

Guide to interpreting Markings for Single Axis Fire Doors Hinges

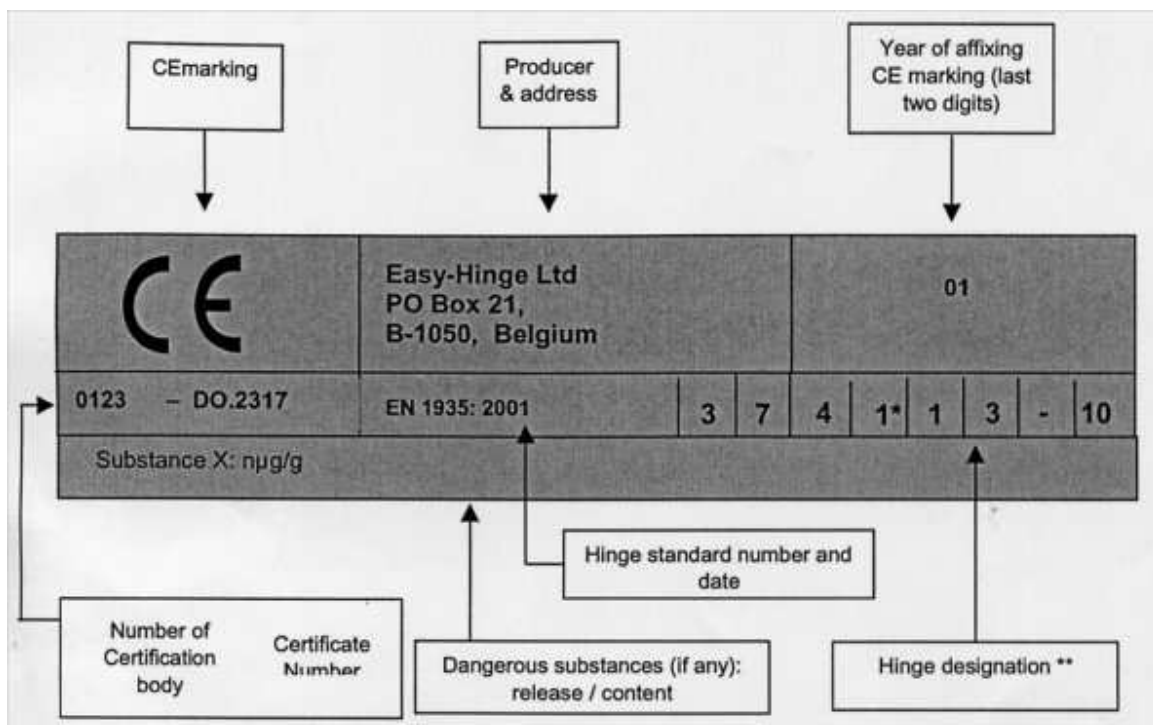
**An overview of BS EN 1935: 2002: Building Hardware.
Single Axis hinges as relates to Fire doors.**

INTRODUCTION.

It is a criminal offence to supply products that do not comply with the UK Construction Products Regulations. For fittings intended for use on fire, smoke and escape doors marking will be the easiest method to demonstrate compliance. The Building Control Officer or other approved inspectors or a Trading Standards Officer will require proof of this compliance. Across the UK construction industry and in Europe, construction products are being tested to the new EN Standards to ensure that fire, safety and performance requirements are met in future building projects. Door hardware will eventually have 21 new EN Standards. For many ironmongery items you will need to ensure that only marked products are used on all fire resisting, smoke control and escape doors.

This summary only relates to single axis hinges, which are the most common means for hanging fire doors. The appropriate British Standard is BS EN 1935: 2002: Building Hardware Single Axis Hinges. The purpose of this submission is to enable interested persons to interpret the markings. If a greater understanding is required then it will be necessary to study the standard in depth.

EXAMPLE OF CE MARKING FOR SINGLE AXIS HINGES



* The manufacturer will state the precise field of application for fire/smoke door use according to B.2 of annex B of BS EN 1935.

** 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.

EXAMPLE OF HINGE DESIGNATION

For hinges for fire doors the hinge designation is very important.

