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Secured by Design

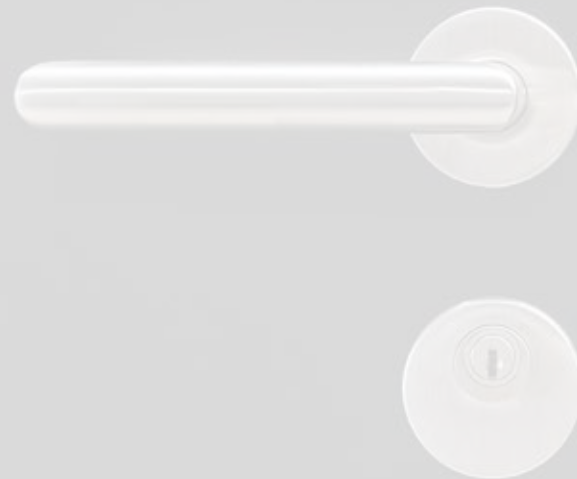


Official Police Security Initiative

IRONMONGERY AND SECURITY

GAI SPECIFIER'S GUIDE

The specifier's guide to security issues relating to doors and how the specification of the right ironmongery hardware can help.



IRONMONGERY AND SECURITY

GAI SPECIFIER'S GUIDE

Based on the RIBA Approved CPD of the same name, the specifier's guide on Ironmongery and Security covers the security issues relating to doors and how the correct specification of the right ironmongery hardware can help.

To ensure that your project meets the latest standards, regulation, legislation and best practice, it is strongly recommended that the ironmongery should be specified by a GAI Registered Professional such as a Registered Architectural Ironmonger (RegAI). All RegAI's have successfully completed the GAI Diploma in Scheduling qualification, and continue to maintain and update their knowledge through the GAI continuing professional development (CPD) programme. RegAI status is a clear demonstration of professional competence in matters which are critical to building safety, accessibility and security. Visit www.gai.org.uk/RegAI.

If you would like to receive a presentation of the CPD, this is available through GAI member companies. Please visit the GAI website (www.gai.org.uk) for more details.

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1. THE IMPORTANCE OF SECURITY

DEFINITION

" Security refers to all the measures that are taken to protect a place, or to ensure that only people with permission enter it or leave it."

Source: Collins Dictionary

WHY DO WE NEED SECURITY?

The security of domestic and commercial property is under threat now more than ever before. Methods of lock attack, previously only known to locksmiths and "professional" burglars, are now laid bare on the internet for all to see. In the UK there are 45 million residential doors. It is estimated that two-thirds of these are vulnerable to attack.

Source: DHF Specifying Security Hardware for Doors

WHAT SHOULD A LOCK DO?

First and foremost, locks must be suitable for the moveable element to which it is fitted – e.g. door/cupboard/box: Padlocks aren't ideal on residential front doors, because you could only lock them from the inside or the outside of the door. The lock type must be suitable for the application:

- Be durable for a sufficiently long time. A lock designed for use on an internal domestic door will not stand up to use in a school or hospital. "Build quality" must be appropriate.
- Be suitable for the level of security required: The more you need to restrict access and protect what's behind the door, the higher must be the level of security.
- Have a locking/unlocking system suitable for the kind of use it will get: Lever handles, knobs, thumbturns, digital buttons, keys, swipe cards – on their own or in combination, are all ways of operating a lock, and each system suits certain applications more than others.

Locks should take in to consideration a number of usage criteria including burglar resistance, accessibility and escape, various types of lock are available which consider all these factors.

It should also comply with the relevant standards, some are mandatory for fire or escape doors such as BS EN 12209 or BS EN 179 and some are recommended for security purposes such as BS 3621, BS 8621 or BS 10621.

2. MORTICE LOCKS FUNCTIONS

There are various types of mortice locks which fulfil different functions within a building:

Sashlock - This has two bolts, one which is the latch bolt and the other which is a dead bolt – these are used with lever handles or knob furniture.

Deadlock - Often fitted where security is of paramount importance e.g. store room doors or to upgrade the security of a door fitted with only a latch.

Bathroom lock - These are usually housed in the same case as an upright mortice lock with the same backsets and centres. They have a bevelled or roller latch bolt with a follower instead of a keyway which a thumb turn and indicator are inserted in to.

