Abbreviations

We give below a list of abbreviations commonly used in architectural ironmongery. We do not claim this to be a complete list, but covers those most widely used in the industry.

A Ampere
AA Anodised Aluminium
AB Art Black
ABR Antique Brass
AC Alternating Current
ACW Anti Clockwise
ANSI American National Standards Institute
BA Bronze Anodised/Black Antique
BB Ball Bearing/Bright Brass
BHMA Builders Hardware Manufacturers Association
BJP Black Japanned
BMA Bronze Metal Antique (see also IBMA and RBMA)
BN Black Nickel
BNP Bright Nickel Plated
BRZ Bronze
BS British Standard
BSEN European Standard (Adopted)
BSS Brushed Stainless Steel
BZP Bright Zinc Plated
c/c Centre to Centre
CC Colour Coated
CE European Conformity
CK Common Key
cm Centimetre
CSK Countersunk
CW Clockwise
DC Direct Current
DIN German Institute for Standardisation
(Deutsches Institut für Normung)
D&T Drilled & Tapped
EB Electro Brass
EG Electro Galvanized
FD Fire Door
GAI The Guild of Architectural Ironmongers
GLD Gold
GLV Galvanized
GMK Grand Master Key
IBMA Imitation Bronze Metal Antique
ISO International Organisation for Standardisation
KA Keyed Alike
KD Keyed to Differ
kg Kilogram
LH Left Hand
m Metre
mm Millimetre
MAA Matt Anodised Aluminium
MK Master Key
MNP Matt Nickel Plated
PAA Polished Anodised Aluminium
PB Polished Brass
PBZ Polished Bronze
PCP Polished Chrome Plated
PNP Polished Nickel Plated
PSS Polished Stainless Steel
PVD Physical Vapour Deposition
RBMA Real Bronze Metal Antique
RBZ Rustic Bronze
RH Right Hand
SA Self Adhesive
SAA Silver/Satin Anodised Aluminium
SB Satin Brass
SC Self Colour
SCP Satin Chrome Plated
SMK Sub Master Key
SNP Satin Nickel Plated
SS Stainless Steel
SSS Satin Stainless Steel
SZP Satin Zinc Plated
UL Underwriters Laboratories (USA)
V Volt
W Watt
YP Yellow Passivated
ZP Zinc Plated
Glossary of Terms

We give below, and right, a list of terms commonly used in architectural ironmongery. This is by no means a complete list. Should you require a more detailed list, please consult the Lock Industry Standards and Training Council website www.locksoft.com/glosscopy.htm or consult British Standards BS 6100 - Glossary of Building and Civil Engineering Terms: Sections 136/5 and 136/6.

ACTIVE LEAF - Single door of a pair on which the active or locking hardware is mounted.

ASTRAGAL - A moulding or strip attached to the active leaf of a pair of doors and overlapping the inactive leaf.

AUTOMATIC FLUSH BOLT - Flush bolts designed to extend themselves when both leaves of a pair of doors are in the closed position (normally supplied in pairs).

BACKCHECK - The resistance provided by a door closer as the door is opened.

BACKSET - Distance between the centre of the keyway (or latch follower) and the bolt edge of door.

BATHROOM LOCK - A lock that has a latch bolt operated by lever handles or knobs from both sides, and a deadbolt operated by thumbturn on the inside only, with an emergency release on the outside (with or without indicator). The follower may be 5 or 8mm square.

BI-FOLD SYSTEM - A support system for 2 panels folding to one side of an opening, also used as a generic term for any folding door gear.

BI-PARTING DOORS - A term to describe a pair of sliding doors that meet in the centre of an opening and then open to opposite sides.

BOLT - Movable part of a lock or latch that usually engages a component fixed to the frame (i.e. box strike) that is capable of being withdrawn into the case.

BOTTOM ROLLING - Either a sliding or folding system where the weight of the doors is supported on bottom rollers.

BOX STRIKE - Strike plate equipped to line the bolt cavity for both aesthetic and protective purposes.

CASE - Part of the lock or latch in which the mechanism is housed.

CENTRES - Distance between the centre of the follower and the centre of the key way, whether cylinder or standard.

CLAWBOLT - A bolt with one or more fingers, which extend out of the bolt/lock, behind the strike plate, as the bolt reaches the locked position. Used mainly on sliding and sliding folding doors.

CLAWBOLT LOCK - A deadlock with a spreading bolt designed specifically for sliding doors.

CLEAR OPENING - A portal providing clearance through which passage is unhindered.

CLEAR THRESHOLD GUIDING - A floor or wall mounted system for top hung sliding doors that does not intrude into the walkthrough area. Only suitable for doors up to 1500mm wide.

CLOSER OPENING - A numerical value related to the applied closing force of the door closer. The larger the number the greater the force.

CONTINUOUS GUIDING - System used for large or frequently operated sliding doors to guide it at the bottom. A floor mounted channel is used with a pair of guides on the bottom of the door.

COORDINATOR - Used in conjunction with a pair of self closing rebated doors, a device designed to cause the inactive leaf to close first.

CYLINDER - A device, usually separate from, but engaging with its associated lock or latch, that contains the differs.

CYLINDER LATCH - A latch in which the latch action is operated by one or more cylinders.

CYLINDER LOCK - A lock in which the lock mechanism is operated by one or more cylinders.

CYLINDER NIGHTLATCH - A nightlatch that is operated by the rotation of a key in a cylinder.

DEADBOLT - A bolt which requires a deliberate action to extend, usually by key or turn, and which resists end pressure when extended.

DEADLOCK - A lock that contains only a deadbolt.

DELAYED ACTION - Normally applied to a door closer, whereby a time lapse can be preset before closing takes place.

DIFFER - Variations between mechanism combinations in locks, or cylinders, of similar design which allows each lock, or cylinder, to be operated by its own key and, in certain circumstances by a master key.

DOGging DEVICE - In an exit device, a mechanism used temporarily to disable the device from relocking.

DOOR CONTROL - Any device which controls the opening, closing and position of a door.

DUPLICATE KEY - Any key reproduced from a pattern key.

ESCUTCHEON - A surface trim which enhances the appearance and/or security of the lock installation.

FACEPLATE - The finished, often removable plate, which covers the front of a lock case.

FOLLOWER - Part of the latch action that withdraws the latch bolt, operated by levers or knobs via the spindle.

FOREND - Part of the lock case through which the bolt(s) protrude. May be fixed or separate (see also 'Faceplate').

FREESWING - This term applies to an electrically operated door closer, that allows the door to operate without pressure, but automatically close in the event of the activation of the fire/smoke alarm.

GLASS CLAMP - A system normally used on top hung frameless glass doors to attach the sliding mechanism to the panel.
Glossary of Terms

GLASS PREPARATION - A term to describe any holes or notches that must be made on a glass panel before toughening to allow profiles, patches or other hardware to be fitted.

GLASS PROFILE - Normally an aluminium length of metal fitted to the top and bottom of a glass panel to allow sliding systems to be attached.

GUIDING - A term used to describe the system used on all sliding and folding systems that allows the doors to move smoothly and prevents lateral movement.

HANDING - The way in which a door or article of ironmongery will be operated. The various methods of describing these are shown in the preface pages of this catalogue on page 12.

HOLDBACK - Function in some self-locking latches to enable the bolt to be held in the retained position. This may be achieved by snib or a reverse turn of a cylinder.

HOLD OPEN - A door closer with the capability of maintaining the door in the open position (not to be used on fire/smoke doors).

INFRONT - A sliding system where the doors and sliding mechanism are installed inside a cabinet.

KEEP - A component, usually, of a rim lock or latch, fixed on to the frame to engage a bolt or bolts.

KEYSWITCH - A switch operated by a keyed lock mechanism, which may be an integral part of the switch assembly.

KNOBSET - Also called a 'bored lock set' or 'bored latch set'. A fastener that comprises an integral assembly of door furniture with a tubular lock or latch...

LATCH - A fastener, self engaging and usually operable from the frame to engage a bolt or bolts.

LATCH ACTION - Arrangement and performance of the constituent parts that operate a latch bolt.

LATCHING SPEED - The final closing speed of a door just prior to closing, usually determined by the door closing device.

LOCK - A fastener that combines in one case a latch bolt operated by handles and a deadbolt operated by a key or other device, mortise or rim. Also known as a sashlock, upright or horizontal mortise lock.

MIXFRONT - A sliding system where the panel overlays at the top and is inset at the bottom or vice versa.

MULTI-POINT LOCK - A lock that has a latch bolt and a number of other bolts positioned remote from, but connected to a lock case.

MUSHROOM PIN - A pin tumbler within a cylinder, usually the top pin, which resembles a mushroom. It is typically used to increase the pick resistance.

NIGHTLATCH - A latch operated with a latch bolt that is operated internally by a handle/turn and by a key externally. Rim or mortise versions are available.

NON-HANDED - Pertaining to hardware that is manufactured in such a way that it will suit any configuration of the door without or very little adjustment.

PARALLEL ARM - A type of door closer that is mounted in such a way that leaves the arm parallel to the door face. This is normally on the push side of the door.

PARKING AREA - A term used to describe the space where doors on a slide stack system move into when opened.

PATCH FITTING - A small mechanical fixing for glass doors to allow clamps or pivots to be attached.

PIVOT SLIDING SYSTEM - A mechanism used for cabinet doors that allows a door to pivot and then slide back into the cabinet.

PLANFRONT MOVEMENT - A sliding option for cabinet and full size doors that allows a door to slide from behind a fixed panel and close next to it.

POCKET DOOR - A sliding door that slides into a pocket or cavity so the doors appears to disappear into the wall.

REBATED DOOR - A door having an edge contoured with an offset, creating two surfaces which form an overlap at their butting edge. When used in pairs any lock fitted must have components to suit this situation.

SASHLOCK - A lock that has a latch bolt, operated by levers or knobs and a deadbolt operated by key or cylinder.

SIDE FIXED TRACK - Top track of a sliding or folding system mounted directly onto a wall.

SLIDING SHUTTERS - Window shutters on a top hung straight sliding system used to optimise solar gain and minimise solar overheating.

SLIDE STACK SYSTEM - A top hung system for multiple sliding panels which create a flush partition and can then be moved individually to a parking area clear of the opening.

SOFFIT FIXED TRACK - Top track of a sliding or folding system which is mounted directly to a support in the ceiling.

SPLIT SPINDLE - A multi-piece spindle, which allows a pair of levers or knobs to be installed on one side of a door, and be operated independently of the other (requires special split follower locks).

STRIKE PLATE - A component, usually of a mortise lock or latch, fixed to the frame to engage a bolt or bolts (see also box strike).

SYMmetric SLIDING SYSTEM - A mechanism that links a pair of bi-parting panels to allow them to open simultaneously.

TELESCOPIC SLIDING DOORS - A mechanism that links two or more sliding doors and allows them to slide from the same side simultaneously to rest in a staggered position across the opening.

THROW - The distance that a lock bolt will protrude from the face of the lock when fully extended (usually given as the deadbolt).

TOP HUNG - A term to describe a sliding or folding system where the weight is supported by trolley hangers at the top of the door.

VORFRONT - A sliding system where the panel overlays a cabinet at the top and the bottom.
Hinges

All hinges must be adequate for purpose and must be fitted accurately, so that all hinge pins are in vertical alignment. Most of the hinges in this catalogue (Section 3) are graded according to BS EN 1935: 2002 and if in doubt, refer to the standards summary on pages 29-30. Hinges are usually supplied dry by the manufacturers and should be lubricated immediately after installation. However, typically in the case of ball bearing type hinges the manufacturers will insert an amount of grease/lubricant at the time of manufacture. The recommendation is, as part of a building maintenance programme, that the hinges be checked, cleaned and lubricated periodically with a light machine oil (eg: 3-in-1 oil) - to maintain hinge efficiency, prolong the life of the product and to maintain aesthetic value. Exceptions are classed as maintenance free. The exception for special situations, such as dusty locations, where a mixture of oil and grit can act as a grinding paste, or public toilet areas, which are subject to hosing down or washing with detergent, which will remove the oil. Such situations require specialist dry film lubricants.

Hinges should be checked regularly for wear, loose screws etc.. Squeaking hinges are a sign of lack of lubrication, but frequent occurrence is a sign of misalignment, and should be rectified immediately.

Failure to fix correctly or maintained inappropriately could invalidate any guarantee supplied by the manufacturer.

Door closers

All door closers must be adequate for purpose and must be fitted in accordance with the manufacturer’s instructions.

All the overhead closers in this catalogue are rated according to BS EN 1154/5 (see pages 20-22) and the correct closer for the door must be fitted and adjusted properly. Failure to comply will invalidate the manufacturer’s guarantee.

At least once a year the closer should be checked for wear, ensuring that the fixing screws are properly secure and any worn component replaced. The moving parts on the link arms should be greased. The closer settings must be checked to ensure smooth operation.

Only cleaning agents not containing corrosive and damaging components should be used.

It is also recommended that door stops be fitted, where practicable, to all doors with door closers, even if there is a backcheck within the closer.

Floor springs

The floor spring must be of a type suitable for the door it is to be fitted to, ensuring that there is no strain on the mechanical parts. If in doubt, see BS EN 1154/5 pages 20-22 for details. The spring must be fitted to the manufacturer’s instructions and the pivot centres must be perfectly vertical. At least once a year the spring should be checked for correct closing speed, latching action etc.. The top centres should be checked and greased. Any damaged item should be replaced.

It is also recommended that door stops be fitted, where practicable, to all doors with floor springs, even if there is a backcheck within the floor spring.

Electro-magnetic closers and static devices

Any electrical hold-open device must be checked on a weekly basis.

Locks and latches

The correct operation of a lock or latch, assuming that it has been fitted correctly, is often affected by movement of the door and/or frame occurring perhaps due to distortion influenced by climatic conditions or wear on hinges or pivots inducing door drop.

The usual effect from these conditions is inability of the latch and deadbolts to easily engage the striking plate or keep, requiring an adjustment to their position on the frame, or an adjustment to the lip of the strike plate may be necessary to provide a more favourable striking angle.

