KNEX

Architechtural Ironmongery Ltd

ACOUSTIC SEALING SYSTEMS

Wherever noise influences human activity, effective acoustic sealing is essential. Whether confidential discussions in a private office or doctor's surgery; or reducing noise from adjacent rooms in hotels, preservation of privacy is paramount. Legislation is now in place giving guidelines for acoustic performance of door assemblies in a number of situations.

This brochure aims to support your understanding of acoustics and the increasingly important part it plays in today's specifications for door assemblies within buildings. It also offers guidance on meeting the acoustic requirements for certain types of doors.

Featuring a selection of products from Lorient's comprehensive portfolio and as demonstrated under test, it makes recommendations for optimum performance in commonly encountered applications.

Contents

Use of Symbols

Sound Smoke Fire Accessibility

These symbols indicate the wide range of benefits provided by the seal solutions within this brochure.

09/08

LORIENT

Lorient is an acknowledged leader in the design and manufacture of a wide range of sealing systems embracing fire and smoke control, acoustic protection and weather exclusion.

The company operates from the UK, Australia, Hong Kong, North America and the Middle East.

With more than 30 years' experience and accumulated knowledge, Lorient also enjoys an enviable reputation for innovation, technical excellence and product quality.

The company has its own professionally staffed research and development facility, with a comprehensive range of development and testing equipment, including colour-matching machinery; an environmental test furnace; a smoke chamber; specialised performance rigs and an analytical laboratory. Lorient also has its own acoustic laboratory.

This dedicated technical and development centre not only provides successful innovation for the company, but also helps Lorient to partner with its customers in developing and testing their own products. Several of the door photographs throughout this brochure have been supplied by one such customer, Leaderflush Shapland Limited.

Lorient operates under the strict disciplines of BS EN ISO 9001:2000 quality procedures. Where relevant, fire seal and smoke seal products are independently accredited and monitored by CERTIFIRE.

The company remains the only manufacturer of acoustic, smoke and fire seals able to boast British Board of Agrément accreditation for its main range of seals.

In the UK, Lorient is also a member of the British Woodworking Federation (BWF/Certifire fire door scheme); the Architectural and Specialist Door Manufacturers Association (ASDMA); the Guild of Architectural Ironmongers (GAI); the Glass and Glazing Federation Fire Resistant Glazing Group (GGF) and is a founder member of the Intumescent Fire Seals Association (IFSA).

Architectural and Specialist Door Manufacturers Association

Fire Resistant Glazing Group
Glass and Glazing Federation

Founder Member of the Intumescent Fire Seals Association

worldwide reputation

LORIENT

making sound sense

It is important to ensure a satisfactory acoustic environment, compatible with the intended use of a particular space.

Door assemblies are an integral part of buildings, and while there must be gaps around the perimeter of the door for it to operate efficiently, these gaps also allow sound to pass through.

Sealing the gaps around a door is therefore crucial to reducing the amount of sound entering or leaving a room.

Lorient and Integrity® acoustic seals provide excellent resistance to airborne sound and significantly improve the acoustic attenuation of the door assembly.

When fitted to external doors, Lorient seals help to isolate buildings from noise generated by roads, railways and airports. When fitted to internal doors, they help to isolate rooms from airborne noise generated within a building, making them ideal for auditoria, offices, consultation and conference rooms, colleges and universities, hotel bedrooms and individual apartments in communal dwellings; in fact – for most buildings.

Every Lorient sealing solution has demonstrated under test that it is able to provide a high level of acoustic performance using readily available, typical fire door assemblies and standard architectural doors.

Other Factors Affecting Performance of Door Designs

When specifying door seals, it is important to consider certain elements that can impact on their performance. These include on-site conditions; glazing; ironmongery; stops and letter plates. In resolving these factors, it is worth noting that Lorient's fin seal technology has been proven to deliver superior acoustic performance and the designs offer low frictional resistance and high durability.

The Advantages of Fin Seal Technology

Using our extensive acoustic testing programme, various Lorient smoke seal profiles have been tested for their acoustic performance. Tests were undertaken on a typical FD30S door assembly with a laminated softwood core and in conjunction with the IS8010 si automatic threshold seal.

These tests proved that smoke seals with elastomeric fins provide a far superior acoustic performance to traditional brush type smoke seals. While the brush type SS smoke seals performed to only 23dB Rw, Lorient's DS and Finesse™ seals gave a result of 31dB Rw. **It is therefore important to note that brush type smoke seals will not provide the level of acoustic performance detailed in Approved Document E. Nor will they provide the low frictional resistance required by Approved Document M.**

For optimum acoustic, smoke and fire performance, coupled with outstanding properties of low friction and durability, the DS or Finesse™ design should always be specified.

Product Code	Acoustic Performance	
	Weighted Sound Reduction Index (Rw)	Sound Transmission Class (STC)
 LP1504 Finesse™	31 dB	31 dB
 LP1504DS	31 dB	31 dB
 LP1504SS	23 dB	22 dB

On-site Conditions

While laboratory testing provides standardised performance data for purposes of comparison, it is recommended that proposed site conditions should also be considered. Such factors as wall, floor and ceiling construction may influence anticipated performance. Furthermore, differences in door construction, materials, quality of workmanship and installation of the components could affect the final result. Certainly the expected frequency bands of the sound or noise which is to be controlled should be taken into account as this could diminish or improve performance in some circumstances.