Nightlatch - There are many types available, all having slam lock operation. For increased security, some have anti-thrust deadlocking.

Latch - There is a wide variety available, from the square 76 x 76 mm case to the housing quality tubular latch. These all have bevelled or roller bolts and are operated by lever handles or knobs. They are designed for internal, non-locking doors.

Escape lock - Can have one or two bolts, The one thing they have in common is that at any time, the inside lever or pushpad will withdraw ALL bolts simultaneously, allowing immediate escape. A mortice escape lock must be CE/UKCA marked to BS EN 179.

Sliding door lock - The function is self-explanatory. There are two types: a claw bolt or a hook bolt.



Sashlock



Latch



Deadlock



Escape lock



Bathroom lock



Sliding door lock



Nightlatch

2.

MORTICE LOCKS STANDARDS

BS EN 12209

BS EN 12209 is the European Standard for locks and latches.

This standard specifies the requirements and test methods for durability, strength, security, and function of mechanically operated locks and latches.

The standard was published in 2003 but revised in 2016.

The 2003 version is harmonised/designated standard meaning locks must be CE/UKCA marked to this version of the standard when used on fire doors.

BS EN 179

BS EN 179 is the standard for emergency escape which is where employees can be trained in their use during fire drills.

This is for doors which have a push pad or lever handle.

These are found most often in the workplace.

Single hand operation must withdraw all bolts immediately.

BS EN 179 is a harmonised/designated standard which means locking products on emergency escape doors must be CE/UKCA marked to BS EN 179.

This differs from panic scenario where panic bars are under BS EN 1125.

BS 3621

This standard specifies the requirements and test methods for a thief resistant mechanically operated single-point lock assembly – it was published in 2007 but amended (A2) in 2012 and has now been revised again in 2017.

This is to allow the Standards to fall in to line with recent changes to BS EN 12209 2016 for locks and BS EN 1303 2015 for cylinders.

BS 8300-2

BS 8300-2 is the Code of Practice on design of buildings to meet the needs of disabled people.

These are recommendations on how mortice locks should be specified under BS 8300-2:

To ensure that blind and partially sighted people and/or people with limited dexterity have unobstructed access to the keyway of a lock, the cylinder should be:

- positioned above the lever handle where it is more visible and accessible.

OR

- if the cylinder is below the handle, the minimum distance between the handle and the keyway of the locking mechanism should be 72mm.

In addition, lock cases should have a minimum backset of 54mm to allow enough room between the keyway/handle and the door frame.



3. RIM AND MULTIPOINT LOCKS



Cylinder rim nightlatch



Internal rim lock/latch

RIM LOCKS

There are two types of rim locks as follows:

Cylinder rim nightlatch

A cylinder rim night latch is mounted on the surface of the inside of the door with a connecting rim pin tumbler cylinder mechanism fitted into the door, with the keyway on the outside. Most cylinders are suitable for master keying. Versions are also available to BS 3621.

Cylinder rim night latches are suitable for house and flat entrance doors because of the large number of key differs and profiles.

Internal rim lock/latch

An internal rim lock/latch is fitted to the face (rim) of a door and some have a flange and/or return edge to the forend. These were used extensively on housing prior to the introduction of flush doors.

Now normally supplied as replacements, or for those applications where locks cannot be morticed into the door e.g. panelled or ledged & braced doors, such as sheds. Also used on new build "period" houses for aesthetic reasons.

MULTIPOINT LOCKS

A multi-point locking system bolts the door into the frame and locks at multiple points at the turn of a key, giving a high level of security. They can also be electrically controlled by motor-driven latch bolt retraction thus allowing access control.

These types of lock are best fitted in the joinery workshop or by the door manufacturer, where the fitter can work very accurately. It's too exacting for site fitting.

Another type of multipoint lock is the kind fitted to uPVC or composite domestic entrance doors. These have specialised extra locking points. Some are designed to "clench" the door into the frame, pulling it firmly against the seals. This offers improved security at the locking points, and good weather-sealing.

The following standards apply to multipoint locks:

PAS 3621:2011 - Multipoint locking assemblies. Keyed egress. (Multipoint lock equivalent to BS 3621).

PAS 8621:2011 - Multipoint locking assemblies. Keyless egress. (Multipoint lock equivalent to BS 8621).