Freedom of operation of the latch action in conjunction with the strike plate or keep is particularly important when the door is fitted with a door closing device and also, of course, on fire doors.

It is important that the holes in the frame behind the strike plates are deep enough (does not apply to strikes with back boxes), and are free from foreign matter, to ensure unrestricted movement of the bolt or bolts. Lubrication, when required in the context of free latching of a door, need only be applied to the sides and striking face of the latch bolt.

Pin tumbler and disc cylinders (see Section 2 page 95) should be lubricated with either flake graphite or a PTFE lubricant.

Lever handles, knob furniture and pull handles

These should be checked periodically for secure fixing. Many problems occur where the incorrect wood screws are installed and where the material to which the products are fixed is unsuitable. It is also important to check that the lever or knob fully retracts the
Care and Maintenance of Ironmongery

**Sliding door gear**
All tracks and channels must be straight and level with fittings adequate for the weight, size and usage of the doors installed plumb. External door gear may require a protective coating to combat corrosion. All floor channels and bottom tracks should be cleared of debris to allow unimpeded travel of the guides or rollers.

**Emergency and panic exit hardware**
All these products must be fitted according to the manufacturer’s instructions and must comply with either BS EN 179 or BS EN 1125 (see pages 17-20). Failure to do this could mean that the device will not be covered by the manufacturer’s guarantee or work correctly. It is vital that all emergency and panic exit devices are inspected and maintained properly to ensure safety is maintained when exiting a building in any situation.

To ensure these devices are functioning correctly, it is recommended that a weekly inspection is made to check for damage/operation and that the keeps are kept free of any obstruction, especially the floor socket. Then every three months, a check should be made to ensure all fixings are secure and that all the units are lubricated where necessary.

**Care of finishes**
Because the majority of surface coatings are applied by fairly complex high volume production processes, it is not usually possible to reproduce the finishing conditions outside the factory. This means that repair or reconditioning of a damaged finish is rarely possible, unless the component can be disassembled and returned to the factory for reprocessing on the production line - not a generally practised proposition. The implication, therefore, for long term durability of a finish is that prevention of unnecessary corrosion is better than attempting a cure.

Atmospheric deposits of dust and grime are the major causes of premature deterioration of the surface coatings because of the wide variety of chemical pollutants in the atmosphere. When such chemicals become damp, they often initiate local attack, generally in the form of pitting on the surface finish. Dampness can rarely be prevented but dust and grime can usually be removed by regular attention such as dusting with a dry cloth or by washing neglected surfaces with clean or soapy water. Little and often should be the rule, avoiding the use of even the mildest abrasives.

The application of wax or silicone polishes can be beneficial because of the barrier layer created between surface finish and atmospheric deposits.

**Aluminium**
Anodised aluminium should be washed periodically with a weak detergent solution and occasionally wiped with wax polish.

**Stainless steel**
Stainless steel basically requires no looking after. Smudges can be removed with a damp cloth. Regular dusting, occasional washing with warm water, with or without a gentle detergent, and dried with a soft cloth is mostly all that will be required, or secondly mild non-scratching abrasive powders, such as typical household cleaners. These can be used with warm water, bristle brushes, sponges or clean cloths. However, outdoor fittings and those at chlorinated pools etc. can develop what is known as ‘flash rust’ after a while. This is not generated from within the metal itself and can be removed by vigorous rubbing. Avoid acid or chlorine based cleaning products.

**Nylon**
Nylon is a non-porous material and the smooth surfaces do not attract dust. Appearance can be maintained by wiping with a damp cloth.

**Unlacquered brass**
Natural unlacquered brass should be polished from time to time with a proprietary brass cleaner, or left to acquire the natural patina of brass.

**Lacquered brass**
Lacquered finishes should be cleaned by the occasional application of a coating of wax polish. Eventually the lacquer will become damaged and break down. (The time scale will depend on the quality of lacquer applied by the manufacturer). When this occurs all traces of the lacquer should be removed using acetate lacquer remover or water washable paint remover (i.e. Nitromors). The product may then be relacquered or cleaned as unlacquered brass.

**Bronze**
Bronze finishes should be periodically washed in warm soapy water. They should then be treated with a sparing amount of wax or furniture polish.

**Stove enamelled**
These finishes should be wiped with a soft cloth.

**Electro-plated**
Electro-plated and electrophoretic finishes should be wiped clean with soapy water and a soft cloth and wiped dry.

**Nickel and chrome**
Nickel and chrome finishes should be washed periodically with a weak detergent solution and rubbed occasionally with paraffin or light oil on a cloth.

**P.V.D. (Physical Vapour Deposition)**
P.V.D. should be wiped over with a damp cloth or use a general furniture polish.

Care of finishes: Text re-printed with kind permission of the Door and Hardware Federation.
The Disability Discrimination Act requires that the following should not discriminate against disabled people.

a) Employers

Since December 1996 employers with fifteen or more employees in total were affected, regardless of the size of the workplace or its branches. From 1st October 2004 the Act encompassed employers, regardless of size, whilst additionally offering some protection to people seeking to access work.

An employer has a duty to ‘take such steps as is reasonable’ in order to prevent an arrangement or physical feature having a discriminatory effect and to avoid placing persons with a disability at a greater disadvantage to others. Employment adjustments do not have to be anticipated or made for the disabled population at large.

b) Service providers and sellers or letters of land and property

In the case of service providers reasonable adjustments need to be anticipated and may have to be made for the disabled population at large. This affects all service providers, whether free or paid for and regardless of organisation size. As from 1st October 2004 some physical features may require to be altered.

The term ‘services’ covers the provision of goods (goods in a store and facilities or conference suite hire). Services which are provided free (access to parks or in return of payment i.e. restaurant meals) are also covered.

Where a service provider may have to make reasonable adjustments to the physical features in their premises to be able to overcome any barriers to access, the physical features are described as:-

- Any feature arising from the design or construction of a building on the premises occupied by the service provider
- Any feature on those premises or any approach to, exit or access to such a building
- Any fixture, fitting, furnishing, furniture, equipment or materials in or on such premises
- Any other physical element or quality of land comprised in the premises occupied by the service provider

The reasonable adjustments may be :-

- Removal of feature
- Alteration to the feature
- Provide means of avoiding the feature
- Provide the service by an alternate means

The Act does not require the service provider to adopt one way rather than another way of meeting the obligations. The focus is on results. Should there be a physical barrier, the service provider’s aim must be to make its services accessible to disabled people.

The important point is that the aim is achieved, rather than how. If a service remains inaccessible, then the service provider may have to justify its decision.

The DDA relates to all service providers and all buildings, existing or new.

Since the DDA became law it has come into force progressively and the final stage was implemented on 1st October 2004 and as from this date applies to all ‘service providers’ and ‘employers’.

The Disability Discrimination Act requires that both service provider and employer shall not discriminate against disabled persons by treating any less favourably than an able-bodied person. It requires that ‘reasonable adjustments’ be made to any physical features of the building or that the service is provided by alternative means.

Having buildings and their facilities designed to ‘best practice design standards’ may reduce the risk of the employers or service providers receiving claims for discrimination from individuals and/or employees, but there are no guarantees.

This is an ‘enabling act’ which will allow people who feel discriminated against to seek redress through the courts. It is not possible for an architect, designer or contractor to be sued directly under this Act as it is not prescriptive.


BS 8300, published in 2001, contains many prescriptive requirements that effect ironmongery that includes dimensional drawings for lever handles, forces for door closers, handrail design and detail of disabled toilets as well as minimum door widths.

Approved Document ‘M’ came into effect on 1st May 2004 and gives the minimum standard for access provision. Titled “Access to and use of buildings” it is aimed at a more inclusive approach to design. The regulations affect all new buildings and extensions to existing buildings and include effective clear door widths, the use and position of vision panels, visual contrast of the door area, opening forces created by door closing devices, doors that are manually and automatically operated and the layouts and components in WCs and bathrooms, among others.

As BS 8300 was written before AD ‘M’, some sections offer differing guidance to that of AD ‘M’. The necessary amendments have been made to the Standard, which are now incorporated into “Technical Memorandum for AD ‘M’ “, published by the Office of the Deputy Prime Minister.
The updated amendments to BS 8300 and the technical memorandum relating to AD 'M' that effect the correct specification, installation and maintenance of architectural ironmongery and associated products on accessible routes in non-domestic premises in England and Wales.

A brief outline of the requirements that affect the specification of items which relate to architectural ironmongery and allied products, are as follows:

1) Locks and latches
All lock cases should have either of the following:-
- 72mm centres
- The cylinder should be fitted above the lever handle
- On bathroom and privacy functions, the release turn should be large enough to be able to operate easily
All lock cases should have a backset of no less than 54mm
Latches should perform better than the lowest resistance class of BS EN 12209 (15N).
High performance latches are available which contribute less than 5N resistance to closing.

2) Lever furniture
A minimum diameter of 19mm is required, but does not have to be round in section. The handle should be operable without having to fully grip the handle, have a minimum of 95mm inside dimension between the shank and the return and a minimum of 45mm clearance behind the grip to the door face, excluding roses or plates. Return to door lever handles are not necessary but recommended.

3) Pull handles
The handle should have a minimum clearance of 45mm from behind the grip to the face of the door or the backing plate. The diameter of the handle should be between 19 and 35mm and at least 400mm in length. To aid the users of wheelchairs pull handles should be fitted horizontally on the doors, which do not have self closing devices. A pull handle should be fitted with a cover rose or trim to provide people with impaired vision easier recognition and provide greater support. External handles on accessible routes should not be cold to touch. A textured grip would be of assistance together with nylon, nylon coated and other materials, such as wood will all be acceptable. Handles should not have any sharp edges or sudden changes in direction.

4) Hinges
Hinges should perform better than the lowest friction requirement of 4N under BS EN 1935. High performance hinges will contribute less than 1N friction per hinge. Hinges with very low friction are efficient in use for reducing the resistance for door closers, which will help keep the power required to a minimum, allowing easier opening of the door leaf.

5) Door closers and operating forces
The amendments to BS 8300 together with the Technical Memorandum to AD 'M' quote a maximum figure of 30N opening force when measured at 0° (closed) and 22.5N when measured between 30° and 60° (open).
It is also stated that backcheck closers should not operate before 80° (open) and the maximum closing force should not occur between 0° and 15° of the final closing.
It is noted that it can be difficult to measure the opening force at the door edge and that it may be measured in line with the handle, up to 65mm from the edge of the door. The figures may be increased by up to 2N in this situation. Plunger type force gauges should be used but unless of the sophisticated digital variety, they only have an accuracy to within 2 or 3N.
It will be possible to use closers to power size 3 (BS EN 1154) as the minimum requirement on fire doors, providing it has 65% efficiency or better for accessible routes. The best possible requirement would be door closers having full adjustable power between 2-4 (not selectable) and an efficiency rating of 65% +.
It is therefore important at the design stage to choose the appropriate products for the best performance
- Low friction hinges
- Low bolt resistance on locks if fitted
- Suitable closing device
Also taking into consideration any differentials in air pressure and natural air flow.
The door set will also be affected if it is to be fire / smoke control as the seals will offer resistance to the efficiency of the closing device.

6) Automatic fire detection and alarm systems
If a Building has an automatic fire detection and alarm system (BS 5839) these doors may be provided with one of the following products which need to conform to BS EN 1155:-

a) A closing device incorporating an electro-magnetic/mechanical hold open/release function. A hold open door closer is not acceptable.
b) A closing device used in conjunction with a separate electro-magnet hold open/release unit. It should be born in mind that if this option is used that the magnet is in the same horizontal plane as the closing device i.e. if used with an overhead door closer this should be roughly door height and floor springs near the floor.
c) An electro-magnetic ‘swing-free’ door control device.
Please note that options a) and b) are more suited to corridor applications, whereas c) would be suited to room or office environments.
If, however, an automatic fire alarm system should not be installed a fully automatic door system or low energy power assisted operators would be preferable.

7) Non-automated fire detection and alarm systems
If this type of system is used it is essential that door closing devices to BS 1154 are adopted, and that after installation the doors are fully tested to ensure that all the necessary recommendations are complied with and any adjustments are made before completion.
At this time all doors must be checked to ensure that closing fully into the frame takes place from any angle and that doors are able to close from as little as 5° opening.
In all cases it is essential that regular inspections are made to ensure that these critical life safety systems are maintained and clearly defined. All the components can effect the efficiency and performance of the doors.

8) Handrails
It is stated that a handrail should be:-
- oval or circular profile and have a diameter of at least 40mm but not greater than 50mm.
b) Finished so as to provide a visual contrast with the surroundings.
c) Easy and comfortable to grip with no sharp edges, smooth and NOT cold to touch and there should be a clearance of between 50 and 60mm between the handrail and the adjacent wall surface.
Standards Relevant to the Architectural Hardware Industry

British Standards
Many British Standards (BS) are being superseded by European Standards (EN). On page 12 we give a list of the current standards as they exist on 1st January 2008.

European Standards
Almost all the European architectural hardware standards follow a common format to help ease their understanding by users.
Each product is classified under a number of performance headings and, generally, these are the same for all products.
All products are "marked" with a six or more digit classification coding which show, in fine detail, just what levels of product performance are being claimed for this item.
This classification system, when applied to all items of architectural hardware, will enable complementary items also to be specified to, for instance, a common level of corrosion resistance, category of use, door mass, etc.

DHF (Door and Hardware Federation) graphic icons
These graphic icons were created in 2002 to facilitate recognition of the various product performance classifications encountered in new European standards for hardware. This suite of graphic icons (refer to page 10 for complete table) comprises individual icons, each designed to portray one of the twenty features of a product’s performance requirements stipulated by the new European standards for hardware e.g. Category of Use, Corrosion Resistance, Security, etc.. Whilst there are twenty possible features for hardware, it is unlikely that all twenty will be used for any single product standard.

