IRONMONGERY AND FIRE SAFETY

GAI SPECIFIER'S GUIDE

The specifier's guide to the issues surrounding fire safety for ironmongery and the relevant guidance and legislation.

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IRONMONGERY AND FIRE SAFETY

GAI SPECIFIER'S GUIDE

Based on the RIBA Approved CPD of the same name, the specifier's guide to Ironmongery and Fire Safety covers the issues surrounding fire safety for ironmongery and the guidance and legislation that needs to be adhered to.

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

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1. FIRE SAFETY

DEFINITION

Fire safety refers to precautions that are taken to prevent or reduce the likelihood of a fire that may result in death, injury, or property damage.

It alerts those in a structure to the presence of an uncontrolled fire in the event one occurs and better enables those threatened by a fire to survive in and evacuate from affected areas. It also helps reduce the damage caused by fire.

Fire safety measures include those that are planned during the construction of a building or implemented in structures that are already standing, and those that are taught to occupants of the building.

The Great Fire of London

HISTORY

The Great Fire of London was the starting point for Fire Safety Legislation in England. As a result of this fire, it was soon clear that the wooden construction of London's buildings had added greatly to the spread of the fire.

Therefore, King Charles II issued a proclamation saying that all buildings were to be built out of stone and roads were to be widened. The English government then looked at providing legislation, so it introduced laws and regulations aimed specifically at fire prevention. At the time of the creation of the United Kingdom in 1801, England, Scotland and Great Britain had some legislation already in place dealing with the issues of fire safety.

While much British legislation applies to the United Kingdom as a whole, Scotland and Northern Ireland have their own versions of the legislation, with slight differences.

In Republic of Ireland, UK legislation before 1922 initially remained in force after its independence. Ireland now has its own legislation including the Fire Services Act.

In US International Building Codes refer specifically to fire safety codes, and there is an International Fire Code. Other international examples of legislation include the Fire Safety (Buildings) Ordinance Cap.572 in Hong Kong.

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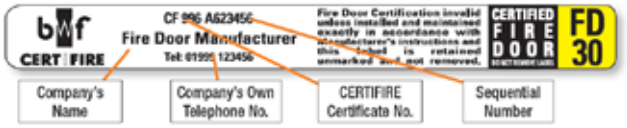
BWF Certifire fire door label



2. APPLICABLE LEGISLATION & GUIDANCE - PRE-HANDOVER

Prior to the handover of a building, Architectural Ironmongers and specifiers work to ensure doors and hardware are compliant in relation to the following fire safety documents.

APPROVED DOCUMENTS

An Approved Document gives practical guidance about how to meet the requirements of the Building Regulations for England and also for Wales. An Approved Document is not a Building Regulation in itself.

- An Approved Document is not law.
- There may be other ways to comply with Building Regulations, but you must demonstrate that the regulations have been complied with by some other acceptable means.
- Note that compliance with an Approved Document can be a good defence in court.

APPROVED DOCUMENT B - FIRE SAFETY

Approved Document B in England covers fire safety matters within and around buildings. In July 2018, the UK Government announced it was to launch a full-scale review of Approved Document B to clarify and reduce the complexity of fire safety guidance. A new clarified version of Approved Document B was published in July 2019 and remained in two volumes:

- Volume 1: Dwellings
- Volume 2: Buildings other than dwellings

APPROVED DOCUMENT B EQUIVALENTS

Approved Document B has a number of equivalents throughout UK and Ireland, listed in the table below.

	England &Wales	Scotland	Northern Ireland	Ireland
Fire safety	Approved Document B	Technical Handbook 2	Technical Booklet E	Technical Document B

APPROVED DOCUMENT 7 - MATERIALS & WORKMANSHIP

An excellent means of determining the quality of materials and workmanship on site is Approved Document 7. This states that Building work shall be carried out:

1. **With adequate and proper materials which –**
   - Are appropriate for the circumstances in which they are used.
   - Are applied, used or fixed so as adequately to perform the functions for which they are designed.