PAS 10621:2011 - Multipoint locking assemblies. Dual mode egress. (Multipoint lock equivalent to BS 10621).

prEN 15685 - A new European Standard currently being developed – similar to EN 12209 for single point mortice locks and latches.



4. CYLINDERS AND PADLOCKS



CYLINDERS

Cylinders in locks are one of the most popular types of lock mechanisms for commercial work in public buildings and the workplace, and widely used on domestic entrance doors. The bolt is thrown and withdrawn by the action of the cylinder when inserted in the cylinder aperture of the lockcase.

Cylinders come in a variety of shapes and sizes (below), and all of these can be master keyed. Oval, Euro profile and Scandinavian cylinders can be supplied in the following forms:

- **Single cylinder** – key access one side only.
- **Double cylinder** – key access from both sides.
- **Cylinder and turn** - key access one side and a thumbturn on the other (Keyless). The thumbturn is usually on the inside or secure side of the door, and it enables the door to be locked from the outside, whilst giving keyless egress from the secure side of the door.

The relevant standard for cylinders is BS EN 1303 which is a European Standard. Where a cylinder provides access to a home or business TS 007 3-star cylinders provide protection against the latest forms of attack. Cylinders can be Kitemarked to TS 007, SS312 Sold Secure standard is also available for cylinders. This is graded Bronze, Silver, Gold and Diamond. The SS312 Diamond standard provides broadly the same security as the TS 007 3-star standard.

MASTER KEY SYSTEMS

A master key system is a key plan whereby selected keys can open a number of pre-defined doors. It helps maintain better control, saves key replacement costs and is convenient, as there are a lower number of keys in circulation. It also provides quick access to all rooms within the premises, e.g. for security staff and management personnel. This is not only convenient but can save lives in case of emergency. Correct key control and master keying is paramount on any project – ensure when you are obtaining a master keyed system that the key control chart is completed by a qualified architectural ironmonger.

PADLOCKS

A padlock is detachable, so can be taken away from its normal locking position. It can be master keyed alongside a suite of cylinders thus allowing to be keyed under the building's master key. It can also be keyed alike allowing multiple padlocks to operate under the same key.

BS EN 12320 is the European Standard for padlocks and staples (padbars) of all types, i.e. open and closed shackle. Security Grades range from 1-6, 6 being the highest. SS303 Sold Secure standard is also available for padlocks which are graded Gold, Silver and Bronze.



Euro profile



Oval profile



Scandinavian oval



Round threaded

5. ELECTRONIC LOCKS

Electronic locks are used as part of access control systems which require varying types of readers to unlock them such as proximity tokens, card swipes or even Biometric readers.

MECHANICAL DIGITAL LOCKS

Mechanical Digital Locks are the simplest form of access control and are offered on a single door, whereby all the programming and system set up is carried out at the door. Whilst identical sets can be installed on other doors within a site, there is no direct interface or connection between this door and any other or to a computer system for transfer of data.

They can look somewhat bulky but newer versions are available combining aesthetics with functionality.

These can be tested to British Standard BS 8607 – grade 4 provides equivalent security to BS 3621 lock.

ELECTRIC STRIKE

An electric strike, or electric release, is perhaps one of the most popular methods of unlocking a door electrically. Access is allowed by electrically operating a solenoid to release the jaw so that, as the door opens, the latch bolt pushes the spring-loaded jaw which pivots out of the way. The jaw returns to the secure position as soon as the latch bolt has cleared it and the solenoid relocks the jaw.

Any sideload can cause the strike jaw to fail to release properly requiring the user to push or pull the door to gain access. Electric strikes are not recommended for use on doors fitted with sound or smoke seals which are compressed when the door shuts or in situations

where a strong draught may prevent closure of the door. Strikes are available as light, medium and heavy duty.

ELECTRO MAGNETIC LOCKS

An electro magnetic lock is one of the simpler means of electronically locking and unlocking doors. It consists of two items; the magnet itself and an armature.

The maglock as it is commonly called, has a core of nickel plated steel around which is wound coils of insulated copper wire. This is encased in epoxy resin to hold it together and housed in a metal casing. When a current is passed through the coil the unit becomes a powerful magnet and will provide enough force to hold a steel plate, called the armature, with sufficient strength to be suitable for securing doors. When the current is switched off the magnetic field collapses immediately releasing the armature.