Example 1:
Icon illustrating the security performance of a lock cylinder according to BS EN 1303
Symbol: Padlock denotes ‘security’ feature
Grade and Range: This particular product achieves a security rating graded 3 in the range of 6 grades attainable for this particular performance standard.

The Classification: A complete performance classification will comprise a series of icons representing the product’s rating for each feature. The number of icons used will vary according to the relevant features stipulated by the product’s European standard.
With hardware standards, the first seven features are usually consistent across all products. Thereafter, features will vary depending on the nature of the product.

Where applicable, the European Standards classification code, using DHF graphic icons, are shown against the products within this catalogue.

European Standards:

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.

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 doors 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.

The following alternative grading system has been developed for fire resistance based on the fire resistance tests incorporated in BS EN 1634-1 and has been included in two revised standards published 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 5 min.

Grade C: Suitable for use on smoke and fire door assemblies with a minimum classification time of 30 min.

Grade D: Suitable for use on smoke and fire door assemblies with a minimum classification time of 60 min.

Grade E: Suitable for use on smoke and fire door assemblies with a minimum classification time of 90 min.

Grade F: Suitable for use on smoke and fire door assemblies with a minimum classification time of more than 90 min.

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 EN 1670:

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

Five grades of security are identified:

Grade 0: Not approved for use on burglary resistant doors.

Grade 1: Mild burglary resistance.

Grade 2: Moderate burglary resistance.

Grade 3: High burglary resistance.

Grade 4: Extra high burglary resistance.

Example No. 1

For a door closer or floor spring tested to BS EN 1154 the following classification code would indicate that it could close the door from 180 degrees, had been tested to 500,000 cycles, was suitable for doors up to 60 kg, suitable for use on fire doors, safe in use and with mild corrosion resistance.

Classification code:

:4:8:3:1:1:1

Using DHF graphic icons:

Example No. 2

For a lever handle or door knob tested to BS EN 1906 the following classification code would indicate that it was for use on doors which are subject to frequent violent usage, had been tested to 200,000 cycles, not suitable for use on fire doors, safe in use, with high corrosion resistance, not approved for use on burglary resistant doors and has operation type identified as type B according to BS EN 1906, i.e. is spring loaded.

Classification code:

:4:7::0:1:3:0:B

Using DHF graphic icons:

Where applicable, the European Standards classification code, using DHF graphic icons, will be shown against the products within this catalogue.

CE Product Marking

Each product and/or its packaging will be required to be marked with :-

The manufacturer’s name or trademark or other means of identification.

Product identification number.

The six digit classification code number as shown above.

The BS EN standard number.

The year and week of manufacture (this may be coded).
## DHF (Door and Hardware Federation) graphic icons

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Symbol no.</th>
<th>Description</th>
<th>Digit</th>
<th>Standard</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Symbol]</td>
<td>01</td>
<td>Category of use</td>
<td>1</td>
<td>All</td>
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</tr>
<tr>
<td>![Symbol]</td>
<td>02</td>
<td>Durability/ no of test cycles</td>
<td>2</td>
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</tr>
<tr>
<td>![Symbol]</td>
<td>03</td>
<td>Test door or window/mass/size/weight</td>
<td>3</td>
<td>All</td>
<td></td>
</tr>
<tr>
<td>![Symbol]</td>
<td>04</td>
<td>Fire resistance</td>
<td>4</td>
<td>All</td>
<td></td>
</tr>
<tr>
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<td>05</td>
<td>Safety</td>
<td>5</td>
<td>All</td>
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<tr>
<td>![Symbol]</td>
<td>06</td>
<td>Corrosion resistance</td>
<td>6</td>
<td>All</td>
<td></td>
</tr>
<tr>
<td>![Symbol]</td>
<td>07</td>
<td>Security</td>
<td>7</td>
<td>All</td>
<td></td>
</tr>
<tr>
<td>![Symbol]</td>
<td>08</td>
<td>Durability/test cycles with force applied</td>
<td>8</td>
<td>EN12209, prEN 14846, WI33/315</td>
<td>Mechanical locks and latches, Electro-mechanical locks and latches, Multipoint locks</td>
</tr>
<tr>
<td>![Symbol]</td>
<td>16</td>
<td>Type of operation</td>
<td>8</td>
<td>EN1906</td>
<td>Lever handle and knob furniture</td>
</tr>
<tr>
<td>![Symbol]</td>
<td>18</td>
<td>Hinge grade</td>
<td>8</td>
<td>EN1935</td>
<td>Single axis hinges</td>
</tr>
<tr>
<td>![Symbol]</td>
<td>19</td>
<td>Projection of device</td>
<td>8</td>
<td>EN179, EN1125</td>
<td>Emergency exit devices, Horizontal panic exit devices</td>
</tr>
<tr>
<td>![Symbol]</td>
<td>15</td>
<td>Category of door</td>
<td>8</td>
<td>EN1527</td>
<td>Sliding and folding doors</td>
</tr>
<tr>
<td>![Symbol]</td>
<td>14</td>
<td>EMC environment</td>
<td>8</td>
<td>EN13633</td>
<td>Electrically controlled panic exit systems</td>
</tr>
<tr>
<td>![Symbol]</td>
<td>11</td>
<td>Time delay</td>
<td>8</td>
<td>EN13637, EN13633</td>
<td>Electrically controlled emergency exit systems</td>
</tr>
<tr>
<td>![Symbol]</td>
<td>24</td>
<td>Field of door</td>
<td>8</td>
<td>EN12209</td>
<td>Mechanically operated locks, latches and locking plates</td>
</tr>
<tr>
<td>![Symbol]</td>
<td>25</td>
<td>Attack resistance</td>
<td>8</td>
<td>EN1303</td>
<td>Cylinders for locks</td>
</tr>
<tr>
<td>![Symbol]</td>
<td>12</td>
<td>Operation at extremes of temperature</td>
<td>9</td>
<td>EN12209, WI33/315</td>
<td>Mechanical locks and latches, Multipoint locks</td>
</tr>
<tr>
<td>![Symbol]</td>
<td>17</td>
<td>Type of device</td>
<td>9</td>
<td>EN179, EN1125</td>
<td>Emergency exit devices, Horizontal panic exit devices</td>
</tr>
<tr>
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<td>13</td>
<td>Closing force</td>
<td>9</td>
<td>WI33/315</td>
<td>Multipoint locks</td>
</tr>
<tr>
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<td>23</td>
<td>Type of key</td>
<td>9</td>
<td>EN12209</td>
<td>Mechanically operated locks, latches and locking plates</td>
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<td>Initial friction</td>
<td>9</td>
<td>EN1527</td>
<td>Hardware for sliding doors and folding doors</td>
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<td>Sideload on lockcase</td>
<td>10</td>
<td>EN12209</td>
<td>Mechanical locks and latches</td>
</tr>
<tr>
<td>![Symbol]</td>
<td>22</td>
<td>Type of spindle</td>
<td>10</td>
<td>EN12209</td>
<td>Mechanically operated locks, latches and locking plates</td>
</tr>
<tr>
<td>![Symbol]</td>
<td>10</td>
<td>Anti-separation provision</td>
<td>11</td>
<td>WI33/315</td>
<td>Multipoint locks</td>
</tr>
<tr>
<td>![Symbol]</td>
<td>21</td>
<td>Key identification</td>
<td>11</td>
<td>EN12209</td>
<td>Mechanically operated locks, latches and locking plates</td>
</tr>
</tbody>
</table>
The International Standards Organisation - I.S.O.

This body have not, as yet, produced any standards relating to hardware except the recommendation R1226, June 1970, which covers the ‘designation of door closing direction’ (see page 12 at the front of the catalogue) and which remains in use in the U.K. today.

BS EN ISO 9000

BS EN ISO 9000 is an International Standard for the assessment of management capability and the effectiveness of quality systems, and has become a fundamental requirement of many purchasers. It is often demanded as a contract requirement, as it ensures that goods produced will be consistently the same as those originally tested and accepted.

Being a BS EN ISO 9000 registered firm of assessed capability also means that a company can, when it has products that have been independently tested for conformity to an appropriate standard, obtain Kitemark authorisation.

BS EN ISO 9000 registration is available not only to manufacturers of products but also to companies in the service industries.

It is expected that registration to this scheme will continue to be of increasing importance to all companies in the hardware industry.

Häfele UK Ltd are BS EN ISO 9000 registered

BS EN ISO 9000 should not be confused with performance standards for products.

BS EN ISO 9000 relates to the structure and working methods of a company which provides a service, or through which products pass, whether it be distribution or manufacture. It ensures consistency and efficiency of working methods at all times.

The Kitemark

The Kitemark has now been used for over 60 years, and is a visual means of letting customers know that a product has been independently tested against a Standard, and passed, and that the manufacturing quality systems have been assessed against BS EN ISO 9000.

After the award of the Kitemark, unannounced visits to the assessed company’s premises will be made by the B.S.I., to ensure that the agreed quality levels are being maintained. Failure to maintain quality standards will result in the license for using the Kitemark being withdrawn.

CE Marking

In addition to the continuing implementation of the EN standards we now need to understand CE marking as it applies to ironmongery.

Progressively over the next few years, certain fire / life safety products can only be used in buildings if they carry the CE mark.

CE marked ironmongery products will have been initially third party tested to the relevant BS EN standard, have evidence of satisfactory performance in the relevant fire test and be produced in a factory which has a Production Control System in place, which can be assessed by a Notified Certification Body.
Standards Relevant to the Architectural Hardware Industry

By kind permission of The Guild of Architectural Ironmongers, we have listed, over the next few pages, those standards relevant to the Architectural hardware industry, which appear in level 1 year 2007 ‘Standards & Regulations for the Ironmonger’

### British Standards

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<td>BS 476 (various)</td>
<td>Fire test on building materials and structures - see also BS EN 1634-1: 2000</td>
</tr>
<tr>
<td>13</td>
<td>BS 3621: 2007</td>
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<td>Code of practice for safety at power operated doors for pedestrian use</td>
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<td>16</td>
<td>BS 7386: (1997)</td>
<td>Specification for draught strips for the draught control of existing doors and windows in housing (including test methods)</td>
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<td>16</td>
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</tr>
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<td>17</td>
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### European Standards

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<td>Panic exit devices operated by horizontal push bar</td>
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<td>BS EN 1154: 1997</td>
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<td>BS EN 1155: 1997</td>
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<td>23</td>
<td>BS EN 1158: 1997</td>
<td>Door coordinator device - requirements and test methods</td>
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<td>24</td>
<td>BS EN 1303: 2005</td>
<td>Building hardware - cylinders for locks - requirements and test methods</td>
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<td>BS EN 1527: 1998</td>
<td>Building hardware - hardware for sliding doors and folding doors - requirements and test methods</td>
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<td>27</td>
<td>BS EN 1634-1: 2000</td>
<td>Fire resistance tests for door and shutter assemblies. Fire doors and shutters</td>
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<tr>
<td>27</td>
<td>BS EN 1634-3: 2004</td>
<td>Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware. Smoke control test of door and shutter assemblies</td>
</tr>
<tr>
<td>27</td>
<td>BS EN 1670: 2007</td>
<td>Building hardware - corrosion resistance - requirements and test methods</td>
</tr>
<tr>
<td>27</td>
<td>BS EN 1906: 2002</td>
<td>Building hardware - lever handles and knob furniture</td>
</tr>
<tr>
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<td>Building hardware - single axis hinges</td>
</tr>
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</tr>
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<td>35</td>
<td>BS EN 13724: 2002</td>
<td>Postal services - apertures of private letter boxes and letter plates</td>
</tr>
</tbody>
</table>
BS 476 - Fire test on building materials and structures.


BS 3621: 2007 - Specification for thief resistant locks.
The standard gives design requirements and methods of test. The lock performances apply to locks fitted to hinged and sliding doors. To comply with the standard, all locks must have a minimum of 1000 differs except for cylinder locks (see next paragraph). Key markings should be used once only and should not disclose the combination of the key. The lock case must be hardened, anti-drill.
The new 2004 edition is based upon the new European standard BS EN 12209: 2003, but with broadly similar requirements to the previous 1980 and 1998 editions. The cylinder type locks have tests on the cylinder that have to satisfy BS EN 1303: 2005 classification :1:6:-:0:1:5:1. They must have a minimum of 30,000 differs, be tested to 100,000 operations and resist a number of other security assessments.
In addition the following tests are applied:
a) Neutral salt spray test, to BS EN 1670: 1998 for 96 hours.
b) Operation of deadbolt mechanism: The lock is operated slowly by its key to throw and withdraw the deadbolt which must throw a minimum of 20 mm. In addition, operation is tested with a force of 15N applied to the end of the bolt to ensure that the bolt will not push back.
c) Operation of the latch mechanism: The mechanism is tested in a full door test rig for 20,000 cycles, with a side load on the latch bolt of 10N.
d) Bolt cutting test: The deadbolt is subjected to hand drilling for 5 minutes prior to the side load test (e).
e) Strength of lock case: A lateral force of 10,000N is applied to the case for one minute. A pull force of 6,000N is applied to the hook or claw bolts.
f) Strength of bolt retention: A force of 6,000N is applied to bolts, hooks or claws for one minute in the direction to which the bolt moves to unlock (2,000N if the locking plate has an enclosed locking box, but the locking plate must resist higher forces).
g) Locked handle/knobs (where applicable): Where lockable handles/knobs are used (e.g. rim night latches) the locked handle/knob must resist a forcing torque based on the radius of the handle/knob.
h) Staples and striking plates: Staples and striking plates are tested by applying a force of 10,000N. Similarly hook and claw bolt strikers are tested to a pulling force of 6,000N.


BS 5499-1: 2002 - Graphic symbols and signs - safety signs including fire safety signs.
Part 1: Specification for geometric shapes, colours and layouts. The standard specifies a system of geometric shapes and safety colours for use with appropriate graphical symbols to produce safety signs.

