Standards in Security Shutters & Fire Shutters
(UK & USA)

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For UKRS Ltd
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Definitions

Standard – Where the term ‘standard’ is used, this refers to a published document; and is never used here as it might commonly be used, i.e., when speaking of judgement about the level of some thing or behaviour, etc.

Preface

1. Although fire rated products are exempt from the safety standards listed here for the UK and the USA, in order to be exempt, Fire rated products must instead adhere to a fire protection standard. That is, all products must follow either a safety standard, or, a choice from several fire protection test standards. In effect, a shutter is either fire rated, or, is marked to indicate that it is manufactured for safe operation.

2. The safety standard for doors and shutters is written so as to include the safety standard for gates. This is so in both the UK and USA. Gates are not discussed in the present document.
1. Roller Shutter Safety Standards
1.1 Roller Shutter Safety Standards - UK

Standard:

Description:
Industrial, commercial, garage doors and gates. Product standard, performance characteristics

Publication date:
July 2003

Created by:
European Commission and European Committee for Standardisation

Published by:
British Standards Institute (in the UK)

Legal Status:
Mandatory in UK and the whole European Economic Area

Enforcement agency:
Health and Safety Executive (HSE), department of UK Government

Powers of the Enforcement Agency:
Prosecution, withdrawal of approvals, provide information, power to enter premises without notice for examination

Applies to:
All shutters, gates, doors, excluding fire protection products

Parent Directive:
Machinery Directive (2006/42/EC);
Construction Products Regulation (305/2011)
Construction Products Directive (89/106/EEC)
Low Voltage Directive (2014/35/EU)
Electromagnetic Compatibility Directive (2014/30/EU)

General Description:
The standard EN 13241-1 has the status of law in the UK based on the European Directive on Construction Products which states that, where a harmonised standard exists for a certain construction product, then its provisions will be followed by manufacturers when making those products. EN 13241-1 is a harmonised standard for doors and gates.

Are tests required:
Initial type testing to determine the values is mandatory, except where the manufacturing organisation is limited in size (to be proven by number of employees, or turnover per annum). Testing should also be done of the entire door/shutter system as a whole. E.g., the door should be fitted with a safety brake, and a safety edge (as an example), and both of these things then tested. But, where a brake or edge has been tested previously by the original manufacturer, it is possible for the assembler of the door to claim the test results of the brake/edge as their own, which is referred
to as the test results ‘cascading’ down to the secondary manufacturer. These provisions are included in the Construction Products Regulation, in part in order to avoid excessive amounts of testing by numerous manufacturers, yielding the exact same result.

**Interpretation:**
The BS EN standard is both legal in all EU countries, and is more comprehensive than the US document. This can be seen from the list of values and results of tests which must be displayed on the CE mark. Not all of the tests must be performed, some are voluntary. But, the standard does state their importance. The following list of tests, with their respective test results, will be shown on the CE mark:

- Watertightness
- Release of dangerous substances
- Resistance to wind load – to be listed as a wind class
- Thermal resistance (where relevant)
- Air permeability
- Safe opening (for vertically moving doors) – which respects anti-fall back devices, i.e., safety brakes
- Definition of geometry of glass components
- Mechanical resistance and stability – so that impacts or damage to it will not affect its safe operation
- Operating forces (for power operated doors) – regarding crushing and shearing of the door leading edge (i.e., safety edge or similar device)
- Durability of watertightness, thermal resistance and air permeability against degradation

Mandatory: resistance to wind load, safe opening, mechanical resistance and operating forces; the others are voluntary.

The standard gives precise instructions for how to calculate thermal resistance (U Value) and wind loading (in Classes) in Annexes. Where other test results are required, the standard makes reference to the applicable sub-standard assigned to the test method to be employed.

Like the Machinery Directive, the standard insists on factory production control and traceability of each manufactured product, and also, installation instructions, along with levels of quality management which are good practice in the industry.
1.2 Roller Shutter Safety Standards - USA

Standard:
UL 325

Description:
Standard for Safety for Door, Drapery, Gate, Louver, and Window Operators and Systems

Publication Date:
1993, (revised 2010)

Created by:
Underwriters Laboratories (UL)

Published by:
Underwriters Laboratories (UL)

Legal Status:
Mandatory only in states which have adopted it.