They are only available as fail unsecure (unlocked) and for this reason they are generally seen as low security solutions. They can be used on inward and outward opening door depending on bracketry used.



Mechanical digital lock



Electric strike

5. ELECTRONIC LOCKS CONT'D



Solenoid lock

SOLENOID LOCKS

Similar to a conventional mortice lock but with a solenoid which blocks or enables the outside handle that is used to release the deadbolt and latch. The appearance and functionality is that of a normal lock and is generally aesthetically pleasing and acceptable to users. A split follower allows separate control of the inside from the outside handles with the internal handle always free for egress. The lock will automatically deadlock when the door is closed. Usually, a key override function is available which works like a mechanical lock to withdraw the bolts or throw the deadbolt.

MOTOR LOCKS

An electric motor drives the lock bolt to retract or project it. They require less power to operate than a solenoid using power only whilst retracting or projecting the bolt so they are suitable for battery powered devices. Some examples feature mechanical retraction of the locking element by lever handle to allow them to be used for exit on escape routes.

Mechanical override by key or thumbturn is common. Motorised locks are as secure as a mechanical deadlock but are expensive. They are considered to be heavy duty devices and are usually specified where reliable operation over an extended period is required.

Both options fall under the scope of BS EN 14846 (harmonised/designated standard) and therefore must be CE/UKCA marked.

ELECTRONIC CYLINDERS

A mechatronic cylinder is a hybrid of conventional mechanical cylinder design and the electronic

functionality of an access control product. This allows the cylinder to still retain the existing fittings such as lock case and lever set whilst providing an electronic answer for access control. In some cases the technology can be applied to other locking products such as padlocks or furniture locks. They usually have built in batteries to provide power and operate a clutch mechanism for access. In some cases these cylinders draw power from an external source.

Mechanical and electronic key based products also combine these two technologies.

These solutions work whereby the power and communication is all carried out by the keys. Audit information, time schedules and validation periods are all programmed into the key. This allows for installations in remote areas without the need for power or networking. Updaters placed in common areas allow users to frequently download new profiles for their keys and upload audit trail information.

These can be tested to BE EN 15684 but do not need to be CE/UKCA marked.

ELECTRONIC ESCUTCHEONS

Electronic escutcheons as they are becoming increasingly known as are an electronic access control solution allowing multiple doors to be linked to each other but not online to a computer. Powered through battery which can have up to a 3 year lifespan it has flexibility in that it can be used with a number of locks. The programming and system set up is carried out at a master controller which distributes the operating parameters to relevant controllers as data is transferred via the media. They can be linked with other forms of access control and communication to PC can be done through a series of wireless hubs.



Electronic escutcheon

TS 621 STANDARD

Electronic escutcheons and cylinders, along with electronic multipoint and single point locks all fall within the scope of TS 621. This is the standard for thief resistant electronic door locking devices which has been adopted as a recognised standard for these types of lock by the British Standard Institute (BSI) Products which have been tested to TS 621 can receive the BSI Kitemark.

THE PRODUCT SECURITY AND TELECOMMUNICATIONS ACT 2022

The Product Security and Telecommunications Act 2022 has now been enacted in to UK law and applies to all consumer IoT products. The UK Government has mandated that businesses will need to be compliant with the new security requirements relating to consumer connectable products such as smart door locks, connected home automation and alarm systems and home assistants.

The Act is based on the ETSI standard ETSI EN 303 645 for consumer IoT security. This standard is designed to prevent large-scale, prevalent attacks against smart devices that cybersecurity experts see every day, by establishing a security baseline for connected consumer products and provides a basis for future IoT certification schemes. It describes building security into IoT products from their design, rather than awkwardly bolting security measures on at the end.

The Secure Connected Device accreditation is the only way for companies to obtain police recognition for the security of their Internet of Things products in the UK.

6. PAS 24

INTRODUCTION

PAS 24 is a standard which has been produced by BSI to provide a method for testing and assessing the enhanced security performance requirements of external doorsets and window types in the UK.

It is intended to resist the levels and methods of attack experienced in the UK and which are normally associated with the casual or opportunist burglar – not the professional one.

It was published in 1999 and has been revised a number of times with the latest version being PAS 24:2022. A GAI Guide to Standard is available on this standard.