While site conditions will always vary in relation to laboratory conditions, Lorient results are truly indicative of practical expectations.

Glazed Panels

These may be incorporated in doors without a major loss of acoustic performance, provided that thick enough glass is used, the size of the aperture is limited and an appropriate sealing system is utilised. Conventional Georgian wired glass has been tested in conjunction with the unique Lorient System-36/6 glazing gasket and provides optimum acoustic performance for most types of door construction, including FD30 / FD30S. By this method, up to 0.16m^2 eg: 800mm x 200mm or 650mm x 250mm can be incorporated in a door assembly, without any significant loss of acoustic performance. Please refer to the Lorient Technical Department if other glass types or larger sizes are being considered.

Ironmongery

Interruption of acoustic seals at hinges, locks and strike plates greatly reduces acoustic performance. In order to meet the requirements of Approved Document E and BS5588 smoke performance, a continuous seal is required around the door perimeter.

Stops

To avoid compromising fire performance, the use of stop mounted seals, or perimeter seals that replace stops, requires careful attention. This is particularly relevant where the use of fully or partially concealed automatic threshold seals is being considered.

Letter Plate Apertures

Lorient letter plates are also suitable for use on most types of door construction, including FD30 / FD30S. Under test conditions, it has been demonstrated that the Lorient product does not cause any significant reduction to the overall acoustic performance of the door assembly to which it is fitted.

Meeting the Requirements

Building Regulations exist to ensure the safety and comfort of everyone using a building. Various documents demonstrate the usual way of meeting the requirements of the Building Regulations and in many cases give specific guidance on acoustic containment, accessibility and fire and smoke containment.

Relevant Guidance Documents

Sound:

Approved Document E (England and Wales), Technical Booklet G (N. Ireland), Technical Handbook Section 5 (Scotland).

The requirements for acoustic containment presented in the Guidance Documents give specific acoustic performance requirements for door assemblies in a number of situations.

In 'dwelling-houses, flats and rooms for residential purposes' (Requirement E1), a minimum acoustic performance of 29dB Rw is required.

For schools (Requirement E4), a minimum of 30dB Rw is required – 35dB Rw for music rooms. Please refer to Building Bulletin 93 for more details (see page 30).

Fire and Smoke:

Approved Document B (England and Wales), Technical Booklet E (N. Ireland), Technical Handbook Section 2 (Scotland).

The requirements for fire and smoke containment with regard to 'means of escape' are contained in the above documents.

These documents specify that practically all internal fire resistant door assemblies are also required to prevent the passage of cold smoke.

Please bear in mind that performance in relation to cold smoke needs to be considered separately from performance in relation to fire and hot smoke, and a separate test report is called for.

Accessibility:

Approved Document M (England and Wales), Technical Booklet R (N. Ireland), Technical Handbook Section 4 (Scotland).

These documents specify accessibility for everyone using buildings. They detail the size and location of glazed panels in doors in various situations, in order to promote safety and accessibility. Visual contrast on the leading edge of doors is also included, as are opening and closing forces for ease of door operation, threshold height and door width requirements.

In addition to providing acoustic insulation and fire/smoke protection, doors must allow free passage. It is crucial that the sealing system fitted to a door assembly should have minimal effect on the opening and closing operation of the assembly.

THREEDOM®

With so many requirements it is vital to ensure that the sealing system chosen will meet them all. Lorient's 'Threedom® Approved' solutions have been designed with just this in mind. Wherever this stamp appears, Lorient gives the assurance of a complete solution, tested for acoustic, smoke and fire containment, and with low friction properties to aid accessibility – meeting the requirements of all three aspects of the Building Regulations.

Comprehensive tests to establish the airborne sound insulation performance of Lorient and Integrity® acoustic seals have been carried out at Sound Research Laboratories Ltd, a UKAS approved testing laboratory.

Tests were conducted in accordance with BS EN ISO 140-3: 1995 (formerly BS 2750 Pt. 3), and ASTM-E413-94.

Perimeter and threshold seals have been tested individually and also in combination so that the performance could be established for a complete installation, reflecting the requirements of actual practice.

Results for each test are expressed in terms of:

1. Weighted Sound Reduction Index (Rw), derived according to BS EN ISO 717-1: 1997 (formerly BS 5821 Pt. 1).
2. Sound Transmission Class (STC). Widely used in the USA, STC is derived over the frequency range 125 to 4000 Hz in accordance with ASTM-E413-94

The sound reduction performance of a given sealing system will vary according to the incident frequency of the sound waves to which it is exposed. The performance graphs used in this publication convey a clear picture of the characteristics of the various sealing systems over a wide range of incident sound frequencies.