Table 1 - Geometric shapes, safety colours and contrast colours for safety signs. *

<table>
<thead>
<tr>
<th>Geometric shapes</th>
<th>Meaning</th>
<th>Safety colour</th>
<th>Contrast colour</th>
<th>Graphical symbol colour</th>
<th>Examples of use</th>
</tr>
</thead>
<tbody>
<tr>
<td>A circle</td>
<td>Prohibition</td>
<td>Red</td>
<td>White</td>
<td>Black</td>
<td>No smoking</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No unauthorised entry</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Do not drink</td>
</tr>
<tr>
<td>A circle</td>
<td>Mandatory action</td>
<td>Blue</td>
<td>White</td>
<td>White</td>
<td>Wear safety helmet</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Keep clear</td>
</tr>
<tr>
<td>An equilateral triangle with radiused outer corners</td>
<td>Hazard</td>
<td>Yellow</td>
<td>Black</td>
<td>Black</td>
<td>Hot surface</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Acid</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High voltage</td>
</tr>
<tr>
<td>A rectangle (square or rectangle)</td>
<td>Safe condition</td>
<td>Green</td>
<td>White</td>
<td>White</td>
<td>First aid room</td>
</tr>
<tr>
<td></td>
<td>Escape route</td>
<td></td>
<td></td>
<td></td>
<td>Fire exit</td>
</tr>
<tr>
<td></td>
<td>Safety equipment</td>
<td></td>
<td></td>
<td></td>
<td>Evacuation assembly</td>
</tr>
<tr>
<td>A rectangle (square or rectangle)</td>
<td>Fire equipment</td>
<td>Red</td>
<td>White</td>
<td>White</td>
<td>Fire point</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td>Fire alarm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Wet riser extinguisher</td>
</tr>
</tbody>
</table>

*For the colour and geometric shape of supplementary signs - see Clause 10

Standards Relevant to the Architectural Hardware Industry

BS 476 - Fire test on building materials and structures.


BS 3621: 2007 - Specification for thief resistant locks.
The standard gives design requirements and methods of test. The lock performances apply to locks fitted to hinged and sliding doors. To comply with the standard, all locks must have a minimum of 1000 differs except for cylinder locks (see next paragraph). Key markings should be used once only and should not disclose the combination of the key. The lock case must be hardened, anti-drill.
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In addition the following tests are applied:
a) Neutral salt spray test, to BS EN 1670: 1998 for 96 hours.
b) Operation of deadbolt mechanism: The lock is operated slowly by its key to throw and withdraw the deadbolt which must throw a minimum of 20 mm. In addition, operation is tested with a force of 15N applied to the end of the bolt to ensure that the bolt will not push back.
c) Operation of the latch mechanism: The mechanism is tested in a full door test rig for 20,000 cycles, with a side load on the latch bolt of 10N.
d) Bolt cutting test: The deadbolt is subjected to hand drilling for 5 minutes prior to the side load test (e).
e) Strength of lock case: A lateral force of 10,000N is applied to the case for one minute. A pull force of 6,000N is applied to the hook or claw bolts.
f) Strength of bolt retention: A force of 6,000N is applied to bolts, hooks or claws for one minute in the direction to which the bolt moves to unlock (2,000N if the locking plate has an enclosed locking box, but the locking plate must resist higher forces).
g) Locked handle/knobs (where applicable): Where lockable handles/knobs are used (e.g. rim night latches) the locked handle/knob must resist a forcing torque based on the radius of the handle/knob.
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BS 5499-1: 2002 - Graphic symbols and signs - safety signs including fire safety signs.
Part 1: - Specification for geometric shapes, colours and layouts. The standard specifies a system of geometric shapes and safety colours for use with appropriate graphical symbols to produce safety signs.

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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High voltage</td>
</tr>
<tr>
<td>A rectangle (square or rectangle)</td>
<td>Safe condition</td>
<td>Green</td>
<td>White</td>
<td>White</td>
<td>First aid room</td>
</tr>
<tr>
<td></td>
<td>Escape route</td>
<td></td>
<td></td>
<td></td>
<td>Fire exit</td>
</tr>
<tr>
<td></td>
<td>Safety equipment</td>
<td></td>
<td></td>
<td></td>
<td>Evacuation assembly</td>
</tr>
<tr>
<td>A rectangle (square or rectangle)</td>
<td>Fire equipment</td>
<td>Red</td>
<td>White</td>
<td>White</td>
<td>Fire point</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Fire alarm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Wet riser extinguisher</td>
</tr>
</tbody>
</table>

*For the colour and geometric shape of supplementary signs - see Clause 10

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BS 5499-1: 2002 - Continued

Size of signs (other than escape route signs)
There is an information annex which gives details of this data and which includes this table as a guide.

<table>
<thead>
<tr>
<th>Maximum viewing distance*</th>
<th>Minimum sign height**</th>
<th>Recommended letter height *** in supplementary text sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 m</td>
<td>60 mm</td>
<td>5 mm</td>
</tr>
<tr>
<td>9 m</td>
<td>80 mm</td>
<td>7 mm</td>
</tr>
<tr>
<td>14 m</td>
<td>120 mm</td>
<td>10 mm</td>
</tr>
<tr>
<td>21 m</td>
<td>180 mm</td>
<td>15 mm</td>
</tr>
<tr>
<td>28 m</td>
<td>240 mm</td>
<td>20 mm</td>
</tr>
</tbody>
</table>

* Calculated using equation A.1 with Z= 120 and rounded down to the nearest whole metre
** For the intermediate viewing distance the next largest available sign height should be used
*** See 3.6

Table A.1 - Minimum sign heights recommended for the different maximum viewing distance


BS 5499-4: 2000 - Safety signs, including fire safety signs.


Fire Exit Signs: Handed Right or Left. Depicting a person moving through a door opening. A green figure is preferred for face illuminated signs or non-illuminated signs. A white figure is preferred for self luminous and internally illuminated signs.

Annex B (information) - Use of arrows to indicate direction of travel.

BS 5499-5: 2002 - Graphic symbols and signs - safety signs, including fire safety signs.

Part 8: Signs with specific safety meanings.

Warning Signs:
Typical warning signs displayed in the standard are illustrated below. The background should be yellow with black triangle and text/symbol.

Prohibition Signs:
Typical prohibition signs are as below. The background is white with red circular band, crossbar and text/symbol.
Standards Relevant to the Architectural Hardware Industry

BS 5499-5: 2002 - Continued

Mandatory Signs:
Typical mandatory signs are as below. The shape, a circle, blue background (at least 50%) of the area. The symbol or text to be white.

| A.1.01 | Letter height 5 mm  
Sign height 60 mm |
| A.1.02 | Letter height 5 mm  
Sign height 60 mm |
| A.1.03 | Letter height 5 mm  
Sign height 60 mm |
| A.1.04 | Letter height 5 mm  
Sign height 80 mm |
| A.1.05 | Letter height 5 mm  
Sign height 80 mm |

Safe Condition Signs:
Typical safe condition signs are shown below. Shape should be square or rectangular. The background should be green covering at least 50% of the area. Symbol/text in white.

Fire Equipment Signs:
Typical fire equipment signs are shown below. Shape should be square or rectangular. The background should be red covering at least 50% of the area. Symbol/text in white.

BS 5588 - Fire precautions in the design, construction and use of buildings.

BS 5588-0: 1996 - Guide to the fire safety code of practice for particular premises / applications.

This standard deals with fire development within a dwelling, house, flat or maisonette. It identifies the starting of a fire by an occupant within a room such as deep fat frying, smoking in bed, children playing with matches. It discusses the fire development, listing precautions and escape provisions. All inner rooms should have means of escape other than by the door and any room higher than 4.5 meters above ground level should have at least two escape routes. It also discusses fire development outside the dwelling and the necessary precautions.

BS 5588-4: 1998 - Smoke control in protected escape routes using pressurisation Specification for the compartmentalization and ducting to provide a positive air pressure in escape routes to contain smoke and toxic gasses within fire compartments. Replaced by BS EN 12101-6: 2008

The standard covers the construction of stairs and lifts with additional protection for the use by the fire fighters. It does not cover means of escape for public.

Covers buildings for on door entertainment and assembly - excluding sports grounds.


This code of practice is a guide for building designers and constructors, when they are incorporating into new or existing buildings, measures to ensure the safe evacuation of disabled people from the buildings, except dwellings, in the event of fire. Recommendations are made for the planning and protection of escape routes in horizontal and downward (or upward) directions. The provision of refuge lobbies in protected stairwells is recommended. The correct parking of wheelchairs to allow a clear escape flow on the stairway is highlighted.
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Deals with public and non-public areas of the complexes and shop units.

This specification calls for the fire door signs on both sides of fire resisting doors and permits the general use of electro-magnetic release closers on fire resisting doors.

BS 5839-3: 1988 - Fire detection and alarm systems for buildings - specification for automatic release mechanisms for certain fire protection equipment.
This standard will be modified as it contains conflicts with BS EN 1155. Requirements and test methods for automatic release mechanisms that hold open (or closed) fire doors, fire shutters and fire dampers against the force of the door closing (or opening) device. Release should occur when manually operated or on receipt of a signal from the fire detector system (including smoke) or a central point of a building or fire alarm. The performance requirements cover damp, insulation resistance, heat and cold resistance, a corrosion test and durability impact and vibration testing. The durability test requires the item to withstand repeated slamming, the test being 500 cycles. A further stipulation states that it should not be possible to remove the protective cover without the use of a tool.


The specification is limited to peg type stays and wedge action fasteners for use on top or side hung windows up to 1m sq in area. The standard is a pure performance standard and specifies loading which simulates pulling the window closed via a stay bar around the peg. It also has a pull test. When the stay bar rests on the pegs, a force is applied to pull the joint away from the stay which simulates pressure differentials in buildings similar to those generated by storms. Loads are also specified to check resistance to vertical bending of the stay, e.g. over window ledge. Wedging forces are specified for the fastener as well as a strength test for the fastener handle. A wear test is also required of fasteners to test their durability in use. 20,000 cycles are specified.

BS 7036-1/5: 1996 - Code of practice for safety at power operated doors for pedestrian use.
This code of practice provides guidance on the provision and installation of safety devices for automatic power operated pedestrian door systems whether swing or sliding which do not exceed 2000 mm in width. Doors exceeding 2000 mm in width may require additional safety features. It is recommended that activators should operate on low voltage with a maximum of 50V AC or 24V DC. Safety measures covered are activators whether swing or sliding which do not exceed 2000 mm in width. Doors exceeding 2000 mm in width may require additional safety features. It is stressed that the types should not be mixed and care should also be taken with rebated meeting stiles which pressure forming seals can spring open.


BS 7950: 1997 - Specification for enhanced security performance of casement and tilt/turn windows in domestic applications.

BS 8213-1: 2004 - Windows, doors and roof lights.
This part of the standard code of practice for the safety in use and during cleaning of windows and doors (including guidance on cleaning materials and methods).

BS 8214: 1990 - Code of practice for fire door assemblies with non-metallic leaves.
The British Standard gives guidance for Fire Door design, construction and installation with non-metallic leaves. The recommendations given are restricted to doors designed to provide fire resistance ratings up to, and including, 2 hours. These ratings are in respect of tests conducted in accordance with the conditions specified in BS 476 : Part 8 and Part 22. The role and use of Fire Doors is explained, making reference to BS 5588 : Parts 1, 2 and 3. Design and manufacturing qualities of Fire Doors are covered in detail. Intumescent seals and smoke seals are explained, along with the use of other intumescent materials which help in maintaining integrity. Pressure forming seals are discussed against the voluminously expanding types. It is stressed that the types should not be mixed and care should also be taken with rebated meeting stiles which pressure forming seals can spring open.

Ironmongery and the fitting thereof, is discussed, categorising the essential and non-essential ironmongery items. The Standard recommends that rising butt hinges should not be fitted to Fire Doors.
Door closers should be fitted to all Fire Doors and be capable of closing the leaf, overcoming any latch or seals that are present.

BS 8220 - Guide for the security of buildings against crime.
Part 1: 2000 - Dwellings
Part 2: 1995 - Offices and shops
Part 3: 2004 - Warehouse and distribution units
BS 8300: 2001 - Supplemented by and amending Part 4 DDA - design of buildings and their approaches to meet the needs of disabled people - code of practice.

The DDT (Disability Discrimination Act) of 1995 has been introduced in a number of stages since Dec. 1996. Since Oct. 1999 it has required "service providers" to take reasonable steps to change practices, provide auxiliary aids and remove physical barriers to make the use of their facility more acceptable for disabled users. Since Oct. 2004 they have had to "make reasonable adjustments to the physical features of their premises, if it is impossible or difficult for disabled people to access their service" i.e. in theory at least, all buildings, new and existing, are having to be upgraded. What has been missing up to now, is some guidance as to "what is reasonable?". The BS 8300 Code of Practice gives clear guidance on layouts, sizes, fittings etc, for almost all types of buildings except those which are intended for use exclusively by disabled people. It does not make specific recommendations relating to the use of buildings by children. Basically it gives guidance and provides a code of practice as to what is"reasonable" - it provides some specific information and some general guidance. The Building Regulations are regularly updated and 2004 saw an update to the Approved Document to Part "M" of the Regulations covering England and Wales. This covers "Access to and use of buildings". The BS 8300 Amd1 and a "FAQ" sheet from the ODPM (Office of the Deputy Prime Minister) in relation to Approved Document M now align both documents.

BS 8424: 2004 - Pull handles - requirements and test methods.

This standard specifies the performance requirements and testing methods for door mounted pull handles incorporating one fixing point or more. It incorporates the same classification system used in the European Standards for Building Hardware.

Digit 1 - Category of use
Grade 1: Light duty
Grade 2: Medium duty
Grade 3: Heavy duty
Grade 4: Severe duty

Digit 2 - Durability
Grade 2: 5000 test cycle

Digit 3 - Test door mass
There is now classification.

