sup>th</sup> digit	6 <sup>th</sup> digit
 Category of use	 Durability/number of test cycles	 Closing force	 Fire resistance	 Safety	 Corrosion resistance

*Read more: DHF graphic icons – Door and Hardware Federation*

*EN 1155 – Building hardware – Electrically powered hold-open devices for swing doors – Requirements and test methods*



## EN 1158-Extracts

### Building hardware — Door coordinator devices — Requirements and test methods

Note: The complete document is available from your National Standard Organization

#### Extracts:

#### Scope

This European Standard specifies requirements for the following door coordinator devices for use on double-leaf swing doors:

- separately mounted door coordinator devices;
- coordinator mechanisms incorporated in door closers;
- coordinator mechanisms incorporated in door closers with electrically powered hold-open devices.

Door coordinator devices are used where it is necessary to ensure the correct sequence of closing of double leaf swing doors, for example doors with rebated meeting stiles.

Door coordinator devices manufactured in accordance with this European Standard are recommended for use wherever there is a requirement for reliable sequential closing of double-leaf swing fire/smoke doors incorporating rebated meeting stiles.

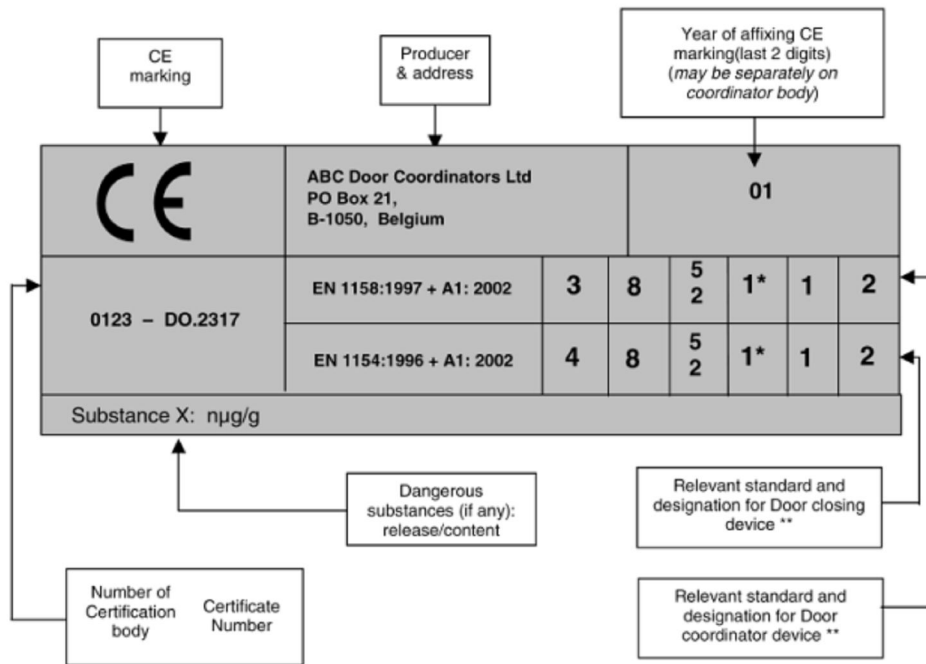
Door coordinator devices for use on fire/smoke doors need additional attributes in order to contribute actively to meeting the essential requirements of safety in case of fire, either independently, or as part of a complete door assembly.

These additional requirements for door coordinator devices for use on a fire/smoke door assembly are specified in normative Annex A.

Door closing devices are covered by EN 1154.

Electrically powered hold-open devices are covered by EN 1155.

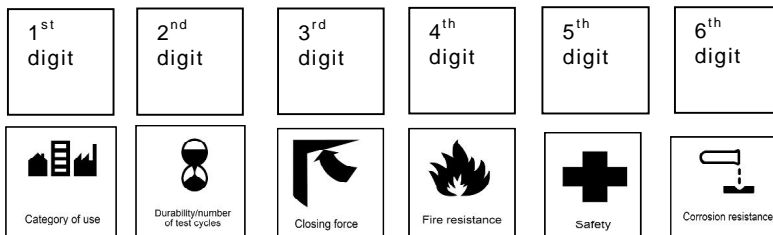
EXAMPLE 1 CE marking of a door coordinator device incorporated in a door closer:



NOTE 1 The manufacturer should state the precise field of application for fire/smoke door use according to A.2 of Annex A.

NOTE 2 All or some of the digits may be substituted by NPD in the designation of products intended to be placed in markets where there are no legal requirements for self-closing or for any of the related characteristics.