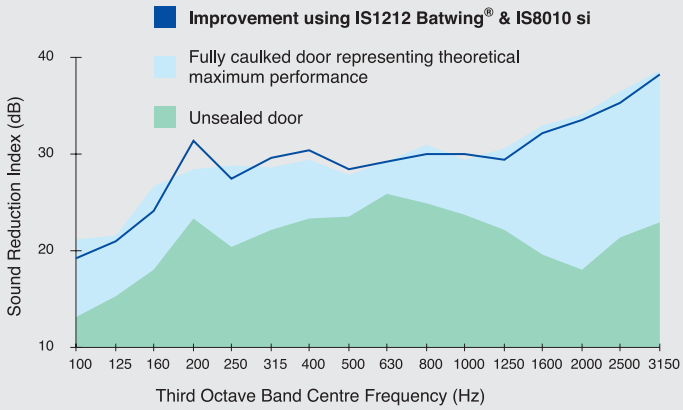
While single-figure Rw or STC ratings are useful for generalised comparisons, the graphs provide a better specific guide, particularly if a known, narrow band of sound frequencies needs to be controlled. In all cases, the graphs compare the performance of the door assembly, fitted with the chosen sealing system, against that of the same door with no seals and fully caulked with lead-filled, completely sound-proof putty.

The graphs allow direct comparison of the performance of the sealing system against the theoretical maximum performance achievable in the fully caulked but unserviceable condition. It is easy to see the contribution that the sealing system makes over that of an unsealed door and, in particular, how effective it is at selected frequencies.

All Lorient sealing systems are acoustically tested in their everyday operational mode. Under laboratory test conditions, it is all too easy to achieve deceptively more impressive results by wedging a door leaf in the frame with the seals in an extreme, highly compressed state – even if the operation of such a door in everyday service would be untenable.

Rest assured that all information in this brochure has been derived from full size, fully operational door assemblies. A third party certified timber doorset is the best guarantee that all elements – ironmongery, fire and smoke seals and glazing – are fully tested to the relevant standards. For specialist doors, and particularly imported door blanks, it is essential to consult the manufacturer to determine which seals have been tested, as many will have been tested with a Lorient solution.

The graphs show indicative sound curves over a range of frequencies. Actual sound curves for individual seals are available on request.



LORIENT

test-driven solutions

LORIENT

Lorient Acoustic, Smoke and Fire Seals

for fire rated doors

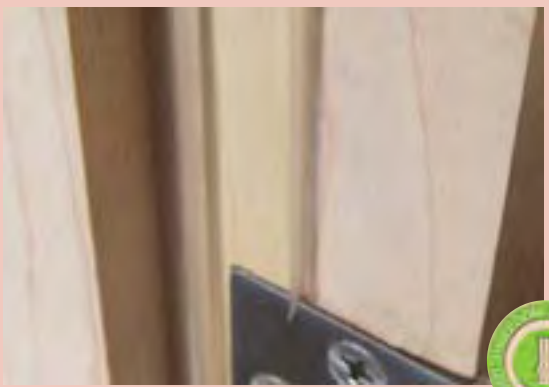
Traditionally, a fire resistant door assembly was required to demonstrate its capacity for resisting the passage of flames and hot gases under the conditions of a strictly controlled test in accordance with British or European Standards.

Today's demands on fire doors go beyond such requirements. For example, it must be remembered that in addition to a fire test report, it is necessary to have a smoke test report too.

Depending on its location in a building, the door may also need to have a designated standard of acoustic performance.

Lorient Finesse™ Acoustic, Smoke and Fire Seals

The Finesse™ seal combines performance and durability with superior aesthetics. It has achieved over 1 million open/close cycles on a full sized door assembly without degradation and has exceptionally low frictional resistance for ease of door operation.

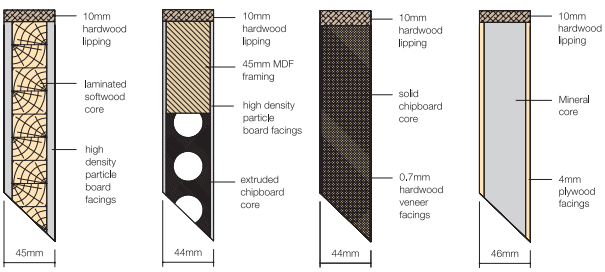


Door Constructions

For testing purposes, a variety of door types in common use around the world were chosen as follows:

- Laminated softwood core with particle board facings – 45mm
- Extruded chipboard core – 44mm
- Solid chipboard core – 44mm
- Mineral core with timber facings – 46mm

Since there were only minor differences in acoustic performance results between these door types, the solutions shown are based on the laminated softwood door construction in 45mm thickness. The maximum dB rating for the door in a completed caulked state is 33dB Rw, compared with an unsealed door rating of 22dB Rw.



Accreditations

All the Lorient combined fire and smoke seals featured in this section have the British Board of Agrément Approval (92/2841) and are CERTIFIRE certificated (CF330/CF341/CF136).

BBA approvals provide independent assurance for the designer, specifier and end-user as to the 'fitness for purpose' of building products.

Operated by Warrington Certification Ltd., CERTIFIRE is an accredited independent product conformity scheme that requires products to meet the requirements of the tests, to add minimal resistance to opening and closing forces, to prove long term performance under a variety of service conditions, and to be permanently marked for easy identification.