TEST AND STANDARDS

There are 3 annexes within PAS 24, each dealing with a separate construction:

ANNEX A - Security hardware and cylinder test and assessment.

ANNEX B - Enhanced security performance requirements for doorsets.

ANNEX C - Specification for enhanced security performance of windows – previously under PAS 23.

It should be noted that PAS 24 is a test on the entire window or doorset; i.e. the door, frame and locks, not the individual component parts.



PAS 24 test

7. SECURITY STANDARDS

BS EN 1627

BS EN 1627-30 are European Standards for testing of hardware, doors and windows which were ratified by the UK as a BS.

BS EN 1627:2021, Pedestrian doorsets, windows, curtain walling, grilles and shutters. Burglar resistance

BS EN 1628:2021, Test method for determination of resistance under static loading;

BS EN 1629:2021, Test method for the determination of resistance under dynamic loading;

BS EN 1630:2021, Test method for the determination of resistance to manual burglary attempts.

It should be noted that the UK committee voted against the ratification of these standards.

This was due to the committee's belief that the standards do not address all known burglary modus operandi including lock picking within the scopes. The preference of UK is to draw attention to PAS 24 instead.

In respect of testing to BS EN 1627-30: If manufacturers wish to use these European Standards as a route to compliance to PAS 24:2016, then all testing must be conducted in accordance with the latest published version of the 'UK Police Service Secured by Design (SBD) Interpretation Document for BS EN 1627:2011, BS EN 1628:2011, BS EN 1629:2011 and BS EN 1630:2011.' This document is available via [this link](#) or available on the SBD website.

LPS 1175 & LPS 2081

BRE GLOBAL Loss Prevention Certification Board LPS 1175 and LPS 2081 standards are another set of security standard which offers independent, third-party certification and listing of fire and security products and services.

LPS 1175 Uses rigorous testing process. Accreditation score is determined by increasing time to breach product as well as increasing the calibre of tools.

LPS 2081 is a new standard based on the methodology of LPS 1175 but attacks are designed to use stealth (low noise levels).

It is more suitable than LPS 1175 for residential applications where excessive noise is generally avoided by the offender.

Both are audited annually.

Both are referred to in Approved Document Q.

Both LPS 1175 and LPS 2081 standards detail the requirements and testing procedures for intruder resistant building components, strong points, security enclosures and free-standing barriers – and not simply doors and windows.

CERTISECURE

Warrington Certification's CERTISECURE is also an independent third party certification scheme.

Security technical schedules STS201, STS202 and STS204 fulfil the entry requirements for the 'Secured by Design' initiative as well as being referenced in Approved Document Q.

STS 222 Issue 1: 2021 is also acceptable to STS222

BR1 (S) and STS222 BR2 (S). STS 222 is the stealth burglary resistance requirements for construction products including doorsets, windows, curtain walling, security grilles, garage doors, roller shutters, fences and barriers. It is a new Security Technical Schedule (STS) for stealth burglary based on the existing test methodology of STS202, where intruders are more likely to use stealth and avoid generating noise.

Products certified in the CERTISECURE scheme are subject to an ongoing test programme to ensure they combat the latest methods criminals are employing within this field.

The scheme lists products which have achieved CERTISECURE status on the website.

CERTIFICATION BODIES

The following certification/accreditation bodies are currently recognised by Secured by Design:

- Bluesky Certification.
- BM TRADA Certification.
- BRE Global.
- British Board of Agrement (BBA).
- British Standards Institution (BSI).
- British Woodworking Federation (BWF).
- Build Check Certification.
- ER Certification.
- IFC Certification Ltd.
- RI.SE.
- UL International (UK) Ltd.
- Warringtonfire Certification.
- Wintech Testing & Certification by UL.



8. APPROVED DOCUMENT Q



Approved Document Q Took effect on 1st October 2015 for use in England. It applies to new dwellings as well as dwellings formed by a material change of use. It has sections on doorsets, windows and bespoke timber secure doorsets.

Approved Document Q states that Reasonable provision must be made to resist unauthorised access to:

- a) any dwelling.
- b) any part of a building from which access can be gained to a flat within a building e.g communal doors or any other door that allows access from the outside.

WHERE DOES IT APPLY?

It applies to easily accessible doors and windows that provide access into:

- Into a dwelling from outside.
- Into parts of a building containing flats from the outside.
- Into a flat from the common parts of the building.