## Classification coding system



Read more: DHF graphic icons – Door and Hardware Federation

EN 1154 – Building hardware – Controlled door closing devices – Requirements and test methods

EN 1158 – Building hardware – Door coordinator devices – Requirements and test methods

## EN 14637-Extracts

### **Building hardware- Electrically controlled hold-open systems for fire/smoke door assemblies - Requirements, test methods, application and maintenance**

Note: The complete document is available from your National Standard Organization

#### **Extracts:**

#### **Introduction**

The purpose of an electrically controlled hold-open system is to reliably hold open and then release self-closing fire/smoke control door assemblies at the earliest practicable moment, in the event of fire, but not to generate an alarm signal. In this regard the required function of the fire detectors is different to the normal usage of fire detectors in fire detection and fire alarm systems. In the case of hold-open systems, conforming to this European Standard, the primary objective is to release a door reliably for self-closing and any incidence of false alarms is of secondary importance. In the case of fire detection and fire alarm systems, however, the incidence of false alarms needs to be kept to the absolute minimum (See 6.1.1 and 6.1.2). This does not, however, exclude the fact that detectors of fire detection and fire alarm systems may be used to initiate door release signals. A logic diagram for modes of operation of an electrically controlled hold-open system is shown in Figure 3.

This European Standard is drafted on the basis of essential system functions and components which are provided on all electrically controlled hold-open systems and which comprise hold-open device(s), a control unit, a power supply unit, and fire detector(s). Options with requirements for additional system functions and components can also be provided, such as remote indicating devices, interconnecting cables, door position sensors, interfaces with other systems, manual controls and a stand-by power supply.

It is intended that the options be used for specific applications. The optional function(s) and components are included separately, with their own set of associated requirements, in order to permit electrically controlled hold-open systems with many different combinations of functions to conform to this European Standard.

Where an option is taken, corresponding requirements are included. The performance tests incorporated in this European Standard are reproducible and, as such, will provide a consistent and objective assessment of the performance of these hold-open systems.

#### **Scope**

This European Standard specifies requirements, methods of test and performance criteria against which the compatibility of components and their performance can be assessed when used in combination to form an electrically controlled hold-open system. It also specifies requirements for the integrity of such hold-open systems when connected to fire detection and fire alarm systems or other systems, including the signal exchange and technical data for interfaces.

This European Standard provides requirements for the application of electrically controlled hold-open systems used for fire/smoke doors in buildings, where such doors are required to be self-closing. It covers planning, design (see Annex A), installation (see Annex B), commissioning, use and maintenance (see Annex E) of hold-open systems, intended for the protection of life and/or the protection of property. This may also include hold-open systems, or components of the hold-open system, that are self-contained in a single enclosure.

Electrically controlled hold-open systems manufactured, installed and serviced in accordance with this European Standard are recommended for use wherever there is a requirement for reliable hold-open and release of an individual self-closing fire/smoke door assembly in the case of fire.

The use of hold-open systems for closures in conveyor systems conforming to EN 1366-7, which applies in conjunction with EN 1363-1, may require additional proof of suitability, which is not covered by this European Standard.



This European Standard does not cover design, installation, commissioning, use and maintenance of building fire detection and fire alarm systems (covered by CEN/TS 54-14) but does cover the connection of hold-open systems conforming to this European Standard to building fire detection and fire alarm systems, under certain prescribed conditions.

This European Standard does not cover the requirements of performance characteristics and operational environment conditions of particular components of a hold-open system, where these requirements are already covered by European specifications, and which include appropriate test methods to assure reproducible test results for the product conformity assessment. These European Standards are referred to in Clause 5.

This European Standard does not cover electrically controlled systems used for smoke venting purposes or systems that allow the door to remain open under fault conditions (i.e. not fail-safe).

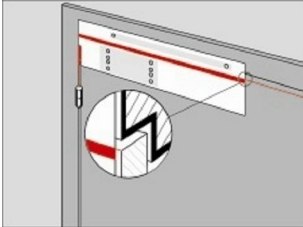
This European Standard does not cover electrically controlled hold-open systems that are not connected to main power supply and are battery powered only.

### Installation Instructions for Extract EN 14637

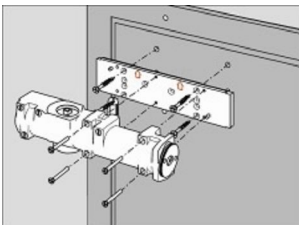
Manufacturers that fulfil the European Standards provide detailed installation instructions with their products which should be passed on the building manager.

The installations instructions should describe all important steps for fixing a door closer and accessories to the door or frame. In the following you will find some extracts of a mounting instruction.

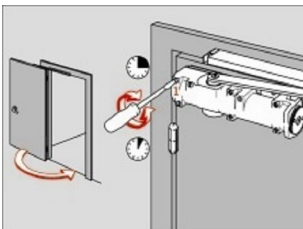
1. Choice of the right position for the door closer.  
Many manufacturers provide a drilling template for marking the attachment holes.