Enforcement agency:
Consumer Product Safety Commission (CPSC), department of the US Federal Government

Powers of the enforcement agency:
Banning dangerous products, establishing requirements for safety, issue product recalls, researching potential hazards

Applies to:
All shutters, gates, doors, excluding fire protection products

Parent Directive:
NA.
However, Consumer Product Safety Improvement Act of 1990 (“Improvement Act”), Public Law 101-608, and Code of Federal Regulations documents are closely related to it, and draw from it.

General Description:
The UL 325 is concerned with gates, doors, shutters, windows, and folding louvres. It is used as a reference in the Code of Federal Regulations as a reference document. Although UL 325 is not a legally mandated document, it is treated by the US Federal Government as if it were such, and its provisions are generally adopted in US Government documents (such as 16 CFR Part 1211). A number of the states of the US have adopted it. UL 325 focuses particularly on devices which control doors / shutters, rather than the shutter or door itself; this contrasts with the European equivalent standard, which gives requirements for the stability, uncontrolled descent, weatherproof quality, etc. of the door. When concerned with gates, the UL 325 standard lays out requirements for gates in different types of location: it sets out levels of safety, depending on how close to the general public and vulnerable individuals it will be installed. When dealing with shutters and doors, there are two main distinctions or classes: residential or commercial shutters and doors.

Product marking:
UL, declared by manufacturer / installer
Are tests required:
Third party testing is required in order to claim conformity to the standard.

Broadly interpreted:
UL 325 contains the basic qualifying factors with which products must comply in order to be listed and labelled under the requirements of the UL 325 voluntary listing and labelling program. It provides a description of the methods for testing products for safety. It covers the installation of products under the requirements of the National Electrical Code. It addresses fire and electrical safety, as well as safety of the public.

16 CFR (Code of Federal Regulations) Part 1211 can be read online – while UL 325 is difficult to buy or read at all. However, 16 CFR Part 1211 makes frequent reference to UL 325, and can be considered an interpretation of UL 325. Primarily focused on anti-entrapment – considered to be the chief danger associated with garage doors and shutters and gates – it requires the shutter to be manufactured with safety sensors as the primary method of protecting against entrapment. Generally, two sensors are required, a primary and secondary (see below). UL 325 also requires shutters to bear signs, requires careful location of push buttons, and guards.

The standard describes four types of use of a gate, defined as Classes (I-IV). Gates makes up a large part of the text of UL 325, but are outside of the area of interest of this report.

Further, the standard stipulates which kind of safety level is required for different applications of shutters, distinguishing between commercial and residential locations and specifying a different approach to safety for each type. Generally, commercial doors have different and lower safety levels for doors.

1. A garage door opener or residential shutter must have: inherent entrapment protection as primary entrapment protection; this means, the door must have built in obstacle detection (a safety edge built into the door, for example, or a motor which senses decrease in power when an obstacle is in its way). In addition, secondary protection, either external (such as a PEC sensor) or a secondary inherent protection. It must also have a 30 second maximum run timer for all domestic garage doors.
2. Commercial / Industrial doors must have: a monitored safety device for impulse-operated or remotely controlled shutter (i.e., any shutter which is not dead-man operated). It must be monitored – which means that if the safety device is removed or damaged, the door will not close correctly. It will revert to a restricted close mode, where the close button must be held and there will be a 5 second delay before it begins moving (i.e., it will revert to dead man operation if the safety edge or motor monitor is defective).

The following information will be displayed on the UL mark: manufacturer, date, serial number for traceability. Also, a notice: “Warning: Risk of Entrapment.” In addition, notes about obstacle detection and reverse travel of door if it touches anything must be shown on the shutter.
2. Fire Shutter / Curtain Standards
2.1 Fire Shutter / Curtain Standards - UK

BS EN 1634-1:2008, Part 1

Fire rating tests for fire rolling shutters are done according to BS EN 1634-1:2008, Part 1, which is a European standard adopted by the British Standards Institute. (UKRS Fire Shutter test was carried out to this standard). The full title is:


As can be seen, Part 1 is applicable to the test for fire resistance. Part 3 of the standard deals with smoke resistance. Part 1 details how the test will be carried out, and goes into details about specific things to monitor and for the test house to pay attention to. A manufacturing / installation organisation should declare clearly which part of the standard has been applied in the test (in a simple fire shutter test, this will be Part 1).