Digit	1	2	3	4	5	6	7	8
	2	7	3	0	1	1	1	10

This denotes a hinge for use in medium duty situations tested to 200,000 cycles, for use on doors with a mass up to 60 kg, with no stated fire resistance, mild corrosion resistance, suitable for use on burglar resistant doors, and with a hinge grading of 10.

CODING SYSTEM

For the purposes of this European Standard, hinges shall be classified according to the eight digit coding system described below.

DIGIT 1 - CATEGORY OF USE.

- Grade 1 - Low frequency of use by people with a high incentive to exercise care and with a small chance of accidents occurring or of misuse.
- Grade 2 - Medium frequency of use by people with some incentive to exercise care but where there is some chance of accidents occurring or of misuse.
- Grade 3 - High frequency of use by public and others with little incentive to exercise care and with a high chance of accidents occurring or of misuse.
- Grade 4 - For use on doors which are subject to frequent violent usage.

Grade 1 hinges should not be used on fire-resistant and/or smoke-control door assemblies.

DIGIT 2 - DURABILITY/NUMBER OF TEST CYCLES

- Grade 1 : 2,500 cycles
- Grade 2 : 5,000 cycles
- Grade 3 : 10,000 cycles
- Grade 4 : 25,000 cycles
- Grade 5 : 50,000 cycles
- Grade 6 : 100,000 cycles
- Grade 7 : 200,000 cycles
- Grade 8 : 500,000 cycles
- Grade 9 : 1,000,000 cycles

DIGIT 3 - TEST DOOR MASS

- Grade 1 : up to 20 kg
- Grade 2 : up to 40 kg
- Grade 3 : up to 60 kg
- Grade 4 : up to 80 kg

- Grade 5 : up to 100 kg
- Grade 6 : up to 120 kg
- Grade 7 : up to 160 kg
- Grade 8 : up to 200 kg
- Grade 9 : up to 250 kg

DIGIT 4 - FIRE BEHAVIOUR

- Grade 0: Not approved for use on fire/smoke resisting door assemblies.
- Grade 1: Suitable for use on fire/smoke resisting door assemblies, subject to satisfactory assessment of the hardware item relative to the performance of the specified fire/smoke resisting door assembly.

No components of the hinge, except decorative parts, or its fastening shall have a melting point less than 800 °C. (Steel) It does not apply to identical hinges that have been certified by passing the appropriate fire test for fire door sets.

The following alternative grading system has been developed for fire resistance based on the fire resistance tests incorporated in BS EN 1634-1 and will be included in two revised standards due for publication in 2006: EN 1125 and EN 179.

Seven grades will be used:

- Grade 0: Not approved for use on fire/smoke door assemblies.
- Grade A: Suitable for use on smoke door assemblies - based solely on the requirements of the relevant product standard.
- Grade B: Suitable for use on smoke and fire door assemblies with a minimum classification time of 15 min.
- Grade C: Suitable for use on smoke and fire door assemblies with a minimum classification time of 30mins.
- Grade D: Suitable for use on smoke and fire door assemblies with a minimum classification time of 60mins.
- Grade E: Suitable for use on smoke and fire door assemblies with a minimum classification time of 90mins.
- Grade F: Suitable for use on smoke and fire door assemblies with a classification time of more than 90mins.

DIGIT 5 - SAFETY IN USE

- Grade 0: No defined safety performance
- Grade 1: Satisfies the safety in use requirements contained in the “Construction Products Directive” issued by the EU.

DIGIT 6 - CORROSION RESISTANCE

Five corrosion grades are identified in accordance with BS EN1670:

- Grade 0 - No defined corrosion resistance
- Grade 1 - Mild resistance
- Grade 2 - Moderate resistance

- Grade 3 - High resistance
- Grade 4 - Very high resistance.

DIGIT 7 - SECURITY - BURGLAR-RÉSISTANCE

Two grades of security are identified for hinges manufactured to this European Standard.