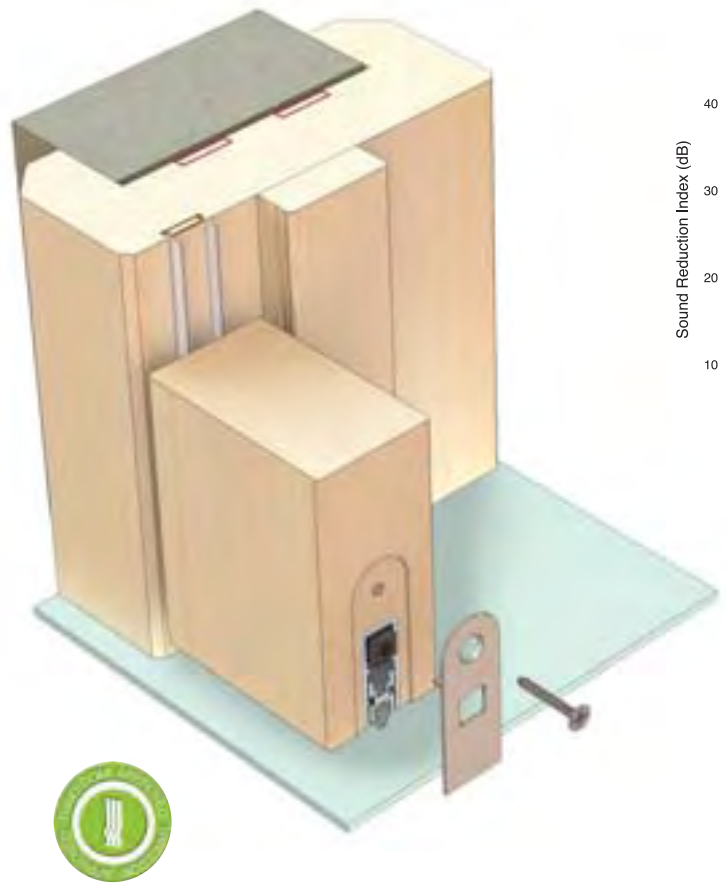
BBA BRITISH BOARD OF AGRÉMENT CERTIFICATE No. 92/2841

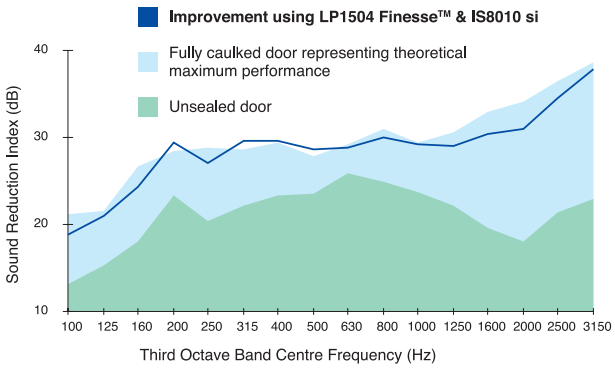
certifire
CERTIFIRE
CF330/CF341/CF136

LP1504 Finesse™ & IS8010 si

Single Leaf / Single Swing

31dB Rw STC

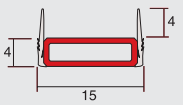




For IS8010 si information – see page 13

LP1504 Finesse™ Acoustic, Smoke and Fire Seal

The Finesse™ seal combines performance and durability with superior aesthetics – its realistic woodgrain finish and transparent fin construction provides a virtually invisible fitted product.



- **Unique dual fins** provide continuous acoustic and smoke protection at ironmongery points
- **Superior acoustic performance** – tested in accordance with BS EN ISO 140-3: 1995
- **Successfully tested for fire and smoke** performance in accordance with BS 476: Pt.22: 1987, BS 476: Pt.31.1: 1983 and BS EN 1634-1: 2000
- **Exceptionally low frictional resistance** for ease of operation – taking accessibility requirements into account
- **Highly durable** – has achieved over 1,000,000 cycles on a full size door assembly
- Available in **woodgrain and metallic finishes** with **translucent fins** as standard – for discreet installation (as specified by many architects)