Doors and windows will meet the requirement if they can resist physical attack by a casual or opportunist burglar by being;

- Sufficiently robust.
- Fitted with appropriate hardware.

DOORSETS

All doorsets including garage and communal entrance doorsets – that provide access into a dwelling or into a building containing a dwelling should be a secure doorset. Secure doorsets should either be manufactured to a design that meets the security requirements of :

- PAS 24.
- STS 201 and 202.
- LPS 1175 security rating 2 and LPS2081 security rating B.

Or else the door should be designed in accordance with appendix B 'bespoke timber secure doorsets'.

The material and dimensions and standards of the doorset and ironmongery which are acceptable are clearly laid out:

- **Glazing** – any glazing which can be broken should be a minimum of class P1A BS EN 356:2000.
- **Doorsets**
 - Letterplate should be to TS008.
 - Requirement for entrance doors to a dwelling to have a door viewer if no other visible means to identify callers is available.
 - Requirement to have a door chain or limiter, unless a warden may need access in a sheltered dwelling. If so then an electronic audio-visual entry system can be used.



WINDOWS

Ground floor basement windows and easily accessible rooflights should be "secure windows" Secure windows should either be manufactured to a design that meets the security requirements of:

- PAS24.
- STS 204 issue 3:2012 – Certisecure.
- LPS 1175 Issue 7 2010 security rating 1.
- LPS 2081 Issue 1 2015 security rating A.

TECHNICAL HANDBOOK SCOTLAND

It should be noted this is not the only UK Building Control guidance document relating to security. Scotland has the Technical Handbook Domestic and non-domestic - Safety. It states in this document that Every building must be designed and constructed in such a way that doors and windows, vulnerable to unlawful entry, can be secured to deter housebreaking and protect the safety and welfare of occupants. It also mentions PAS 24 and Secured by Design.

APPROVED DOCUMENT Q WALES

Approved Document Q: Residential Security is available in Wales and was published in 2018. This document is broadly similar to Approved Document Q in England.

FURTHER ADVICE

Further advice is available in the manual Secured by Design Homes which is available on the [Secured by Design website](#).



9. SECURED BY DESIGN

Secured by Design (SBD) is a police initiative to encourage the building industry to adopt Crime Prevention measures in development design. It focuses on crime prevention of homes and commercial premises and promotes the use of security standards for a wide range of applications and products.

The principles have been proven to achieve a reduction of crime in general by up to 87%, tenants report increased satisfaction with where they live, with less fear of crime and less actual crime.

SBD is the only way for companies to obtain police accreditation for security-related products in the UK. For further details please refer to the manual Secured by Design Homes which is available on the Secured by Design website.

SCOPE

Secured by Design is not just for new homes but also covers a wider scope of buildings including:

- Refurbishment.
- Commercial.
- Healthcare and schools.
- Sports stadia such as London 2012 Olympics.
- Licensed premises.

The following products are all covered by the Secured by Design scheme and all must conform to the recognised Standards which must be independently certified by a UKAS accredited third party:

- Doors and windows.



- Padlocks and locking devices.
- Shutters and Grilles.
- Property marking systems.
- Fencing.
- Personal Alarms.

All products covered by the Secured by Design scheme are listed on their website.

STANDARDS

The following Door Standards are recognised by Secured by Design:

- PAS 24: 2016.
- STS 201 Issue 12:2020.
- STS 202 Issue 9:2020.
- LPS 1175: Issue 8.0.
- LPS 2081: Issue 1.1.

LOCK STANDARDS

The following Lock Standards are recognised by Secured by Design:

- BS 3621: BS 8621: BS 10621.
- PAS 3621: PAS 8621: PAS 10621.
- DHF TS007: 3 star rating.
- Sold Secure SS 312 - Diamond Standard.



The Guild of Architectural Ironmongers (GAI) is the only trade body in the UK that represents the interests of the whole architectural ironmongery industry - architectural ironmongers, wholesalers and manufacturers.

Formed in 1961, the GAI is internationally recognised and respected as the authority on architectural hardware, building its reputation on three key pillars; education, technical support and community.

Its technical information service is the only specialist service of its kind, providing comprehensive advice on issues relating to the legislation, regulations and standards governing the use of architectural ironmongery and related hardware.