Digit 4 - Fire resistance
Two categories of fire resistance are identified:
Grade 0: Not approved for use on fire/smoke door assemblies
Grade 1: Suitable for use on fire/smoke door assemblies, subject to satisfactory assessment of the contribution of the emergency device to the fire resistance of specified fire/smoke door assemblies

Digit 5 - Safety
Grade 1: Safe

Digit 6 - Corrosion resistance
Classification to Clause 4 of BS EN 1670: 1998
Grade 0: No defined corrosion resistance
Grade 1: Low resistance
Grade 2: Moderate resistance
Grade 3: High resistance
Grade 4: Very high resistance

Example
The following classification denotes a pull handle, suitable for sever duty, non fire door use, with a high resistance to corrosion.
*:4:**0:**1:**4

BS 8621: 2007 - Thief resistant lock assemblies - keyless egress.

Exactly the same as BS 3621 except that the locks are classified as providing keyless egress at all times and are therefore suitable for doors which have to be free from fastenings on the inside.

BS EN 179: 2008 - Emergency exit devices operated by a lever handle or push pad.

The standard provides details on product types, classification by use, test cycles, door mass, corrosion resistance, as well as definitions, product performance requirements, test apparatus, test methods and marking on products. In addition, the published standards include annexes illustrating the various points made through diagrams and supplementary text.

The standard covers devices to be used in emergency situations where people are familiar with the emergency exit and its hardware and therefore a panic situation is most unlikely to develop. Lever handle operated escape mortise locks or push pads may therefore be used.

Scope
The main purpose of the performance requirements of this standard is to give safe and effective escape through a doorway with one single operation to release the device although this can require prior knowledge of its operation, i.e. for locked doors on escape routes where panic situations are not foreseen.
Classification

The standard classifies emergency exit devices by using a 9 digit coding system. Each digit refers to a particular feature of the product measured against the Standard’s performance requirements.

- **Digit 1 - Category of use**
  - Only one category is identified:
    - Grade 3: High frequency

- **Digit 2 - Number of test cycles**
  - Two categories of durability are identified:
    - Grade 6: 100,000 cycles
    - Grade 7: 200,000 cycles

- **Digit 3 - Test door mass**
  - Two categories of test mass are identified:
    - Grade 5: up to 100 kg
    - Grade 6: up to 200 kg

- **Digit 4 - Fire resistance**
  - Two categories of fire resistance are identified:
    - Grade 0: Not approved for use on fire/smoke door assemblies
    - Grade 1: Suitable for use on fire/smoke door assemblies, subject to satisfactory assessment of the contribution of the emergency device to the fire resistance of specified fire/smoke door assemblies

- **Digit 5 - Safety**
  - All emergency devices have a critical safety function, therefore only the top grade
    - Grade 1: Safe is identified

- **Digit 6 - Corrosion resistance**
  - Classification to Clause 4 of BS EN 1670: 1998
    - Grade 3: High resistance
    - Grade 4: Very high resistance

- **Digit 7 - Security**
  - Three categories of security are identified:
    - Grade 2: 1,000N
    - Grade 3: 2,000N
    - Grade 4: 3,000N

- **Digit 8 - Projection of device**
  - Two categories of projection are identified:
    - Grade 1: Projection up to 150 mm (standard)
    - Grade 2: Projection up to 100 mm (low)

- **Digit 9 - Type of device**
  - Two categories of device are identified (see Fig. 1 and Fig. 2 above):
    - Type A Emergency device with lever handle operation
    - Type B Emergency device with push pad

**Example**

The following marking denotes an emergency exit device tested to 100,000 operations for a door mass up to 100 kg. Suitable for fire door use, with high corrosion resistance, very high security and operated by a lever handle.

Standards Relevant to the Architectural Hardware Industry

Marking
a) Manufacturer's name or trademark or other means of positive identification
b) Classification details
c) The number of the European standard
d) The month and year of the final assembly by the manufacturer. Note: This information can be in coded form. Items b) and c) should be clearly visible after installation

Fire door assemblies
The emergency exit device representative of its type shall have been subjected to a successful fire test to prove the contribution of the device to the fire resistance of the complete door assembly. Such assessments are outside the scope of this European standard but are covered by BS 476: Part 22 which remains in force.

Specification issues
The decision as to which products are specified should be made on the basis of the building use and occupancy. Products incorporating a cross bar (BS EN 1125) to operate the exit device must be used in public buildings, places of public entertainment, shops and any other location where the building occupants do not have prior knowledge of the escape device and where a panic situation can be foreseen. Products incorporating a push pad or lever handle to operate the exit device (BS EN 179) should only be used where the building occupants are familiar with the emergency exit and its hardware and where panic situations are not foreseen. If there is a doubt about the conditions relating to Building occupancy, only devices covered by BS EN 1125 should be specified.

BS EN 1125: 2008 - Emergency exit devices operated by horizontal push bar
The standard provides details on product types, classification by use, test cycles, door mass, corrosion resistance, as well as definitions, product performance requirements, test apparatus, test methods and marking on products. In addition, the published standards include annexes illustrating the various points made through diagrams and supplementary text. Experiences relating to escape from buildings and general safety have made it desirable that doors at exits in public buildings, places of entertainment, shops etc., should be fitted with panic devices operated by a horizontal bar. The emphasis for products covered by this standard is on safe exit rather than security.

Scope
The main purpose of the performance requirements of this standard is to give safe and effective escape through a doorway with minimum of effort and without prior knowledge of the device i.e. for locked doors on escape routes where panic situations can be foreseen.

Classification
The standard classifies emergency exit devices by using a 9 digit coding system. Each digit refers to a particular feature of the product measured against the Standard’s performance requirements.

Digit 1 - Category of use
Only one category is identified:
Grade 3: High frequency

Digit 2 - Number of test cycles
Two categories of durability are identified:
Grade 6: 100,000 cycles
Grade 7: 200,000 cycles

Digit 3 - Test door mass
Two categories of test mass are identified:
Grade 5: up to 100 kg
Grade 6: up to 200 kg

Digit 4 - Fire resistance
Two categories of fire resistance are identified:
Grade 0: Not approved for use on fire/smoke door assemblies
Grade 1: Suitable for use on fire/smoke door assemblies, subject to satisfactory assessment of the contribution of the emergency device to the fire resistance of specified fire/smoke door assemblies.

Digit 5 - Safety
All emergency devices have a critical safety function, therefore only the top grade.
Grade 1: Safe is identified

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BS EN 1125: 2008 - Continued

Digit 6 - Corrosion resistance
Classification to Clause 4 of BS EN 1670: 1998
Grade 3: High resistance
Grade 4: Very high resistance

Digit 7 - Security
One category of security is identified:
Grade 2: 1,000N

Digit 8 - Projection of device
Two categories of projection are identified:
Grade 1: Projection up to 150 mm (standard)
Grade 2: Projection up to 100 mm (low)

Digit 9 - Type of device
Two categories of device are identified (see Fig. 1 and Fig. 2 shown on page 19):
Type A: Emergency device with push bar operation
Type B: Emergency device with touch bar operation

Example
The following marking denotes an emergency exit device tested to 200,000 operations for a door mass up to 200 kg. Suitable for fire door use, with high corrosion resistance, and low push bar projection.


Marking
a) Manufacturer’s name or trademark or other means of positive identification
b) Classification details
c) The number of the European standard.
d) The month and year of the final assembly by the manufacturer. Note: This information can be in coded form. Items b) and c) should be clearly visible after installation

Fire door assemblies
The emergency exit device representative of its type shall have been subjected to a successful fire test to prove the contribution of the device to the fire resistance of the complete door assembly. Such assessments are outside the scope of this European standard but are covered by BS 476: Part 22 which remains in force.

Specification issues
The decision as to which products are specified should be made on the basis of the building use and occupancy. Products incorporating a cross bar (BS EN 1125) to operate the exit device must be used in public buildings, places of public entertainment, shops and any other location where the building occupants do not have prior knowledge of the escape device and where a panic situation can be foreseen.

Products incorporating a push pad or lever handle to operate the exit device (BS EN 179) should only be used where the building occupants are familiar with the emergency exit and its hardware and where panic situations are not foreseen. If there is a doubt about the conditions relating to Building occupancy, only devices covered by BS EN 1125 should be specified.

For safety reasons the push bar of a type “A” panic devise shall not protrude beyond either of the end supports. This means that for pairs of rebated doors, the traditional British designed “double panic bolt” will not be permitted. An acceptable solution is for a single vertical panic bolt to be fitted on the “inactive leaf” and a panic latch on the active leaf. A box keeper may be needed for the panic latch.

A Grade 2 (low projection) panic device should be used in situations where there is restricted width for escape or where doors are not able to open beyond 90°.

Panic device push and touch bars should be installed to provide the maximum effective length but never less then 60% of the door leaf width.

BS EN 1154: 1997 - Controlled door closing devices - requirements and test methods.
The standard provides details on product types, classification by use, test cycles, door mass, corrosion resistance, as well as definitions, product performance requirements, test apparatus, test methods and marking on products. In addition, the published standards include annexes illustrating the various points made through diagrams and supplementary text.

This European standard has replaced the previous national product performance standard BS 6459: Part 1: 1984: Door Closers - Specification for mechanical performance of crank and rack and pinion overhead closers.

Scope
The standard covers all controlled surface mounted, concealed, or transom mounted closers as well as both single and double action floor springs.
Classification
The standard classifies door closers by using a 6 digit coding system. Each digit refers to a particular feature of the product measured against the Standard’s performance requirements.

Digit 1 - Category of use
For all internal and external doors for use by the public, and others, with little incentive to take care, i.e. where there is some chance of misuse of the door.
Grade 3: For closing doors from at least 105° open
Grade 4: For closing doors from 180° open
Note 1: Grade 4 classification assumes standard installation according to the manufacturer’s instructions.
Note 2: For applications subject to extremes of abuse, or for particular limitations of opening angle, door closers incorporating backcheck function or provision of a separate door stop should be considered.

Digit 2 - Number of test cycles
Only one test duration is identified for the door closing device manufactured to this standard:
Grade 8: 500,000 cycles

Digit 3 - Test door mass/size
Seven test door mass grades and related door closer power sizes are identified according to table 1 of this standard. Where a door closer provides a range of power sizes both the minimum and maximum sizes shall be identified.

<table>
<thead>
<tr>
<th>Power size of closer</th>
<th>Max. mass of hinged leaf</th>
<th>Width of test door leaf</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20 kg</td>
<td>&lt;750 mm</td>
</tr>
<tr>
<td>2</td>
<td>40 kg</td>
<td>850 mm</td>
</tr>
<tr>
<td>3</td>
<td>60 kg</td>
<td>950 mm</td>
</tr>
<tr>
<td>4</td>
<td>80 kg</td>
<td>1100 mm</td>
</tr>
<tr>
<td>5</td>
<td>100 kg</td>
<td>1250 mm</td>
</tr>
<tr>
<td>6</td>
<td>120 kg</td>
<td>1400 mm</td>
</tr>
<tr>
<td>7</td>
<td>160 kg</td>
<td>1600 mm</td>
</tr>
</tbody>
</table>

Table 1

Digit 4 - Fire behaviour
Two grades of fire behaviour are identified for door closing devices manufactured to this standard:
Grade 0: Not suitable for use on fire/smoke door assemblies
Grade 1: Suitable for use on fire/smoke door assemblies, subject to satisfactory assessment of the contribution of the emergency device to the fire resistance of specified fire/smoke door assemblies

Digit 5 - Safety
All door closers are required to satisfy the Essential Requirement of safety in use contained in the Construction Products Directive by the EU. Therefore only Grade 1 is identified

Digit 6 - Corrosion resistance
Five grades of corrosion resistance are identified according to BS EN 1670:
Grade 0: No defined corrosion resistance
Grade 1: Low resistance
Grade 2: Moderate resistance
Grade 3: High resistance
Grade 4: Very high resistance

Example
The following marking denotes a closer capable of opening to at least 105°, and with a range of power sizes from size 2 to size 5. Note that as the 4th digit is zero, such a closer would not be suitable for fire door use.

:3:8:2/5:0:1:0:

Marking
a) Manufacturer’s name or trademark or other means of positive identification
b) Product model identification
c) Classification details, 6 digit.
d) The number of the European standard. (BS EN 1154)
e) The month and year of the final assembly by the manufacturer. Note: This information can be in coded form.
BS EN 1154: 1997 - Continued

Fire resisting doors

BS EN 1154 makes the following recommendations as to the feature considered necessary for such devices when they are fitted to fire and smoke resisting doors.

a) The door closer when installed in accordance with the manufacturer’s installation instruction shall be capable of closing the test door from any angle to which it may be opened.

b) Due to their low closing moments, door closers sizes 1 and 2 are not considered suitable for use on fire/smoke resisting door assemblies. Door closers with adjustable closing force shall be capable of adjustment to at least power size 3.

c) The door closer shall not include a hold open device unless it is electrically powered device in accordance with BS EN 1155.

d) Control regulators shall be either concealed or operable only by means of a tool.

e) The design of a door closer shall be such that it is not possible to inhibit its closing action in any way without the use of a tool.

f) Any incorporated delayed action function shall be capable of adjustment to less than 25 seconds between the door closing angle of 120° and the end of the delay zone.

g) The door closer representative of its model shall have been incorporated in a door assembly that has satisfied the appropriate criteria of a fire test. The test shall have been on a full size assembly in accordance with BS EN 1634-1.

BS EN 1155: 1997 - Electrically powered hold open devices for swing doors - requirements and test methods

Scope

The standard specifies requirements for separate electrically powered hold-open devices and also for hold-open mechanisms incorporated in a door closer. Whilst these devices may incorporate smoke or fire detection elements, the performance of these particular elements is outside the scope of BS EN 1155.

Classification

The standard classifies electrically powered hold-open devices using the 6 digit coding system. Each digit relates to a particular feature of the product measured against the standard’s performance requirement.

Digit 1 - Category of use

Only one category of use is identified for electrically powered hold-open devices.

Grade 3: For all internal and external doors for use by the public, and others, with little incentive to take care, i.e. where there is some chance of misuse of the door.

Digit 2 - Number of test cycles

Two test durations are identified for devices manufactured to this European standard:

Grade 5: 50,000 cycles. For all stand alone electrically powered hold open devices

Grade 8: 500,000 cycles. For all stand alone electrically powered hold open and free-swing door closers and devices that contain operating arms.