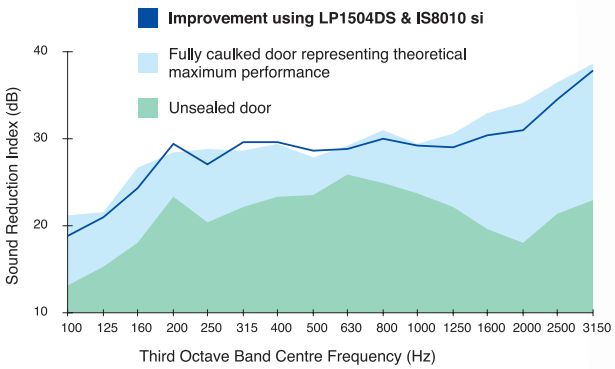
BBA

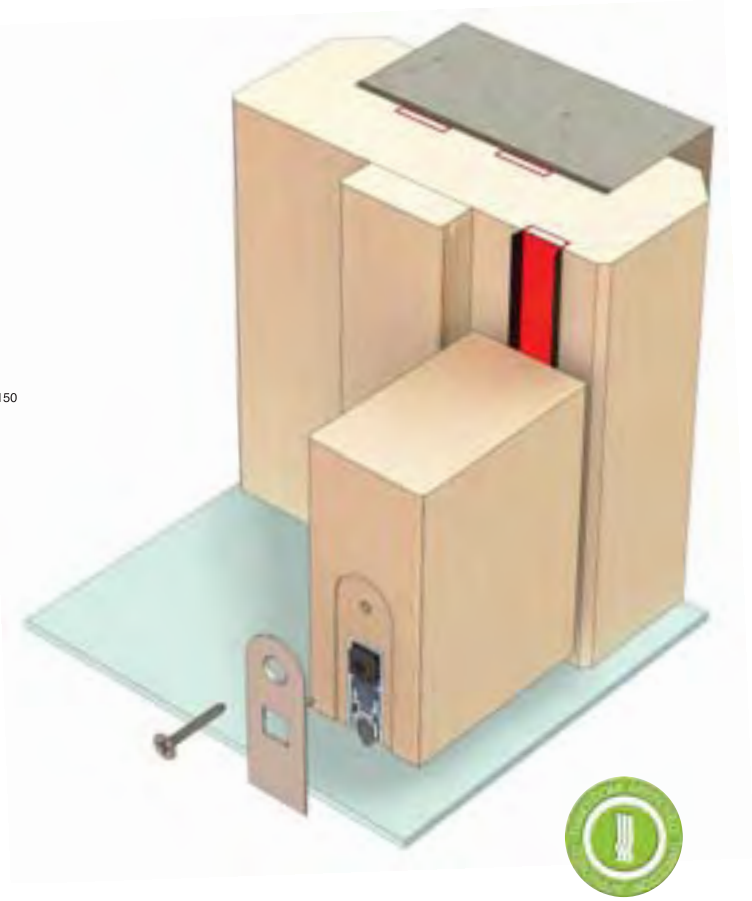
certifire
CERTIFIRE
CF330/CF341

LP1504DS & IS8010 si

Single Leaf / Single Swing

Rw STC 31dB





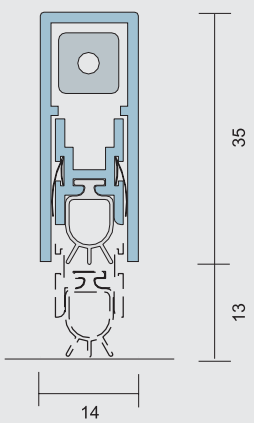
For LP1504DS information – see page 15

IS8010 si Automatic Threshold (Door Bottom) Seal

A medium duty, automatic threshold seal featuring a high efficiency mechanism. The seal is lifted clear of the floor as soon as the door is opened by a few millimetres – resulting in exceptional low door operating forces.

- **Internal fins** provide superior acoustic properties – tested in accordance with BS EN ISO 140-3: 1995
- Meets the **smoke leakage performance requirements of BS 5588** when tested in accordance with BS 476: Pt.31.1: 1983
- Also fire tested under the conditions of **BS EN 1634-1: 2000**
- Tested for up to 60 minutes under the conditions of BS 476: Pt.20/22: 1987 **without compromising fire resistance**
- Requires **no power connection and is self-levelling** on uneven surfaces
- **Highly durable** – has achieved over 1,000,000 cycles on a full size door assembly

