

Self-closing doors:

(Mechanical) Fail Safe (FS) or Electric Fail Safe (EFS)

EN 13241 - EN 16034

(product standard, performance characteristics - Fire-resistant and/ or smoke-reducing doors)



In this document, we would like to explain what is stated in the present standards and how we made the conclusion written below. If there are requirements in your country (within the EU rules) for the self-closing of doors, the following applies.

The conclusion:

If you have an (industrial) door that stands in an **open** position and has fire-resistant and / or smoke-reducing characteristics, it must be able to close at all times using mechanical energy. If electricity is required to close the door, it does not meet the requirements as noted in the European standards.

Electric Fail Safe (EFS) is not allowed!

The normative substantiation of this conclusion is written on the following pages.

Normative substantiation

When controlling self-closing (industrial) doors, a discussion often arises as to what is applicable now, or in other words: can't this be done in another way that costs (much) less money, like the EFS solution.

The answer is simple: **not allowed**.

With the EN 16034 becoming mandatory for door types that fall under the harmonized product standards EN 13241 (including industrial doors), the implementation of self-closing for industrial doors with fire-resistant and / or smoke-restricting characteristics in Europe is clear.

Why has there been confusion for so long and is the Electric Fail Safe still often used?

This is probably due to the text in the classification standard EN 13501-2 under Article 5.2.6:

5.2.6 C - Self-closing

Self-closing C is the ability of an open door or window to close fully into its frame and engage any latching device that may be fitted, without human intervention, by stored energy, or be mains power backed up by stored energy in case of power failure.

It applies to elements usually kept closed and which shall close automatically after every opening. It also applies to elements usually kept open which shall close in the event of a fire, and to mechanically operated elements which also shall close in the event of a fire.

This states; *by stored energy, or be mains power backed up by stored energy in case of power failure.*

It could be concluded from this, that this may be possible with an EFS system.

But is this also a characteristic that may be declared under EN 16034?

Unfortunately not. The characteristics for fire-resistant and / or smoke-reducing doors are described in the same standard. It states the following under Article 4.4:

4.4 Self-closing (only for self-closing fire resistant and/or smoke control doorsets and/or openable windows)

Self-closing (C) is the ability of an open doorset and/or openable window to close fully into its frame and engage any latching device that may be fitted without human intervention, e.g. by stored energy, or by mains power backed up by stored energy in case of power failure and is verified according to A.2.2. Results are classified according to EN 13501-2 and expressed by "C" and may be completed with a digit of 0 to 5 according to the use categories determined by the number of cycles performed (see 4.5.2.1).

So far things are still going well and an EFS system could be applied.

But what if the door is in an open position?

This is almost always the case with industrial doors. Because of this, the characterized *Ability to release* must also be met. This is stated under article 4.3 of the EN 16034:

4.3 Ability to release

In order to release the products covered by this standard and enable the reliable closing of a doorset and/or openable window in the event of fire and/or smoke or failure of the power supply the hold-open device shall be tested according to 5.3 and test results shall be expressed as "released".

When we look at how to validate the *Ability to release*, it appears that, prior to a fire and / or smoke test, the *Ability to release* must be demonstrated 3 times. See Article 5.3 below.

5.3 Ability to release

The ability to release test shall be undertaken on one sample which is submitted to fire resistance testing according to EN 1634-1 or smoke control testing according to EN 1634-3.

The ability to release shall be verified by simulating a fire signal (e.g. cut off mains power) three consecutive times.

5.4 Durability

5.4.1 Durability of the ability to release

The durability of the ability to release is satisfied if the electrically powered hold open device complies with EN 1155 or EN 14637.

5.4.2 Durability of self closing (only for self closing doorsets and/or openable windows) — Durability of self closing against degradation (cycling testing)

The test methods for cycling testing are given in EN 1191 (for pedestrian doorsets and/ or openable windows and EN 12605 (for industrial, commercial and/or garage doorsets).



It also states that the standard for hold open devices, the EN 14637, is controlled and, for durability, the EN 12605.

The *Ability to release* is often declared in the Declaration of Performance (DoP) of the manufacturer, but without this being classified by the Notified Body.

Whether the door meets, can be verified by means of the classification report and / or the CE certificate, which can be requested from the manufacturer. It must state the **C** and the *Ability to release* as **released**.

What exactly does the EN 14637 standard say?

It is explicitly stated here, see Article 5.5.3.1 below, that the doors must always close on the basis of mechanical energy, which excludes EFS!

5.5.3 Hold-open devices for sliding doors, lifting doors, industrial doors and roller shutters

5.5.3.1 General

The minimum and maximum holding forces claimed for the hold-open device in any position of the door/shutter shall be stated by the manufacturer. Within these limits of holding force, reliable holding and release of the door/shutter should be verified at the rated supply voltage -15 % and rated supply voltage +10 % in accordance with the initial type test in F.1. When testing hold-open devices on exceptionally large or heavy doors/shutters the maximum test door mass may be simulated by attaching weights to a typical door/shutter.

NOTE The actual performance of the exceptionally large or heavy doors/shutters is normally demonstrated to the building authority as part of the commissioning process for the Works.

In the event of failure of the electric power supply, electrically operated doors/shutters shall reliably close (i.e. the door shall close from the position it was held to its fully closed position) by stored **mechanical energy**.



Why is EFS excluded for doors that are kept open?

There is a risk of a short circuit in the power supply, circuit board or wiring. See the diagram below and the explanation under 5.4 Control units.

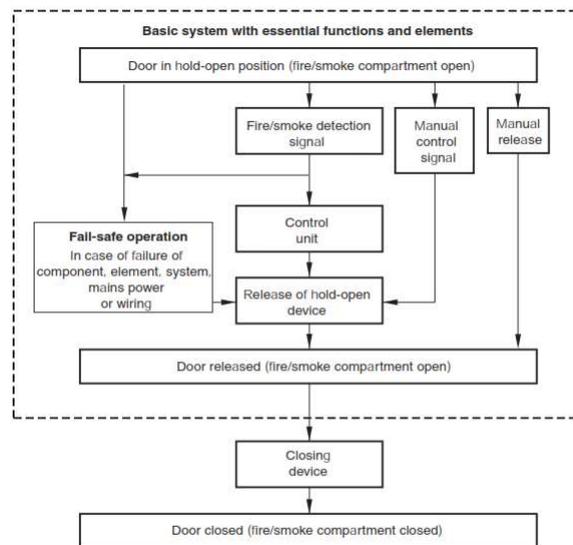


Figure 3 — Logic diagram for modes of operation of an electrically controlled hold-open system

5.4 Control units

5.4.1 General

Control units shall release (de-energize) the connected hold-open device(s) reliably (see 6.1.6) (fail-safe) within maximal 3 s in the event of alarm (fire alarm), fault (wire break, short circuit, mains power failure) or manual control. A delayed release is only permitted in the case of those hold-open systems where the closing range of the fire/smoke door is monitored by presence sensors (see 5.3.2.1).

Which closing options are allowed?

Permitted are: mechanical (gravitational) self-locking chain wheel motors / tubular motors, systems with springs, hydraulic and pneumatic systems. Possibly in combination with a UPS (emergency battery), but only for keeping the door open temporarily in the event of a power failure. In all cases, the door closes in the event of an alarm signal, such as a fire alarm.

Not permitted are: slip-on drives without automatic release, motors equipped with an electric auxiliary motor, the standard chain, slip-on and tubular motors, also not in combination with a UPS (emergency battery). These types of drives cannot close on the basis of mechanical energy alone, as prescribed in the standards.