Digit 3 - Test door mass/size

Five test door mass grades and related hold-open power sizes are identified according to Table 1 of this standard. Where an electrically powered hold-open device is suitable for a range of power sizes both the minimum and the maximum sizes shall be identified.

<table>
<thead>
<tr>
<th>TEST DOOR MASS AND RECOMMENDED DOOR WIDTHS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hold-open power size</td>
</tr>
<tr>
<td>----------------------</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
</tbody>
</table>

Table 1

Digit 4 - Fire behaviour

Only one grade of fire resistance is identified for the electrically powered hold-open devices

Grade 1: Suitable for use on fire/smoke door assemblies, subject to satisfactory assessment of the contribution of the emergency device to the fire resistance of specified fire/smoke door assemblies.

Digit 5 - Safety

All electrically powered hold-open devices are required to satisfy the Essential Requirement of safety in use contained in the Construction Products Directive, issued by the EU. Therefore only Grade 1 is identified.

Digit 6 - Corrosion resistance

Five grades of corrosion resistance are identified according to BS EN 1670:

Grade 0: No defined corrosion resistance

Grade 1: Low resistance

Grade 2: Moderate resistance

Grade 3: High resistance

Grade 4: Very high resistance
Standards Relevant to the Architectural Hardware Industry

Example
The following marking denotes an electrically powered hold-open device suitable for a range from power size 3 to power size 6.

:3:5:3/6:1:1:0:

Marking
The standard requires that each electrically powered hold-open device manufactured to the standard shall be marked with the following:

a) Manufacturer’s name or trademark or other means of positive identification
b) Product model identification
c) Classification details, 6 digit.
d) The number of the European standard, (BS EN 1155)
e) The month and year of the final assembly by the manufacturer. Note: This information can be in coded form.

BS EN 1158: 1997 - Door coordinator device - requirements and test methods.

Scope
This European Standard specifies requirements for door coordinator devices for double leaf single swing doors fitted with door closing devices. It includes both separately mounted devices and those mechanisms which are incorporated in the door closing device.

Classification
The standard classifies door coordinator devices using the 6 digit coding system. Each digit relates to a particular feature of the product measured against the standard’s performance requirements.

Digit 1 - Category of use
Only one category of use is identified for door coordinator devices.
Grade 3: For all internal and external doors for use by the public, and others, with little incentive to take care, i.e. where there is some chance of misuse of the door.

Digit 2 - Number of test cycles
Two test durations are identified for devices manufactured to this European standard:
Grade 5: 50,000 cycles. For all other door coordinator devices not included below.
Grade 8: 500,000 cycles. For all door coordinator devices which incorporate in, or for use in conjunction with automatic swing door operators, and for devices incorporated in a door closer.

Digit 3 - Test door mass/size
Five test door mass grades and related door coordinator sizes are identified according to Table 1 of this standard. Where a door coordinator device is suitable for a range of power sizes both the minimum and the maximum sizes shall be identified.

<table>
<thead>
<tr>
<th>Door coordinator size</th>
<th>Max. mass of hinged leaf</th>
<th>Width of test door leaf</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>60 kg</td>
<td>950 mm</td>
</tr>
<tr>
<td>4</td>
<td>80 kg</td>
<td>1100 mm</td>
</tr>
<tr>
<td>5</td>
<td>100 kg</td>
<td>1250 mm</td>
</tr>
<tr>
<td>6</td>
<td>120 kg</td>
<td>1400 mm</td>
</tr>
<tr>
<td>7</td>
<td>160 kg</td>
<td>1600 mm</td>
</tr>
</tbody>
</table>

Digit 4 - Fire behaviour
Two grades of fire behaviour are identified for door coordinator devices manufactured to this European standard:
Grade 0: Not suitable for use on fire/smoke door assemblies
Grade 1: Suitable for use on fire/smoke door assemblies, subject to satisfactory assessment of the contribution of the emergency device to the fire resistance of specified fire/smoke door assemblies.

Digit 5 - Safety
All door coordinator devices are required to satisfy the Essential Requirement of safety in use contained in the Construction Products Directive, issued by the EU. Therefore only Grade 1 is identified.

Digit 6 - Corrosion resistance
Five grades of corrosion resistance are identified according to BS EN 1670:
Grade 0: No defined corrosion resistance
Grade 1: Low resistance
Grade 2: Moderate resistance
Grade 3: High resistance
Grade 4: Very high resistance
Example
The following marking denotes a stand alone door coordinator device suitable for a range of door closer power sizes from size 3 to size 6 which is suitable for use on fire resisting doors but no defined corrosion resistance.

:3:5/3:6:1:1:0:

Marking
The standard requires that each door coordinator device manufactured to the standard shall be marked with the following:

a) Manufacturer’s name or trademark or other means of positive identification
b) Product model identification
c) Classification details. 6 digits.
d) The number of the European standard. (BS EN 1158:1997)
e) The month and year of the final assembly by the manufacturer. Note: This information can be in coded form.

BS EN 1303: 2005 - Building hardware - cylinders for locks - requirements and test methods

Scope
This European standard applies to cylinders for such locks as are normally used in buildings and are designed to be used with cylinders. It identifies one category of use grade, three grades of durability, four grades of fire resistance, two grades of corrosion and temperature resistance, six grades of key security and three grades of attack resistance.

Cylinder types and application

<table>
<thead>
<tr>
<th>Profile</th>
<th>Single Cylinder</th>
<th>Double Cylinder</th>
<th>Cylinder and Turn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Euro Profile</td>
<td>Single Cylinder</td>
<td>Double Cylinder</td>
<td>Cylinder and Turn</td>
</tr>
<tr>
<td>Oval Profile</td>
<td>Single Cylinder</td>
<td>Double Cylinder</td>
<td>Cylinder and Turn</td>
</tr>
<tr>
<td>Round Cylinder</td>
<td>Rim fixing</td>
<td></td>
<td>Screw into lock case</td>
</tr>
</tbody>
</table>

Classification
The standard classifies cylinders using a 8 digit coding system. Each digit refers to a particular feature of the product measured against the standard’s performance requirements.

Digit 1 - Category of use
Only one category of use is identified for cylinders.
Grade 1: Keys shall resist a torque of 2.5Nm and still be usable.

Digit 2 - Durability
Three grades of durability classify cylinders as either grade 4, 5 or 6 based on the number of test cycles achieved:
Grade 4: 25,000 cycles
Grade 5: 50,000 cycles
Grade 6: 100,000 cycles

Digit 3 - Door mass
No requirement

Digit 4 - Fire resistance
Cylinders are classified as either grade 0 or 1:
Grade 0: No requirement
Grade 1: Cylinders shall be fire tested in accordance with current fire test requirements of EN 1634-1

Digit 5 - Safety
No requirement

Digit 6 - Corrosion and temperature resistance
Cylinders are classified as grade A, B or C
Grade 0: No requirement
Grade A: Conforms to grade 3 of BS EN 1670 as a minimum
Grade B: Will resist temperature extremes of -20/+80°C
Grade C: Conforms to grade 3 of BS EN 1670 (minimum) and will resist temperature extremes of -20/+80°C
Standards Relevant to the Architectural Hardware Industry

Note: No distinction is made between the inside and the outside of either the cylinder and/or the door. On completion of the test, the cylinder must operate using a maximum 1.5Nm torque on the key.

**Digit 7 - Key security**

Cylinders are classified in grades 1 to 6, where 6 is the highest. The grade of security can differ from one side of a double cylinder to the other.

Table 1 provides a summary of the main security requirements.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Grade</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min. number of effective differs</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>300</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>15,000</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>30,000</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>30,000</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>100,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Grade</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min. number of movable detainers</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Grade</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. number of steps</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Grade</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct coding on key</td>
<td>1</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Grade</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque resistance of plug/cylinder</td>
<td>1</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>15</td>
</tr>
</tbody>
</table>

**Table 1 - Security**

**Digit 8 - Attack resistance**

Cylinders are classified grades 0, 1, and 2 where 2 is the highest. Table 2 provides a summary of the main requirements.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Grade</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistance to drilling (nett drilling time)</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Resistance to chisel attack (number of defined blows)</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>40</td>
</tr>
<tr>
<td>Resistance to twisting attack (number of defined twists)</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>Resistance to plug/cylinder extraction (pull load)</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>Torque resistance of plug/cylinder (torque on tool)</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>30</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Grade</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistance to drilling (nett drilling time)</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Resistance to chisel attack (number of defined blows)</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>40</td>
</tr>
<tr>
<td>Resistance to twisting attack (number of defined twists)</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>Resistance to plug/cylinder extraction (pull load)</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>Torque resistance of plug/cylinder (torque on tool)</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>30</td>
</tr>
</tbody>
</table>

**Table 2 - Attack resistance**

**Example**

The following marking denotes a cylinder meeting the required category of use, durability grade 6 (100,000 cycles) with no fire resistant requirement, grade C corrosion and temperature resistance, grade 4 key security and grade 1 attack resistance.

:1:6:--:0:--:C:4:1:

**Marking**

The standard requires that the classification relevant to the cylinder shall be quoted in the accompanying documentation, on its labelling or packaging and/or by marking the product itself or by more than one of these methods. The marking/labelling shall include the following:

a) Manufacturer’s name or trademark or other means of positive identification
b) Product model identification
c) Classification details. 7 digit.
d) The number of the European standard. (BS EN 11303:2005)

**Specification Issues**

All European countries will use the same product standard. Products complying with the new European standard provide peace of mind and evidence of professional specification. Product selection should be made on the basis of building use, occupancy and particular application. This standard should be read in conjunction with BS EN 12209:2003.

**BS EN 1527: 1998 - Building hardware - hardware for sliding doors and folding doors - requirements and test methods.**

**Scope**

The standard covers most of the main types of sliding and sliding/folding applications, giving details of product performance criteria, test apparatus, testing methods, door mass durability, fire and corrosion resistance. The standard specifies requirements for the principal components for most sliding and sliding/folding doors but excludes the doors and panels themselves. Products included within the standard are:

- Straight sliding systems
  - top hung
  - bottom rolling (panels over 100 kg)
- Sliding/folding doors
- Multi-panel folding doors

The standard does not cover bottom rolling systems where the door weight is less than 100 kg and certain types of folding systems.
BS EN 1527: 1998 - Continued

Classification

This standard classifies sliding door gear using a 9 digit coding system. Each digit relates to a particular feature of the product measured against the standard’s performance requirements.

**Digit 1 - Category of use**

No grade identified for these products

**Digit 2 - Durability**

Durability is measured by the number of openings (cycles) performed by the gear under standard test conditions. All parts must remain in a serviceable condition throughout the test and no adjustment is allowed. Fittings are required to pass the Initial Friction Test (Digit 9) both before and after the durability test. The six grades are:

- 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

**Digit 3 - Door weight**

Four grades are identified:

- Grade 1: up to 50 kg
- Grade 2: from 51 to 100 kg
- Grade 3: from 101 to 330 kg
- Grade 4: over 330 kg

**Digit 4 - Fire resistance**

Two grades of fire resistance are identified:

- Grade 0: Not approved for use on fire door assemblies
- Grade 1: Suitable for use on fire door assemblies

**Digit 5 - Safety**

No requirements

**Digit 6 - Corrosion resistance**

Five possible grades are identified, classified in accordance with BS EN 1670:

- Grade 0: No defined corrosion resistance
- Grade 1: Low resistance
- Grade 2: Moderate resistance
- Grade 3: High resistance
- Grade 4: Very high resistance

**Digit 7 - Security**

No requirements

**Digit 8 - Category of door**

Three types of door are covered by the standard:

- Grade 1: Straight sliding door
- Grade 2: Sliding/folding doors
- Grade 3: Multi-panel doors

**Digit 9 - Initial friction**

This is the measurement of the amount of force required to start the movement of the door. The grade allocated is variable depending upon the weight of the door.

<table>
<thead>
<tr>
<th>Weight</th>
<th>0-50 kg</th>
<th>51-100 kg</th>
<th>101-330 kg</th>
<th>Over 330 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 1</td>
<td>50N</td>
<td>80N</td>
<td>100N</td>
<td>5%*</td>
</tr>
<tr>
<td>Grade 2</td>
<td>40N</td>
<td>60N</td>
<td>5%*</td>
<td>4%*</td>
</tr>
<tr>
<td>Grade 3</td>
<td>30N</td>
<td>40N</td>
<td>4%*</td>
<td>3%*</td>
</tr>
</tbody>
</table>

*% of door weight

**Example**

The following marking denotes a straight sliding door with a weight between 51 kg and 100 kg, durability tested to 100,000 cycles, no fire resistance, high corrosion resistance and having initial friction equal to or less than 60N.

::-6:2:0::-3::-1:2:
Marking
Hangers manufactured to this standard should be marked with the following:

a) The manufacturer’s name or trade mark.
b) Product identification. The identification should, where possible, be shown on the product. Alternatively, it should be on the packaging. The classification illustrated above may also be included.

BS EN 1634-1: 2000 - Fire resistance tests for doors and shutter assemblies. Fire doors and shutters.
This standard specifies the methods of tests for Fire Doors. The furnace performance and pressures are defined. Generally regarded as being more severe than the previous BS476 fire tests.


BS EN 1670: 2007 - Building hardware - corrosion resistance - requirements and test methods.

Scope
This European Standard specifies the requirements for the corrosion resistance of hardware including the metal fastenings. The standard specifies requirements for four grades of corrosion performance plus an additional "0" grade which has no requirements.

Classification
Requirements are specified for four grades of corrosion resistance classified as low, moderate, high and very high which may be typified by situations ranging from mild exposure in interior environments to very severe exposure in interior environments in very polluted localities.

Requirements
Particular test methods are defined for the testing of materials that have been nickel plated, nickel/chromium plated, and zinc plated on steel or anodised aluminium. There is also a method defined for testing all other materials and coatings. Acceptance criteria are defined and are based upon the visual identification of corrosion spots on any significant surface. These must not be larger than 1.5 mm in any direction and must not average more than one per 650 mm².