BS 476-22: 1987, Clause 8

To further work out the fire resistance of the metal slats and barrels which will be used on larger shutters (sizes not physically tested) an engineering document was referred to in order to infer fire resistance of larger steel elements. BS 476-22 states that the maximum size sample shall be tested in the furnace in a particular way. It also implies that an assessment of larger sizes than were actually tested can be made.

E.g., from Appendix A 2.2

‘For very large doors it is likely that a different type of construction would be employed in order to increase the resistance to distortion either during normal use or during fire exposure. Such constructions should be the subject of a separate evaluation.’

The standard used when estimating (but not physically testing a shutter) is:


Tests of fire resistance and smoke control can be carried out by reference to other standards, but they must be accepted in the UK in order fully to comply with building regulations. The standard should have the BS prefix.

Other Methods and factors:

1. Other test standards
2. Building regulations and fire shutters
1. Other test standards employed by installation / manufacturing organisations:


2. Building Regulations and Fire Shutters [?]
2.2 Fire Shutter / Curtain Standards – USA

There are several UL fire protection standards. The standards apply to different types of product, and to different types of protection.

UL standard GSNV is applicable to Fire Doors. The following falls under the category GSNV - Fire Doors:

Access, bullet-resisting, chute, curtain, dumbwaiter, freight elevator, passenger elevator, rolling steel, service counter, sliding, special purpose, swinging, and swinging, positive-pressure-tested doors.


Generally, UL tests a product, which allows it to be listed as compliant with the appropriate standard; it can then be marked with the UL mark.

Products Rating:

The GSNV category contains the following which is applicable to fire rated roller shutters:

OPBW – Leakage-rated Door Assemblies
This category covers leakage-rated door assemblies, which consist of combinations of the following individual component products: door, frame, hardware, gasketing and other door accessories. The door assemblies covered under this category are certified for use with other certified component products.

GSVV - [Fire Doors] Rolling Steel Fire Doors
This category covers rolling steel fire doors, which consist of interlocking galvanized or stainless steel slats, bottom bar, wall guides, barrel assembly, automatic-release device, governor, and counterbalance mechanism. The doors may be provided with a motor-drive assembly that does not interfere with the manual or automatic ( fusible link, other fixed-temperature release, or a rate-of-rise temperature release) closing of the door.

Installation Requirements:

The following non-UL standards are also applicable, and are standards for Installation:

NFPA 80 - standard for Fire Doors and Other Opening Protectives
NFPA 105 – standard for Smoke Door Assemblies and Other Opening Protectives
**NFPA 80 is the Standard for Fire Doors and Other Opening Protectives.** It regulates the installation and maintenance of assemblies and devices used to protect openings in walls, floors, and ceilings against the spread of fire and smoke within, into, or out of buildings. The standard addresses assemblies that have been subjected to standardized fire tests, including UL fire tests.

**NFPA 105 is the Standard for Smoke Door Assemblies and Other Opening Protectives.** It includes requirements for smoke door assemblies to restrict the movement of smoke through door assemblies in order to maintain a tenable environment. It does this by regulating the installation, maintenance, and testing of smoke door assemblies. It is applicable to smoke door assemblies that restrict the passage of smoke at temperatures up to 400°F (204°C). NFPA 105 includes requirements for the testing, installation and maintenance of smoke door assemblies. This covers topics such as operability, replacement, repairs, annual inspections, prevention of door blockage and maintenance of closure mechanism. Smoke door assemblies that are intended for use as fire door assemblies are also required to comply with NFPA 80. Doors without fire protection ratings are permitted to be used as smoke doors in door openings not required to be protected by fire doors.
References:

BS 476-22:1987 *Incorporating Corrigendum No. 1*


BS EN 1634-1:2014

NFPA 80-2016 *Edition  Standard for Fire Doors and Other Opening Protectives*