   The use of products covered by national and international standards such as EN, ISO and BS standards as well as third-party certificated products are some of the means listed of assessing suitability.
2. **In a workmanlike manner.**
   - Using standards such as ISO 9000 and on-site workmanship standards such as BS 8000 are some of the means listed of establishing the adequacy of workmanship.

REGULATION 38: BUILDING REGULATIONS 2010

Under this regulation, fire safety information must be handed to a "responsible person" at the completion of a project or when the building or extension is first occupied. This is information relating to the design and construction of the building or extension, and the services, fittings and equipment provided in or in connection with the building or extension.

For the responsible person to carry out future inspections and maintenance of fire doors they must have the installation and maintenance instructions and traceability to the fire certificate handed over. A label such as a BWF Certifire fire door label provides the traceability.

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2. APPLICABLE LEGISLATION & GUIDANCE - PRE-HANDOVER CONT'D

BS 9999:2017

BS 9999:2017 is a British Standard which is very important, yet many are not aware of its very existence. The following clauses are some of those which relate to fire doors and hardware:

- Doors in fire-separating elements are one of the most important features of a fire protection strategy, and it is important to select a fire door that is suitable for its intended purpose.
- Doors installed on site should conform in dimensions and workmanship, to the manufacturer's specification for the appropriate fire resistance test report/assessment.
- The failure of doors under fire conditions usually occurs at the gap between the door and the frame or at one or more of the points where building hardware is fitted (particularly at the hinge or lock positions).

BS 8214:2016

BS 8214:2016 provides guidance and recommendations for the specification, installation and maintenance of timber-based fire doors (up to 2 hours resistance) covering fire door assemblies. This includes:

- Fire resistance classification of fire doors.
- Specification of Fire Doors
- Identification & Marking
- Installation
- Doors & Frames
- Glazing (VP's)
- Storage and handling
- Hardware
- Smoke & Fire Seals
- Decoration & On-Site maintenance

ENVIRONMENTAL PRODUCT DECLARATIONS (EPDs)

EPD have been used for construction products since the first environmental assessments schemes were developed in the 1990s and an ISO standard for EPD sets out the standards they should meet. EPD can only be compared when the rules of the Product Category Rules (PCR) used are the same and all the relevant life cycle stages have been included. Therefore can only be compared on a like for like basis.

EPD form a common program can therefore be used alongside each other to make comparisons and evaluations at a building level. The construction products industry was actively involved in the development of the International Standards for Life Cycle Assessments (LCA) and EPD.

- Ironmongery for fire and escape doors can have their environmental impact communicated in a standardised manner through Environmental Product Declarations or EPDs
- These are not mandatory but certain manufacturers do provide this information.
- Declarations include information on the environmental impact of: raw material acquisition, energy use and efficiency, content of materials and chemical substances, emissions to air, soil and water and waste generation. Product and company information is also included.
- It has been developed to provide information from life cycle assessments (LCA) and is issued by an independent program Operator.
- The standard which relates to EPD is BS EN 15804:2012

ACCESSIBILITY

The specification of ironmongery for fire doors not only needs to consider fire safety but also the impact on accessibility. This includes pre and post-handover of a building. Applicable legislation and standards which impact include:

- The Equality Act 2010.
- Relevant Approved Documents/Technical Handbooks eg Approved Document M
- BS 8300:1 and 2 2018

GAI have produced a GAI specifiers Guide on "Ironmongery and Accessibility" with further detail on this area.

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2. APPLICABLE LEGISLATION & GUIDANCE - PRE-HANDOVER CONT'D

FIRE TEST EVIDENCE

A fire door is a door which must have fire test evidence to prove that it is a fire door. For an ironmongery product to be used on a fire door it should have fire test evidence that it has been tested on a similar construction of fire door.

- The European standard for testing of fire doors is EN 1634 1.
- The British standard for testing of fire doors is BS 476 22

Both EN 1634 1 and BS 476 22 are acceptable for fire door testing under Approved Document B and equivalents in UK and Ireland, as well as Hong Kong.