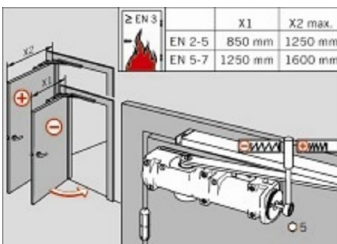
2. Select all necessary accessories according to the national regulations (e.g. mounting backplate for fire and smoke check doors) and fix the door closer.



3. After fixing the door closer and the arm adjust the hydraulic functions such as closing speed.



4. Make sure closing power is adjusted according to the door size, and according to EN 14600 for fire and smoke check doors.



*Read more: EN 14600 – Doorsets and openable windows with fire resisting and / or smoke control characteristics – Requirements and classification*

## Maintenance Instructions for Extract EN 14637

According to EN 14637 and national regulations, manufactures provide detailed maintenance instructions with their products which should be passed on the building manager. The maintenance instructions should describe all important steps for testing and maintenance of a door closer system.

The maintenance has to be carried out according to service instructions by authorized persons. In the following you will find an example of a maintenance book for a hold-open system.

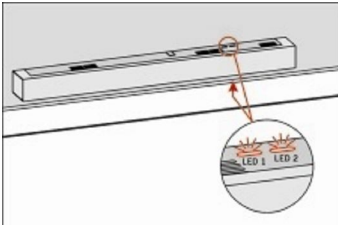
Manufactures should provide such a manual in which the results can be recorded. If an authorized person carries out the maintenance and documentation according to these documents the building manager can be sure that the EN 14637 and/ or the national regulations will be fulfilled.

Inspection of:	Accepted	Measures to be taken
<b>1. Door:</b>		
<b>1.1 General:</b> - Check of free movement of leaf/leaves and self-closing from any opening angle under the control of the closing device(s).		
<b>1.2 Closing device(s):</b> - Check that manufacturer's instructions were followed. Readjust door closing device(s) if necessary.		
<b>1.3 Door coordinator device:</b> - Check that manufacturer's instructions were followed. Readjust door coordinator device if necessary.		
<b>2. Hold-open system:</b>		
<b>2.1 General:</b> - Check whether installed components are in accordance with the components indicated in the list of approved components. - Check whether accompanying information of the components installed is in accordance EN 14637, 6.2.		
<b>2.2 Installation of detectors:</b> - Check whether number and mounting position of installed detectors are in accordance with EN 14637, A.3.2.		
<b>2.3 Hold-open device(s):</b> - Check whether manufacturer's instructions were followed. - Check voltage (24 V d.c. +10 %/-15 %) at hold-open device terminal(s). - Check hold-open function(s) and manual release/control.		
<b>2.4 Function test:</b> - Check the interaction of all components of the hold-open system with the initiation event being tested both by simulation of the fire parameter of the detectors and by manual operation if applicable. - Check whether the door(s) is/are released for self-closing in case of faults (e.g. through the removal of a detector, interruption of power supply or other comparable actions). - Check reset function where relevant.		
<b>3. Formalities:</b> - Inspection results to be reported to the building manager. - This certificate to be passed to the building manager. - After successful inspection, Acceptance Inspection Plate to be affixed.		
<b>Date of above checks:</b> .....	<b>Signature of authorized person who performed this acceptance inspection:</b>	
<b>Date of first inspection and maintenance:</b> .....	.....	

*Read more: EN 14637– Building hardware – Electrically controlled hold-open systems for fire/smoke door assemblies – Requirements, test methods, application and maintenance*

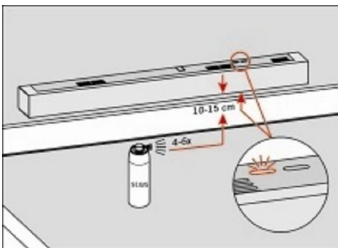
In the following you will find some extracts of a maintenance instruction of smoke detector for hold-open systems.

1. LED 1 as “status display” and LED 2 as “service display” signalise the daily operation and the necessity for maintenance.



2. The building manager is obligated to check the proper operational status of the hold-open device regularly (once a month) and to organise the maintenance of all system components at least once a year by an authorised person.

In this extract from a maintenance instruction the testing of a smoke detector with a special testing aerosol is shown.



3. The scope, result and date of this regular inspection should be recorded in a maintenance book, which should be kept by the building manager.

### **Disposal of door closers and associated items**

Door closers and associated items and the respective accessories must not be disposed as domestic waste. Please ensure that the old appliance and the respective accessories (if available) are properly disposed of. Please abide by the prevailing national statutory provisions.