Specification issues
BS EN 1670 is not, in itself, a product standard but it is the reference corrosion standard included in all current BS EN product standards. Although BS EN 1670 includes visual acceptance criteria, some BS EN product standards only use the BS EN 1670 method of test and add their own acceptance criteria.

BS EN 1906: 2002 - Building hardware - lever handles and knob furniture.
This standard details performance requirements and test methods in relation to corrosion resistance, security and other aspects pertaining to the application of lock and latch furniture.

Scope
The European Standard specifies the performance requirements and test methods (i.e. durability, static strength, operating torque, corrosion, safety, etc.) for sprung and unsprung lever handles and knobs for doors on backplates or roses. It applies only to lever handles and knobs that operate a lock or latch. The standard has 4 grades of performance. Compliance with the standard ensures a margin of strength in excess of that needed for normal operation. The standard has additional graded safety requirements where a high risk of failing exists.

Classification
BS EN 1906 classifies door furniture by using an 8 digit coding system. A similar classification applies to all building hardware products so that complementary items of hardware can be specified to, for instance, a common level of corrosion resistance, category of use etc. Each digit refers to a particular feature of product measured against the standard’s performance requirements.

Digit 1 - Category of use
Four grades are identified:
Grade 1: Medium frequency of use with high incentive to exercise care and a small chance of misuse, e.g. internal residential doors.
Grade 2: Medium use by people with some incentive to exercise care but where there is some chance of misuse, e.g. internal office doors.
Grade 3: High use by public or others with little incentive to exercise care and with a high chance of misuse, e.g. public office doors.
Grade 4: High use on doors which are subject to frequent violent use, e.g. football stadiums, oil rigs, barracks, public toilets etc.

Digit 2 - Durability
Two grades of durability are identified:
Grade 6: Medium use - 100,000 cycles
Grade 7: High use - 200,000 cycles
The tests undertaken to achieve these grades involve the application of additional forces to the door furniture in order to simulate the conditions of use likely to be experienced in the field.

Digit 3 - Test door mass
No requirement
Standards Relevant to the Architectural Hardware Industry

BS EN 1906: 2002 - Continued

Digit 4 - Fire resistance

Two grades of fire resistance are identified:

Grade 0: Not approved for use on fire and smoke doors.
Grade 1: Suitable for use on fire and smoke doors.

Note: Grade 1 classification means only that the furniture has been designed for use on fire/smoke control doors; the actual fire performance achieved (e.g. fire integrity of 30 minutes on a partially glazed timber door etc.) will be contained in a separate test report.

Digit 5 - Safety

Two grades of safety are identified:

Grade 0: Normal use.
Grade 1: Safety application - to qualify for this grade, handles must have a high strength handle-to-plate and plate-to-door fixing and/or handle-to-spindle fixing, such that they would withstand a person grabbing in order to prevent falling. It is recommended that only Safety Grade 1 furniture is used at the top of cellar steps or other staircases.

Digit 6 - Corrosion resistance

Five grades of corrosion resistance are identified:

Grade 0: No defined corrosion resistance.
Grade 1: Mild resistance - minimum requirement for internal use.
Grade 2: Moderate resistance.
Grade 3: High resistance - minimum requirement for external use.
Grade 4: Very high resistance for use in exposed marine atmospheres or very high polluted industrial environments.

Note: Products intended to develop a natural patina (such as bronze or brass) are not required to comply with any requirements.

Digit 7 - Security

Five grades of security are identified:

Grade 0: Not approved for use on burglary resistant doors.
Grade 1: Mild burglary resistance.
Grade 2: Moderate burglary resistance.
Grade 3: High burglary resistance.
Grade 4: Extra high burglary resistance.

Note: The main requirements include resistance to drilling, close fitting plates or escutcheons to help protect the lock and support the cylinder. They must be resistant to removal from the outside of the door and make provision to minimise the cylinder projection to a maximum of 3 mm. Full details of the requirement can be found in BS EN 1906.

Digit 8 - Type of operation

Three operation types are identified:

Type A: Spring assisted furniture
Type B: Unsprung furniture
Type U: Unsprung furniture

Example

The following marking denotes a lever handle for use on a door that has a high frequency of use and is subject to frequent violent use. It is suitable for use on fire door assemblies and for use where safety is important. It has a very high corrosion resistance and a high burglary resistance suitable for external doors. It is of the unsprung type.

Fire door assemblies

Lock and latch furniture for use on fire/smoke doors requires a set of lock and latch furniture to comply with appropriate requirements of the European Standard. In addition, for lock and latch furniture to be attested suitable for the use on fire/smoke door assemblies a third set of lock or latch furniture should be incorporated in a door assembly that has satisfied the criteria of a fire test according to BS EN 1634-1. This furniture should be fitted on to an identical design, shape and size of door assembly.

Specification issues

Security - Security lock furniture is one element of a burglary resistant door assembly that includes the door leaf and frame, lock, hinges and the method of fixing. Main design requirements include the use of at least two through-door fixings which cannot be detached from the outside. Requirements also include the use of an internal plate with a cylinder aperture that closely matches the cylinder profile and that the cylinder does not project more than 3 mm from the face of the plate. Full details of the requirements can be found in BS EN 1906.

Sprunging - Type A furniture has light springing only and is dependant upon the lock/latch springing to fully return the lever to the 'at rest' position. Type B furniture has integral springing capable of returning the lever to its rest position, whilst Type U is dependant wholly upon the lock/latch to return it to its rest position. It is essential, therefore, to select the correct lock/latch to suit the furniture.

Application - It is most important to specify the correct grade of door furniture for the intended application. For example, Category of Use Grade 1 lever is most suited for light residential use, whereas Grade 4 door furniture is most appropriate choice for buildings such as schools and sports stadiums where there will be a high level of use, and possible abuse.
BS EN 1935: 2002 - Building hardware - single axis hinges

This standard provides details on product types, classification by use, test cycles, door mass corrosion resistance, as well as definitions, product performance requirements, test apparatus, test methods and marking of products. In addition, the published standard includes annexes with details of special needs. Note: This standard has replaced BS 7352:1990.

Scope
This European Standard specifies requirements for single-axis hinges for windows and doors opening only in one direction whose rotation axis is no more than 30 mm from the face of the sash or door. It covers both fixed pin and lift-off hinges.

Classification
This European Standard classifies single-axis hinges using an 8 digit coding system. It is intended that this classification system will apply to all building hardware product standards so that complementary items of hardware can be specified to, for instance, a common level of corrosion resistance, category of use, etc. Each digit refers to a particular feature of the product measured against the standard’s performance requirements.

Digit 1 - Category of duty
Four categories of duty are identified:
Category 1: Light duty
Category 2: Medium duty
Category 3: Heavy duty
Category 4: Severe duty

Digit 2 - Durability
Three grades of durability for single-axis hinges are identified:
Grade 3: 10,000 test cycles, for light duty hinges on windows.
Grade 4: 25,000 test cycles, for light duty hinges on windows and doors.
Grade 7: 200,000 test cycles, for medium, heavy and severe duty hinges on doors only.

Digit 3 - Test door mass
Eight door mass grades related to single-axis hinges are identified as shown in Table 1

<table>
<thead>
<tr>
<th>Test door mass grade</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Door mass</td>
<td>10 kg</td>
<td>20 kg</td>
<td>40 kg</td>
<td>60 kg</td>
<td>80 kg</td>
<td>100 kg</td>
<td>120 kg</td>
<td>160 kg</td>
</tr>
</tbody>
</table>

Table 1

Digit 4 - Suitability for fire/smoke door use
Two grades of suitability are identified:
Grade 0: Not suitable for fire/smoke resistant door assemblies.
Grade 1: Suitable for use on fire/smoke resistant door assemblies subject to satisfactory assessment of the contribution of the single-axis hinge to the fire resistance of special fire/smoke door assemblies. Such assessment is outside the scope of this European standard (See EN 1634-1).

Digit 5 - Safety
Single-axis hinges are required to satisfy the essential requirements of safety in use. Therefore, only Grade 1 is identified.

Digit 6 - Corrosion resistance
Five grade of corrosion resistance are identified in accordance with EN 1670
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
Two grades of security are identified:
Grade 0: No security
Grade 1: Suitable for applications requiring a degree of security. Annex C of this European Standard details the hinge grade to use for the level of security.

Digit 8 - Hinge grade
Fourteen grades are identified in this standard and are detailed in Table 2. The full classification is shown in the standard.

<table>
<thead>
<tr>
<th>Hinge grade</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Window/Door</td>
<td>Window</td>
<td>Window</td>
<td>Win/Dr</td>
<td>Door</td>
<td>Window</td>
<td>Win/Dr</td>
<td>Door</td>
<td>Window</td>
<td>Win/Dr</td>
<td>Door</td>
<td>Door</td>
<td>Door</td>
<td>Door</td>
<td></td>
</tr>
<tr>
<td>Test cycles</td>
<td>10,000</td>
<td>10,000</td>
<td>25,000</td>
<td>10,000</td>
<td>25,000</td>
<td>200,000</td>
<td>10,000</td>
<td>25,000</td>
<td>200,000</td>
<td>10,000</td>
<td>25,000</td>
<td>200,000</td>
<td>200,000</td>
<td>200,000</td>
</tr>
<tr>
<td>Door mass</td>
<td>10 kg</td>
<td>20 kg</td>
<td>20 kg</td>
<td>20 kg</td>
<td>40 kg</td>
<td>40 kg</td>
<td>60 kg</td>
<td>60 kg</td>
<td>80 kg</td>
<td>100 kg</td>
<td>120 kg</td>
<td>160 kg</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2
Standards Relevant to the Architectural Hardware Industry

BS EN 1935: 2002 - Continued

Example

The following marking denotes a single-axis hinge for use in medium duty situations, tested to 200,000 cycles, for use on doors with a mass up to 60 kg, with stated fire door suitability, high corrosion resistance, suitable for burglar-resistant doors, and a hinge grading of 10.

\[ \text{Marking} \]

Each single-axis hinge manufactured to this European Standard must be marked with the following:

a) Manufacturer’s name or trademark, or other means of identification.

b) The hinge grade (eight digit classification code)

c) Number of this European standard.

Note: This information can be in coded form.

CE marking

Single-axis hinges intended for use on fire resisting doors and smoke control doors are covered by a Construction Products Directive mandate, issued by the European Commission. Consequently, this standard is regarded as a “harmonised” standard and compliance with it, supported by suitable evidence, allows the application of the CE mark. As fire/smoke door hinges have a critical safety function, application of the CE mark requires the involvement of a notified certification body to provide verification of the compliance claim. This involves initial type testing of the product to EN 1935, initial inspection of the manufacturer’s factory production control and continuing surveillance and approval of the factory production control. On satisfactory completion of these tasks, the notified body issues an EC Certificate of Conformity which then permits the manufacturer to declare compliance and affix the CE marking to his product.

The standard requires the following additional information to accompany the CE mark:

a) The identification number of the notified certification body

b) The name or identifying mark of the manufacturer.

c) The registered address of the manufacturer

d) The last two digits of the year in which the marking was applied.

e) The number of the EC certificate of conformity.

f) The classification code of the product.

Note: Although the notified body has to be involved to verify the manufacturer’s claims, the manufacturer remains responsible for designing and producing the product, for the affixing the CE marking, and for ensuring that the product meets the requirements of the Directive.

BS EN 12051: 2000 - Door and window bolts.

Scope

This standard covers single point bolts and associated keeps used to secure, or to increase the security of, doors and windows providing that movement of the shoot is by direct hand or foot operation. It includes bolts operated by lever, knob, slide, pull etc. or by a removable device (though not a multiple differ key) from the secure side of the door leaf only.

The following types of bolt are included:

- Barrel bolts and Tower bolts
- Foot bolts, Drop bolts, Square spring bolts and garage door bolts.
- Flush bolts (sunk slide, knob slide, lever action and automatic).
- Padlock bolts
- Privacy bolts
- Mortise bolts (operated by a removable device, fixed knob, lever etc).

Locking bolts that are operated by hand and then locked to prevent withdrawal are also included. Espagnolette/Cremone bolts and emergency/panic bolts are not covered by this standard.

Classification

The standard classifies bolts using the seven digit coding system. Each digit relates to a particular feature of the product measured against the standards performance requirements.

Digit 1 - Category of use

Classification is in for grades, grade 1 being the lowest.

Grade 1: Light duty

Grade 2: Medium duty

Grade 3: Heavy duty

Grade 4: Extra heavy duty

The category of use is determined by the amount of excess force (abuse) that can be resisted at the normal operating point of the lever, knob etc. when the shoot is obstructed. Minimum forces for each grade are shown in Table 1.

Table 1 - see opposite, top of page 31
Table 1

<table>
<thead>
<tr>
<th>Digit 2 - durability (Number of test cycles)</th>
<th>Grade</th>
<th>Number of test cycles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 1</td>
<td>1</td>
<td>2,500 cycles</td>
</tr>
<tr>
<td>Grade 2</td>
<td>2</td>
<td>5,000 cycles</td>
</tr>
<tr>
<td>Grade 3</td>
<td>3</td>
<td>10,000 cycles</td>
</tr>
<tr>
<td>Grade 4</td>
<td>4</td>
<td>50,000 cycles</td>
</tr>
</tbody>
</table>

* * Exposed means at least 10 mm between lever/knob and body of bolt, otherwise F1(2) applies.

Table 2

<table>
<thead>
<tr>
<th>Abuses forces</th>
<th>Grade</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear force on end of exposed* lever, knob etc. (F1(1))</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>300</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>400</td>
</tr>
<tr>
<td>Linear force on restricted access thumb slide, lever, etc. (F1(2))</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>200</td>
</tr>
<tr>
<td>Forces applied to extremities of rotating knob, key etc.</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>200</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Security requirement</th>
<th>Grade</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistance to end load</td>
<td>0</td>
<td>1500</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>3000</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>4000</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>5000</td>
</tr>
<tr>
<td>Resulting projection</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>17</td>
</tr>
<tr>
<td>Resistance to sawing</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Resistance to side load</td>
<td>0</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1500</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>4500</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>7000</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>10000</td>
</tr>
</tbody>
</table>

Marking

The standard requires that the classification relevant to the product shall be quoted in the accompanying documentation, on its labelling or packaging, and/or by marking the product itself. The marking/labelling shall include:

a) Manufacturers name, trademark or other means of identification.

b) The 7 digit classification code.

c) The number and date of the European Standard.

d) The month and year of manufacture (may be coded).