An example of an international test is UL10C. This is an American standard for testing of fire doors and is their equivalent to EN 1634 1, although there are distinct differences between the two including a hose stream test at the end of UL10C. Internationally, some or all of these test standards may be acceptable but local advice for each country must always be sought

CE & UKCA MARKING

CE marking is mandatory in EU and under the Construction Products Regulation for all products which fall under the scope of a Harmonised Standard.

UKCA marking will also be mandatory in GB for all products which fall under the scope of a UK designated Standard. Certain hardware products are covered under this including hinges, controlled door closers, locks and panic hardware.

Other European Standards exist which are voluntary. Internal fire-rated doorsets still cannot be CE/UKCA marked as EN 14351-2 is still not harmonised/ designated and it looks likely this will continue to be the case for a number of years.

External-fire rated doorsets must now be CE/UKCA marked to EN 16034 and EN 14351-1. Please note that fire door assemblies do not fall under the scope of EN 16034 therefore cannot be CE/UKCA marked.

THIRD PARTY CERTIFICATION

Independent third-party certification schemes assure performance, quality, reliability and traceability of fire protection products. Recognised by regulatory authorities worldwide, these can act as an internationally respected mark of fire safety.

This gives the regulator, specifier, customer and end-user confidence with regards to the stated performance of the product.

Choosing a product that carries the mark of a reputable third-party certification body gives assurances as to the performance of the products. Using certificated products, correctly installed, provides a powerful demonstration that due diligences have been served. New GAI DHF Guidance on third party testing, assessment and certification publication is now available to assist members.

Regulatory Reform (Fire Safety) Order

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3. APPLICABLE LEGISLATION & GUIDANCE - POST-HANDOVER

The Building Regulations/Approved Documents (maintaining standards as at time of planning permission) highlighted in Section 2 (Pages 4-6) are still applicable after handover of the building. But in addition, the following legislation is also applicable.

REGULATORY REFORM (FIRE SAFETY) ORDER 2005

The RR(FS)O covers England and Wales and means that any person who has some level of control in premises must take reasonable steps to reduce the risk from fire and make sure people can safely escape if there is a fire.

The responsibility for fire risk assessment in all non-domestic buildings, including the common parts of flats and houses of multiple occupation, falls to the so-called 'responsible person'.

The responsible person must carry out a fire safety risk assessment and implement and maintain a fire management plan. Failure to comply with the RR(FS)O can place property and lives at risk and is likely to result in criminal prosecution.

EQUIVALENTS TO RF(FS)O IN THE UK

Fire Safety (Scotland) Regulations 2006

In Scotland these regulations do not have a "Responsible person" therefore the person in control of the premises has a duty to undertake a risk assessment in respect of fire. They must also ensure that routes to emergency exits from relevant premises and the exits themselves are kept free from obstruction at all times.

Fire and Rescue Services (Northern Ireland) Order 2006

A small amount of prosecutions have occurred under NI Fire Regulations. And fines tend to be smaller - in the region of £2500.

NI Fire Rescue Service policy is to "work with community" rather than imposing larger fines. BUT all orders handed out by NIFRS are a matter of public record on their website.

HEALTH AND SAFETY LEGISLATION

The Health and Safety at Work Act 1974 is the main piece of UK legislation that outlines the legal duties that employers have to protect the health, safety and welfare at work of all of their employees.

An employer's duty . . . extends [to] include in particular: So far as is reasonably practicable as regards any place of work under the employer's control, the maintenance of it in a condition that is safe . . . and the provision and maintenance of means of access to and egress from it that are safe and without . . . Risks. In addition, persons not employed, but on the premises, must not have their health or safety put at risk.

Safety, Health and Welfare at Work Act 2005 (Ireland) and Cap. 509 Occupational Health and Safety Ordinance (Hong Kong) are examples of international legislation which is of similar nature.

Electro-magnetic locks

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4. RISKS TO CONSIDER

There are the 5 main risks for incorrectly manufacturing, supplying, specifying, installing or maintaining fire doors:

- Danger for building users and possible loss of life.
- Danger for emergency services responding to a fire.
- Property and possessions will not be protected.
- Risk to reputation.
- Prosecution with a risk of fine or imprisonment.

WHAT CAN COMPROMISE FIRE DOORS?