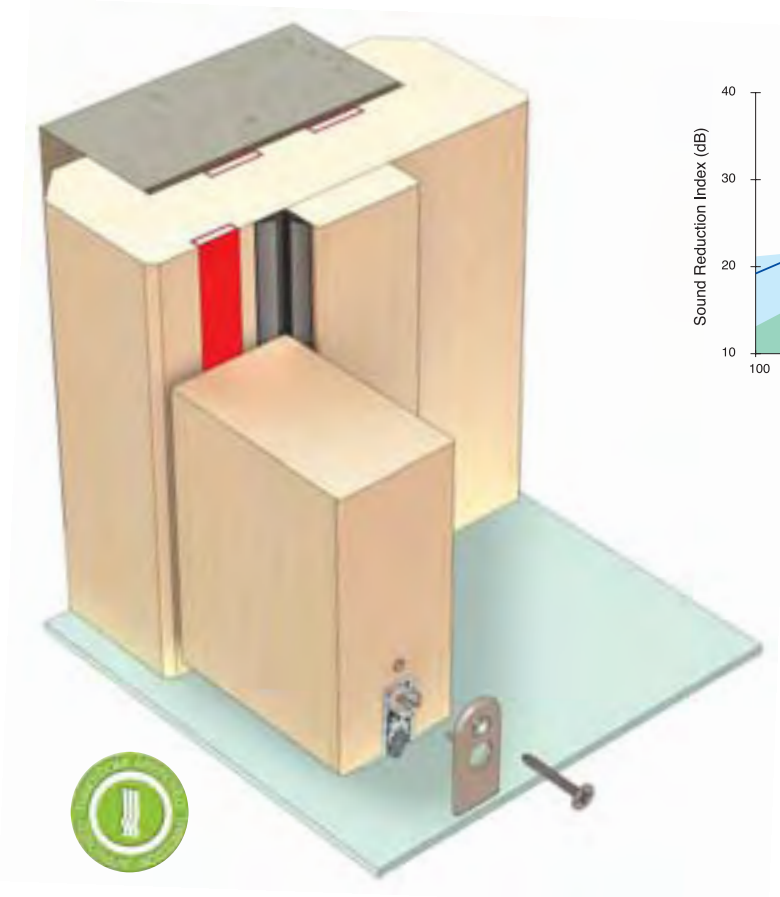
certifire
CERTIFIRE
CF136

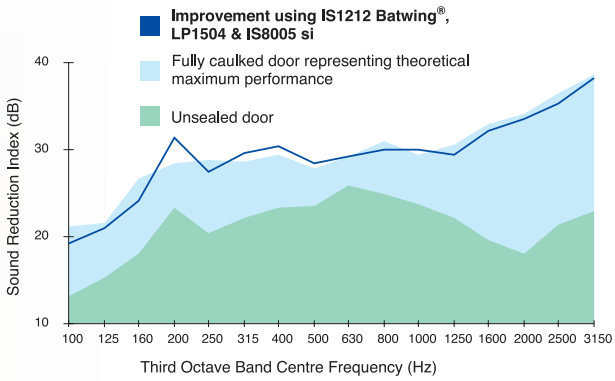


LP1504, IS1212 & IS8005 si

Single Leaf / Single Swing

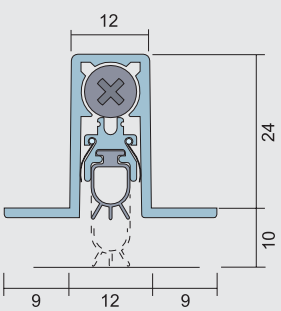
31dB Rw STC





For Batwing® information – see page 20

IS8005 si Automatic Threshold (Door Bottom) Seal



A slim line, automatic threshold seal featuring a high efficiency mechanism. The seal is lifted clear of the floor as soon as the door is opened by a few millimetres – resulting in exceptional low door operating forces.

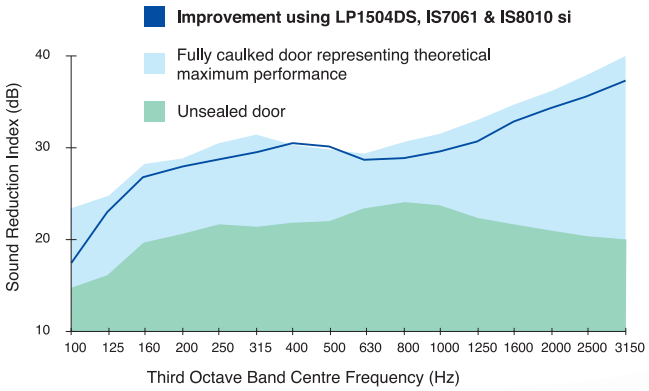
- **Internal fins** provide superior acoustic properties – tested in accordance with BS EN ISO 140-3: 1995
- Meets the **smoke leakage performance requirements of BS 5588** when tested in accordance with BS 476: Pt.31.1: 1983
- Tested for up to 60 minutes under the conditions of BS 476: Pt.20/22: 1987 **without compromising fire performance**
- Requires **no power connection and is self-levelling** on uneven surfaces
- **Highly durable** – has achieved over 1,000,000 cycles on a full size door assembly