CE marking

It is not mandatory for bolts to be manufactured to BS EN 12051 and they will not therefore carry a CE mark.

Example

The following door bolt classification denotes that it is heavy duty, tested to 50,000 cycles, not required to be fire tested, not required to be safe in use, high resistance to corrosion and is very secure. The dash in box three denotes that the standard has no door mass requirement.

:3:4:0:0:3:5:

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BS EN 12209: 2003 - Mechanically operated locks, latches and locking plates.

Scope
This standard covers the requirement and test methods for durability, strength, security and function of all types of mechanical locks and latches (including associated or separately locking plates), intended for use on pedestrian doors in buildings. Excluding electro-mechanically operated locks and striking plates, multipoint locks and their locking plates, locks for windows, padlocks, locks for safes, furniture locks and prison locks.

Classification
The standard classifies locks and latches using the 11 digit coding system. Each digit relates to a particular feature of the product measured against the standards performance requirements.

Digit 1 - Category of use
Classification is in three grades, grade 1 being the lowest

Grade 1: Low frequency. For use by people with a high incentive to exercise care and a small chance of misuse, e.g. internal residential doors

Grade 2: Medium frequency. For use by people with some incentive to exercise care but where there is some chance of misuse, e.g. internal office doors.

Grade 3: High frequency. For use by public or others with little incentive to exercise care and with a high chance of misuse, e.g. public doors

Digit 2 - Durability
Twelve grades of durability are identified:

Grade A: 50,000 cycles. No load on latch bolt

Grade B: 100,000 cycles. No load on latch bolt

Grade C: 200,000 cycles. No load on latch bolt

Grade D: 50,000 cycles. 10N load on latch bolt

Grade E: 100,000 cycles. 10N load on latch bolt

Grade F: 200,000 cycles. 10N load on latch bolt

Grade G: 50,000 cycles. 25N load on latch bolt

Grade H: 100,000 cycles. 25N load on latch bolt

Grade I: 200,000 cycles. 25N load on latch bolt

Grade J: 50,000 cycles. 50N load on latch bolt

Grade K: 100,000 cycles. 50N load on latch bolt

Grade L: 200,000 cycles. 50N load on latch bolt

Grade M: 100,000 cycles. 120N load on latch bolt

Grade N: 200,000 cycles. 120N load on latch bolt

Digit 3 - Door mass and closing force
Nine grades of door mass and closing force are identified:

Grade 1: Up to 100 kg door mass; 50N maximum closing force

Grade 2: Up to 200 kg door mass; 50N maximum closing force

Grade 3: Up to 200 kg door mass or specified by the manufacturer; 50N maximum closing force

Grade 4: Up to 100 kg door mass; 25N maximum closing force

Grade 5: Up to 200 kg door mass; 25N maximum closing force

Grade 6: Up to 200 kg door mass or specified by the manufacturer; 25N maximum closing force

Grade 7: Up to 100 kg door mass; 15N maximum closing force

Grade 8: Up to 200 kg door mass; 15N maximum closing force

Grade 9: Up to 200 kg door mass or specified by the manufacturer; 15N maximum closing force

Digit 4 - Fire resistance
Two grades of suitability for use on fire/smoke doors are identified:

Grade 0: not approved for use on fire/smoke door assemblies

Grade 1: suitable for use on fire/smoke door assemblies tested to EN 1634-1 etc

Note 1. A grade 1 classification means only that the lock has been designed for use on fire/smoke control doors; the actual fire performance achieved (e.g. fire integrity of 30 minutes on a partially glazed timber door etc.) will be contained in a separate fire test report.

Note 2. Where a product is intended for fire/smoke use (i.e. “1” in box 4), it must be possible to demonstrate compliance with the Essential Requirements of the Construction Products (Amendments) Regulations. It is recommended that the product should bear the CE mark. (see section on CE marking).

Digit 5 - Safety
Only one grade of safety is identified:

Note: A lock or latch conforming to this standard can, at the same time, also be part of an exit device conforming to EN 179 or EN 1125

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Standards Relevant to the Architectural Hardware Industry

Digit 6 - Corrosion resistance and temperature
Eight grades of corrosion resistance are identified:
- Grade 0: No defined corrosion resistance; no temperature requirement
- Grade A: Low corrosion resistance; no temperature requirement
- Grade B: Moderate corrosion resistance; no temperature requirement
- Grade C: High corrosion resistance; no temperature requirement
- Grade D: Very high corrosion resistance; no temperature requirement
- Grade E: Moderate corrosion resistance; temperature requirement: from -20°C to +80°C
- Grade F: High corrosion resistance; temperature requirement: from -20°C to +80°C
- Grade G: Very high corrosion resistance; temperature requirement: from -20°C to +80°C

Digit 7 - Security and drill resistance
Seven grades of security and drill resistance are identified:
- Grade 1: Minimum security and no drill resistance
- Grade 2: Low security and no drill resistance
- Grade 3: Medium security and no drill resistance
- Grade 4: High security and no drill resistance
- Grade 5: High security with drill resistance
- Grade 6: Very high security and no drill resistance
- Grade 7: Very high security with drill resistance

Digit 8 - Field of door application.
Fifteen grades of door application are identified in Table 3: Classification in fifteen grades

<table>
<thead>
<tr>
<th>Grade</th>
<th>Type</th>
<th>Application 1</th>
<th>Application 2</th>
<th>Application 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Mortice</td>
<td>Unrestricted application</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Mortice</td>
<td>Hinge door</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Mortice</td>
<td>Sliding door</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Rim</td>
<td>Unrestricted application</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Rim</td>
<td>Hinged door</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Rim</td>
<td>Sliding door</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>Bored lock</td>
<td>Unrestricted application</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>Mortice</td>
<td>Hinged door</td>
<td>Supported</td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>Rim</td>
<td>Hinged door</td>
<td>Inwards</td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>Mortice</td>
<td>Hinged door</td>
<td></td>
<td>Locked from inside</td>
</tr>
<tr>
<td>L</td>
<td>Mortice</td>
<td>Sliding door</td>
<td></td>
<td>Locked from inside</td>
</tr>
<tr>
<td>M</td>
<td>Rim</td>
<td>Hinged door</td>
<td></td>
<td>Locked from inside</td>
</tr>
<tr>
<td>N</td>
<td>Rim</td>
<td>Sliding door</td>
<td></td>
<td>Locked from inside</td>
</tr>
<tr>
<td>P</td>
<td>Mortice</td>
<td>Hinged door</td>
<td>Supported</td>
<td>Locked from inside</td>
</tr>
<tr>
<td>R</td>
<td>Rim</td>
<td>Hinged door</td>
<td>Inwards</td>
<td>Locked from inside</td>
</tr>
</tbody>
</table>

Table 3

Digit 9 - Type of key operation and locking
Nine grades of type of key operation and locking are identified:
- Grade 0: not applicable
- Grade A: cylinder lock or latch; manual locking
- Grade B: cylinder lock or latch; automatic locking
- Grade C: cylinder lock or latch; manual locking with intermediate locking
- Grade D: lever lock or latch; manual locking
- Grade E: lever lock or latch; automatic locking
- Grade F: lever lock or latch; manual locking with intermediate locking
- Grade G: lock or latch without key operation; manual locking
- Grade H: lock without key operation; automatic locking

Digit 10 - Type of spindle operation
Five grades of spindle operation are identified:
- Grade 0: lock without follower
- Grade 1: lock with sprung lever or knob
- Grade 2: lock with light unsprung lever
- Grade 3: lock with heavy unsprung lever
- Grade 4: lock with manufacturer’s own specification furniture

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BS EN 12209: 2003 - Continued

Digit 11 - Key identification

Nine grades of key identification are identified:

Grade 0: No requirement
Grade A: Minimum three detaining elements
Grade B: Minimum five detaining elements
Grade C: Minimum five detaining elements, extended number of effective differs
Grade D: Minimum six detaining elements
Grade E: Minimum six detaining elements, extended number of effective differs
Grade F: Minimum seven detaining elements
Grade G: Minimum seven detaining elements, extended number of effective differs
Grade H: Minimum eight detaining elements, extended number of effective differs

Note: This applies only to lever locks: cylinders are assessed to BS EN 1303: 1998

CE marking

Locks and latches intended for use on fire resisting doors and smoke control doors are covered by a Construction Products Directive mandate issued by the European Commission. Consequently this standard is regarded as a "harmonised" standard and compliance with it, supported by suitable evidence, allows the application of the CE mark. As locks and latches have a critical safety function, application of the CE mark requires the involvement of a notified certification body to provide verification of the compliance claims. This involves initial type testing of the product to EN 12209, initial inspection of the manufacturer's factory production control and continuing surveillance and approval of the factory production control. On satisfactory completion of these tasks, the notifying body issues an EC Certificate of Conformity which then permits the manufacturer to declare compliance and affix the CE marking to his product. The standard requires the following additional information to accompany the CE marking:-

a) Identification number of the notified certification body.
b) The name or identifying mark of the manufacturer.
c) The registered address of the manufacturer.
d) The last two digits of the year in which the marking was applied.
e) The number of the EC certificate of conformity reference to EN 12209: 2003.
f) The classification code of the product.

Example

This indicates a mechanically operated lock and locking plate intended for use in situations where there is an incentive to exercise care; that will withstand a durability of 200,000 cycles with 10N side load on the latch bolt on a door of up to 200 kg in mass; that will close with a maximum force of 25N; that is suitable for use on a fire/smoke resisting door; that has no safety requirement; that has moderate corrosion resistance over a temperature range of -20°C to +80°C; that has high security and drill resistance; that is suitable for unsprung furniture; and that has five detaining elements with a minimum of 10,000 differs

:2:H:5:1:0:E:5:A:F:2:C:

BS EN 12209

BS EN 12320: 2001 - Building hardware - padlocks and padlock fittings.

Scope

a) This European Standard specifies performance requirements and describes test methods for strength, security, functions and corrosion of padlocks and padlock fittings used in building applications, but excluding cables and chains.
b) Requirements which relate to security are classified in six grades, based on performance tests that simulate attack.
c) Human intervention, durability, manipulation and picking tests are not included in this standard.

Classification

BS EN 12320 classifies padlocks and padlock fittings using a seven digit coding system. Each digit refers to a particular feature of the product measured against the standard’s performance requirements.

Digit 1-5 - Classification of use

Test cycles/durability, door mass, fire resistance and safety are not applicable.

Digit 6 - Corrosion resistance

Two grades are applicable

Grade 1: Internal applications

Grade 3: External applications - Published standard contains an error. BSI to correct.

Digit 7 - Security requirements

Six grades are applicable, where 1 is the lowest. See Table 1

Table 1 - see opposite, top of page 35
Subject to the application, decide the level of security required and use a padlock and fittings matching classification. The padlock and fittings are suitable for external use and to have 5000 differs.

The security of the locking device may be compromised if, for example, a high graded padlock is used with a low graded padlock fitting.

Marking
The standard requires that the classification relevant to the padlock or padlock fitting shall be quoted in the accompanying documentation, on its labelling or packaging and/or by marking the product itself or by more than one of these methods. The marking/labelling shall include the following:

- a) Manufacturer’s name or trademark, or other means of identification
- b) Product model identification
- c) The 7 digit classification
- d) Number of this European Standard
- e) Year and week of manufacture

BS EN 13724: 2002 - Postal services - apertures of private letter boxes and letter plates.

Scope
Specifies the requirements and test methods of the aperture for the delivery of letter post items.

Defines four types of unit’s outdoor private letter boxes, indoor private letter boxes, slide through boxes and letter plates.

Two aperture sizes, three corrosion grades and two security grades are also defined.

The units are tested for safety, opening force of the flap and for water penetration.

The dimensions for these devices are shown in Table 1.

For letterplates, installation shall be between 700 and 1700 mm from the delivery floor level and shall not be less than 680 mm from the receiving floor height nor the aperture height of more than 40 mm unless special security attachments are used. The letterplate should not be installed within 400 mm of an unsecured door or window lock.

Example
Subject to the application, decide the level of security required and use a padlock and fittings matching classification. The padlock and fittings are suitable for external use and to have 5000 differs.

Table 1

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Grade</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum number of effective differs</td>
<td>300</td>
<td>1,000</td>
</tr>
<tr>
<td>Non-interposing of keys with just one interval differ. Torque on key</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Resistance to force on cylinder plug or locking mechanism</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Resistance to tongue on cylinder plug or locking mechanism</td>
<td>-</td>
<td>2.5</td>
</tr>
<tr>
<td>Resistance to pulling of shackle and staple</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Resistance to twisting of shackle and staples</td>
<td>40</td>
<td>100</td>
</tr>
<tr>
<td>Resistance to cutting of shackle and staple</td>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>Resistance to impact on padlock body</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Shackle and staple at low temperature</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Resistance to drilling of padlock, shackle and staple</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Resistance to sawing of padlock, shackle and staple</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 1

BS EN 12320

<table>
<thead>
<tr>
<th>Size</th>
<th>Type 1, 2 &amp; 3</th>
<th>Type 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Short side of aperture</td>
<td>Short side of aperture</td>
</tr>
<tr>
<td>1</td>
<td>minimum 30 mm, maximum 35 mm</td>
<td>minimum 30 mm, maximum 35 mm*</td>
</tr>
<tr>
<td>2</td>
<td>minimum 30 mm, maximum 35 mm</td>
<td>minimum 30 mm, maximum 35 mm*</td>
</tr>
</tbody>
</table>

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Note: DHF (Door and Hardware Federations) graphic icons have been added