The occupier may decide to retrofit access control product post handover. It should be noted that any additional (retro-fitted) access control/electric locking that is fitted to a door and/or frame will have some form of effect on its fire integrity and would need a form of documentary evidence. We look at the following specific examples to demonstrate what risks need to be considered.

Mechanical digital locks

- Fire test evidence may not be requested (or in certain cases available).
- Intumescent protection may not be used to safeguard the fire door's integrity.
- Unauthorised modification of life safety equipment.
- The fire door is no longer "as tested".
- Any third-party certification for the fire door is nullified.

Electro-magnetic locks

- Armature plate usually bolted through door.
- Still needs evidence if screw-fixed.
- Wiring sometimes drilled through frame.

Electrically released strikes

- Electrically released strikes.
- Large amount of material taken out of frame to fit the strike.
- Unauthorised modification of life safety equipment.
- The fire door is no longer "as tested".
- Any third-party certification for the fire door is nullified.

Necessity for documentary evidence

Extra items can be retro-fitted if

- there is fire test evidence for the door with product fitted, or
- there is fire test evidence for the product on a very similar door, or
- there is an assessment by a competent authority, based on test evidence.

NOT MAINTAINING FIRE DOORS / IRONMONGERY

Under Regulatory Reform (Fire Safety) Order 2005, critical items should be maintained at regular intervals as mentioned in the following quotation:

"Where necessary in order to safeguard the safety of relevant persons the responsible person must ensure that the premises and any facilities, equipment and devices... are subject to a suitable system of maintenance and are maintained in an efficient state, in efficient working order and in good repair."

Electrically released strike

Mechanical digital lock

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4. RISKS TO CONSIDER CONT'D

NOT INSPECTING FIRE DOORS / IRONMONGERY

In January 2020, the UK Government issued new building safety advice for building owners on the measures they should take to ensure their buildings are safe. This advice included specific information on inspection of flat entrance fire doors where it stated the following:

> "It is important that all fire doors... are routinely maintained by a suitably qualified professional."

This was also echoed in Public Inquiry of Grenfell Tower Fire. This could lead to inspection becoming mandatory in UK for these doors. As a further note, inspection of fire doors is already mandatory in a number of countries including USA and Australia.

To emphasise the need for inspection of fire doors, the UK Fire Door Inspection Scheme conducted a Survey of 672 doors across 31 sites and identified 2506 faults as follows:

- 61% Fire or smoke seals either missing or installed incorrectly.
- 34% Excessive gaps between the door and frame (over 3mm).
- 15% Damage to door leaves.
- Over a third had incorrect fire signage.
- Almost 1 in 5 had unsuitable hinges.

DILUTION OF SPECIFICATION

A further risk to consider is the dilution of an existing compliant specification. Changes to an ironmongery specification can happen for a number of reasons, including:

- Reduction of costs (value engineering).
- Pressure on timescales for supply.
- Design changes.

It is also fraught with risk and danger as changing essential ironmongery can have a hugely damaging impact on the correct performance of a fire door as follows:

- Incorrect/badly performing door closers can cause inability to close a fire door from any angle.
- Incorrect hinges can cause fire doors to drag on the floor and therefore not close fully in to its frame.
- Locks – must be CE/UKCA marked to EN 12209 where applicable.
- Seals – must be as per fire test evidence.
- It is also recommended that products use third party certification such as Certifire.
- Any changes to a fire door which hampers its ability to close properly into its frame will inhibit its proper function.
- **A fire door which does not close correctly will not work in the event of a fire.**

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5. POTENTIAL CONSEQUENCES OF IGNORING THE RISKS

REGULATORY REFORM FIRE SAFETY ORDER

Here are some reasons why businesses should not fall foul of the Regulatory Reform (Fire Safety) Order:

- Fines in the UK for faulty fire doors reached almost £1million in 2015 according to research by the UK Fire Door Inspection Scheme (FDIS).
- FDIS found 45 published prosecutions relating to faulty or missing fire doors under the Regulatory Reform (Fire Safety) Order.
- In addition to the large number of fines given, many defendants were also handed down suspended prison sentences, typically three to eight months or longer.
- Note also that Fire & Rescue Services have the power to restrict the use of a building or even close it. A number of cases which involved nurseries or care homes which house the most vulnerable have shown that these were put into special measures or closed down altogether.