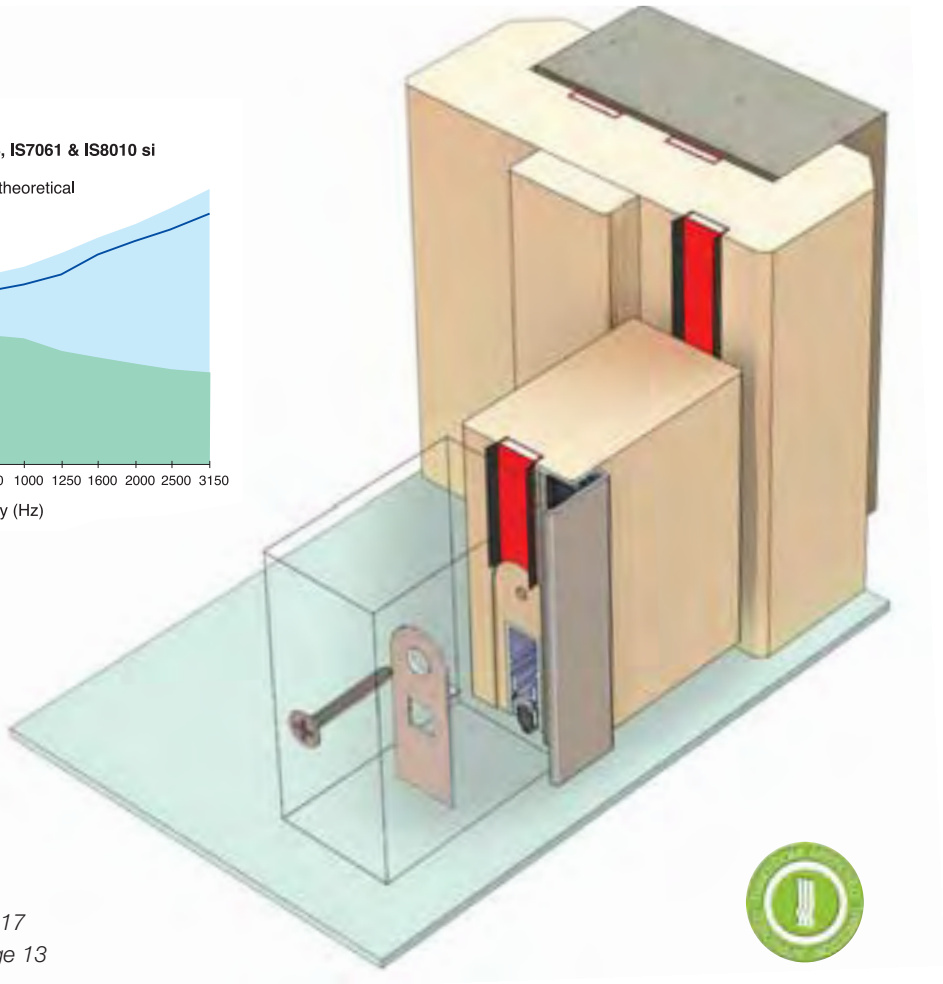
certifire
CERTIFIRE
CF136

LP1504DS & IS7061 & IS8010 si

Double Leaf / Single Swing

Rw
STC 32dB



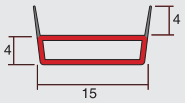


For IS7061 information – see page 17
For IS8010 si information – see page 13

LP1504DS Acoustic, Smoke and Fire Seal

The DS seal combines three seals in one; offering the ultimate in acoustic, smoke and fire containment, coupled with outstanding properties of low friction and high durability.

- **Unique elastomeric dual fins** provide continuous acoustic and smoke protection at ironmongery points
- **Superior acoustic performance** – tested in accordance with BS EN ISO 140-3: 1995
- **Successfully tested for fire and smoke** performance in accordance with BS 476: Pt.22: 1987 and BS 476: Pt.31.1: 1983
- **Exceptionally low frictional resistance** for ease of operation – taking accessibility requirements into account
- **Highly durable** – has achieved over 1,000,000 cycles on a full size door assembly
- **Variety of standard colours** with black fins – to blend or contrast with surrounds as required



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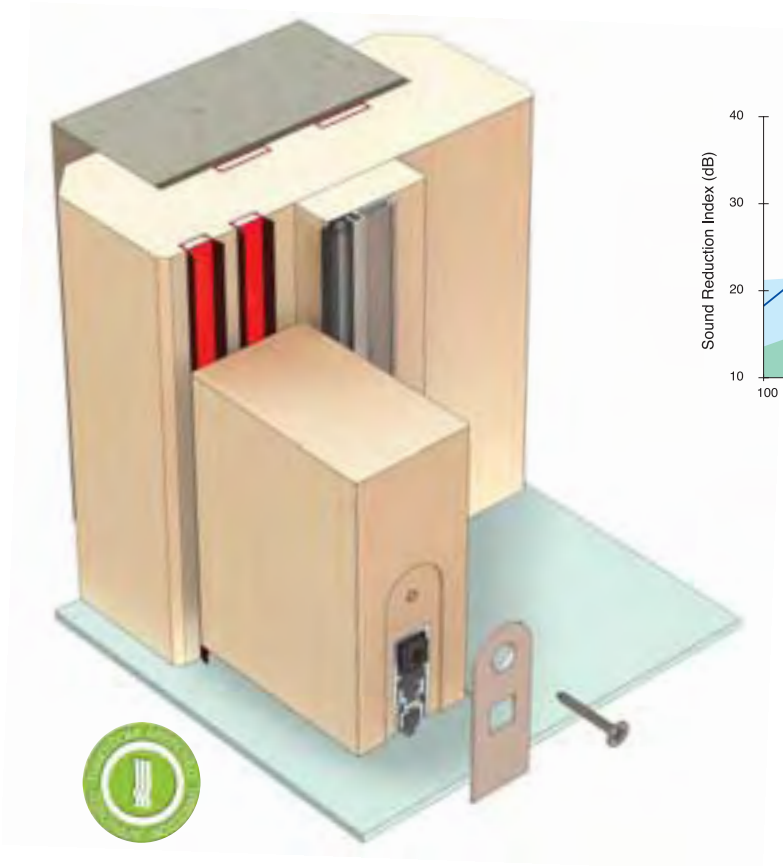
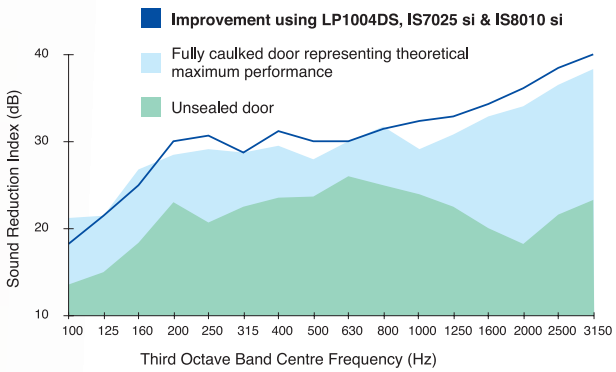
CERTIFIRE
CF330/CF341