- Grade 0: not suitable for use on burglar-resistant door assemblies;
- Grade I: suitable for use on burglar-resistant door assemblies, subject to satisfactory assessment of the contribution of the hinges to the burglar resistance of specified burglar-resistant door assemblies. Such assessment is beyond the scope of this European Standard.

DIGIT 8 - HINGE GRADE

Fourteen grades of hinge are identified in this European Standard, as listed in Table 1

Table 1 – Classification Summary

First Digit			Second Digit		Third Digit		Fourth Digit	Fifth Digit	Sixth Digit	Seventh Digit	Eight Digit
Category of use			Durability test Cycles		Test door mass		Fire/smoke suitability	Safety	Corrosion resistance	Security	Hinge grade
Duty	Grade	For use on	Grade	Number of test cycles	Grade	Mass	Grades Available	Grades Available	Grades Available	Grades Available	Grades
Light	1	Window	3	10 000	0	10	0 or 1	1	0,1,2,3,4	0 or 1	1
Light	1	Window	3	10 000	1	20	0 or 1	1	0,1,2,3,4	0 or 1	2
Light	1	Door or Window	4	25 000	1	20	0 or 1	1	0,1,2,3,4	0 or 1	3
Medium	2	Door	7	200 000	1	20	0 or 1	1	0,1,2,3,4	0 or 1	4
Light	1	Window	3	10 000	2	40	0 or 1	1	0,1,2,3,4	0 or 1	5
Light	1	Door or Window	4	25 000	2	40	0 or 1	1	0,1,2,3,4	0 or 1	6
Medium	2	Door	7	200 000	2	40	0 or 1	1	0,1,2,3,4	0 or 1	7
Light	1	Window	3	10 000	3	60	0 or 1	1	0,1,2,3,4	0 or 1	8
Light	1	Door or Window	4	25 000	3	60	0 or 1	1	0,1,2,3,4	0 or 1	9
Medium	2	Door	7	200 000	3	60	0 or 1	1	0,1,2,3,4	0 or 1	10
Heavy	3	Door	7	200 000	4	80	0 or 1	1	0,1,2,3,4	0 or 1	11
Severe	4	Door	7	200 000	5	100	0 or 1	1	0,1,2,3,4	0 or 1	12
Severe	4	Door	7	200 000	6	120	0 or 1	1	0,1,2,3,4	0 or 1	13
Severe	4	Door	7	200 000	7	160	0 or 1	1	0,1,2,3,4	0 or 1	14

Additional requirements for hinges intended for use on fire doors.

It shall not be possible to remove the hinge pin or separate the hinge element of the door assembly without the use of special tools

Hinges interrupt the leaf edge and frame gap, and their fastenings penetrate the leaf. The influence that this may have on the smoke-control properties of an assembly can only be determined by subjecting a full-sized assembly fitted with the hinges to the appropriate fire test.

Hinges for doors fitted with door closers

Door closers increase the loading on door hinges and their rate of wear. For closers without back-check it is normal to allow for this by assuming the effective door mass to be 20 % greater than the actual door mass. For back-check closers the effect is much greater, and the effective door mass is calculated to be 75 % greater.

Timber doors fitted with door closers should normally use three or more hinges.

Door manufacturers may recommend the use of only two hinges under special conditions, if experience allows demonstrating adequate performance of the door.

Door closers which include hold-open devices or a back-check facility can impose substantially increased stresses on hinges and their fastenings. Hinges of grade 12, 13 or 14 should be used with such closers. If three hinges are used the third hinge should be fitted approximately 200 mm below the top hinge, in which position it supports some of the additional outward bending moment exerted on the top hinge. Substantial fastenings are recommended for both hinges and closers in such situations to prevent loosening of the fastenings and possible damage to the door or frame as a consequence of such loosening.

The maximum closing torque that can be exerted by a door closer is limited and varies according to the size and the mounting mode of the door closer. For this reason it is important that hinges used with doors fitted with door closers should not generate excessive frictional torque.

It is recommended that the maximum in-service torque for a set of two, three or more hinges when installed on such doors should be 3 Nm for grades 1 to 7, 4 Nm for grades 8 to 11, and 5 Nm for grades 12 to 14. Hinges for such applications should be carefully selected.