POTENTIAL JAIL SENTENCES & FINES

If breaches of the Regulatory Reform (Fire Safety) Order in England and Wales cause a death the authorities can give serious consideration to pursuing corporate manslaughter. Corporate Manslaughter is the offence a corporation would face again when that body's gross negligence or omission has led to loss of life.

Maximum sentence for the individual is a possible life imprisonment although guidelines suggest, depending upon how serious the negligence is, of between one to eighteen years imprisonment. Fines for the organisation are turnover dependent but range from £180,000 to £20 million for companies of largest turnover bracket.

NEW LOOK, OXFORD ST, LONDON - 2007

Here is an example where fire safety breaches of RR(FS)O cost one business over half a million pounds in fines and costs:

> "High Street chain New Look was fined a record £400,000 for fire safety breaches after a devastating blaze on April 26, 2007 turned one of their shops into a potential death trap."
> (Daily Mail: September 2009)

> "The London Oxford Street store, which allegedly had inadequate emergency exits and poorly trained staff, was also ordered to pay more than £136,000 costs for what Judge Geoffrey Rivlin QC said could have been a 'disaster almost too awful to contemplate'."

New Look's appeal against its record £400,000 fine for fire safety breaches at its Oxford Street store was dismissed with the Court of Appeal saying the fine was not excessive in view of the company's "lamentable" performance of fire safety duties.

ADDRESS DOWNTOWN HOTEL, DUBAI

On New Year's Eve 2015, a huge fire broke out at the Address Downtown Hotel in Dubai.

- The fire was contained to the outside of the building and was reported to be caused by an electrical short circuit on a spotlight used to illuminate the building.
- Thankfully, there were only minor injuries, as the fire broke out only in the external interface and the majority of the fire did not make it to the inside.
- A British Engineering firm are now facing legal action for its alleged role in the fire. The claim accuses them of 'negligence in the specification, testing and installation of the building cladding which is claimed to have exacerbated the fire, thereby increasing the damage to the building'
- The size of the claim is unknown but is expected to be substantial as it relates to refurbishment costs and loss of income with the hotel reopening over two years after its closure.

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6. THE WAY FORWARD FOR FIRE SAFETY

It is a sad truth that it often takes a significant tragedy to occur to make a real difference to the regulatory regime of a country relating to fire safety.

Great Fire of New York City

Stardust Nightclub fire, Dublin

HISTORIC EXAMPLES

Great Fire of London, 1666
Estimated to have destroyed the homes of 70,000 of the city's 80,000 inhabitants.

Result: London acquired its first complete code of Building Regulations and means for its implementation.

Great Fire of New York City, 1835
Killed two people, and destroyed hundreds of buildings, with an estimated $20 million of property damage (equivalent to $528 million in 2019).

Result: Reform and expansion of the US Fire Service.

Stardust Nightclub fire, Dublin, 1981
48 young people died and 214 were injured.

Result: This prompted huge reform to Irish Building Control system and regulations, including provision of fire extinguishers and emergency exits to be kept clear.

GRENFELL TOWER

On 14th June 2017, the Grenfell Tower fire spread primarily through its external cladding, tragically killing 72 people.

In addition to the cladding, the PIR insulation contributed to the speed and extent of the fire's spread. Smoke extractors did not operate as they were expected to, and fire doors did not perform as they should.

The reasons for these failures are still coming to light and are likely to be complex, including issues with maintenance and installation as well as with the marketing and performance of products.

The Grenfell Tower Public Inquiry identified matters of concern relating to construction products including the testing and certification of materials, design and choice of materials, fire doors and smoke extraction systems.

Grenfell Tower

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6. THE WAY FORWARD FOR FIRE SAFETY CONT'D

As a response to the Grenfell tragedy the UK Government launched an independent review of Building Regulations and Fire Safety

UK GOVERNMENT RESPONSE

The independent review of Building Regulations and Fire Safety: The Hackitt Review entitled "Building a Safer Future" presented the following findings:

- Methods for testing, certification and marketing of construction products and systems are not clear.
- Products are often marketed with specification data presented in ways which can easily be misinterpreted.
- Constant indifference and ignorance in the UK construction industry led to a "race to the bottom" culture in building safety practices, with cost prioritised over safety.

The UK Government has now committed to:

- Appointing a Building Safety Regulator responsible for all major regulatory decisions with powers of enforcement.
- Appointing a new national construction products regulator responsible for: market surveillance, oversight of local enforcement action with manufacturers, and providing advice and support to the industry and to UK government.
- Increasing Industry Competence with new competence frameworks to be developed and creation of a suite of new BS national standards for competence requirements. (GAI are represented in this work as chair of Working Group 12: Construction Products).
- Increasing Duty holders: The client, the principal designer, principal contractor, designers and contractors will now have formal responsibilities for complying with building regulations.
- A new Fire Safety Act to emphasise risk assessment from external walls and front entrance doors
- Approved Document B: Fire Safety. A full technical review will take place.

UK BUILDING SAFETY BILL

UK Government have announced the publication of the Building Safety Bill :

- This is aimed at setting out a clear pathway for the future on how residential buildings should be constructed and maintained. This Bill is seen as a key step in an extensive overhaul to building safety legislation, giving residents more power to hold builders and developers to account and toughening sanctions against those who threaten their safety.
- It will see the introduction of a new Building Safety Regulator which will oversee the new regime and will be responsible for ensuring that any building safety risks in new and existing high rise residential buildings of 18m and above are effectively managed and resolved, taking cost into account.

- The reforms will tackle bad practice head on, building on Dame Judith Hackitt's review of Building Regulations and Fire Safety, which highlighted a need for significant cultural and regulatory change.
- It will include implementing specific gateway points at design, construction and completion phases to ensure that safety is considered at each and every stage of a building's construction, and safety risks are considered at the earliest stage of the planning process.
- These changes will simplify the existing system to ensure high standards are continuously met, with a 'golden thread' of information created, stored and updated throughout the building's lifecycle, establishing clear obligations on owners and enabling swift action to be taken by the regulator, wherever necessary.
- This is due for publication most likely in 2022.

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7. FURTHER HELP AND ADVICE

In order to help with risk management we have put together the following ten top tips:

TOP TEN TIPS

1. Always keep up to date and specify product to relevant industry standards such as BS, EN and ISO.
2. Ensure the products you are specifying for fire and escape doors are CE/UKCA marked where applicable.
3. Be careful with specifying product for a fire door that there is sufficient fire test evidence for the type of door it is intended to be fixed to.
4. Specify intumescent protection where needed, including for locks, hinges and concealed closers. Consult the fire door manufacturer or hardware manufacturer if in doubt.
5. Consult product manufacturers for technical assistance when needed, particularly in specialist applications such as anti-ligature, access control or door automation.
6. Familiarise yourself with Approved Documents or equivalent publications re Building Regulations.
7. Read industry guides such as GAI Technical Briefings, Specifiers Guides and AIJ articles.
8. Keep your knowledge up to date through CPD including training, seminars and webinars.
9. Never lower your specification to a level you are not comfortable with and know when to walk away from an order. Your reputation is lifelong and is always worth more than your next project.
10. NEVER TAKE UNNECESSARY RISKS WHEN SPECIFYING OR SUPPLYING PRODUCT and always remember that fire doors and ironmongery are life safety critical products.

Guild of Architectural Ironmongers

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.

RegAI - Pinnacle of Professionalism

A Registered Architectural Ironmonger (RegAI) is a fully qualified professional who has passed the GAI Diploma course and has completed the annual CPD programme.

Controlled by the GAI, the scheme offers the assurance that by working with a RegAI, you will be working with a professional that is fully up-to-date with the latest legislation, industry standards and products. RegAI status represents the highest possible standard of education and professionalism.

To find a RegAI to work with, check out the RegAI directory on the GAI website.

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