LP1004DS x 2, IS7025 si & IS8010 si

Single Leaf / Single Swing

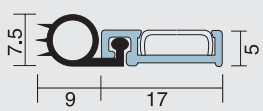
33dB Rw STC





For DS information – see page 15
For IS8010 si information – see page 13

IS7025 si Perimeter Seal



A slim line, face-fixed acoustic and smoke seal featuring a silicone bulb.

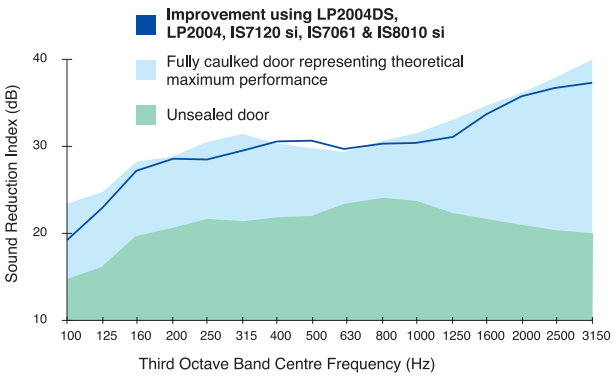
- **Superior acoustic performance** – tested in accordance with BS EN ISO 140-3: 1995
- Meets the **smoke leakage performance requirements of BS 5588** when tested in accordance with BS 476: Pt.31.1: 1983
- **Highly durable** – has achieved 1,000,000 cycles on a full size door assembly
- **Easily installed** without removing the door

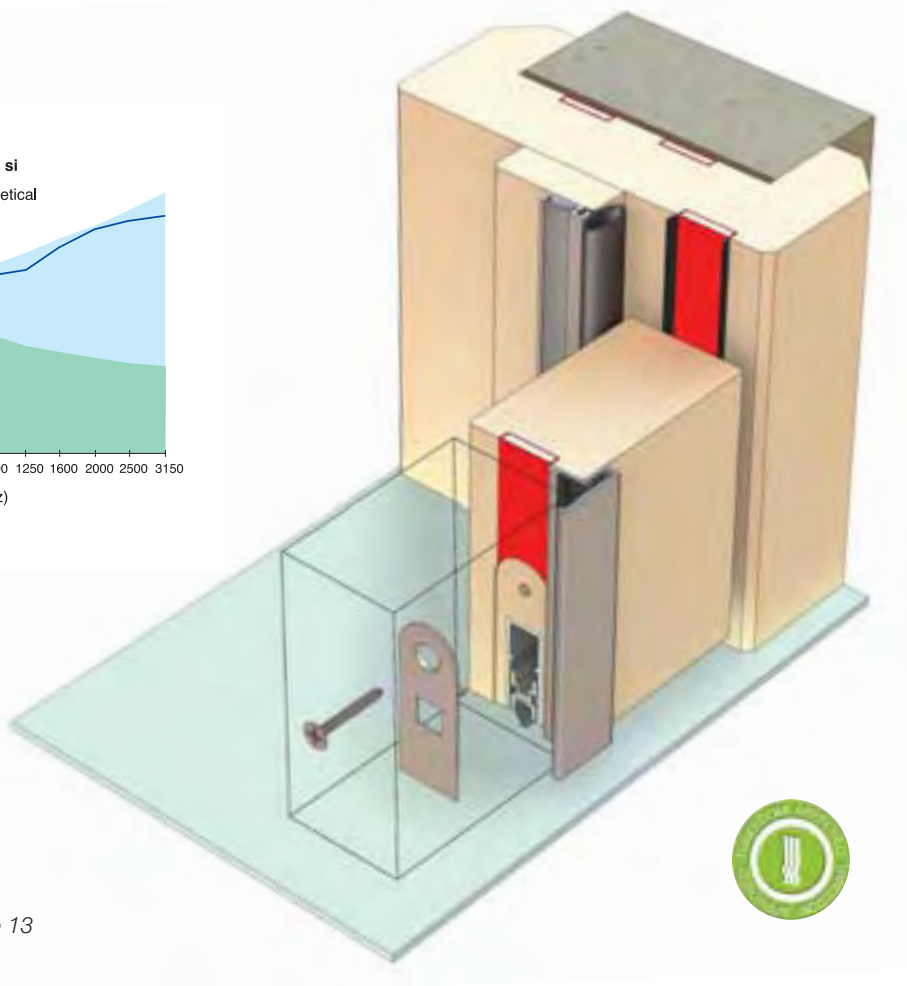
certifire
CERTIFIRE
CF136

LP2004DS, IS7120 & LP2004, IS7061 & IS8010si

Double Leaf / Single Swing

Rw STC 33dB



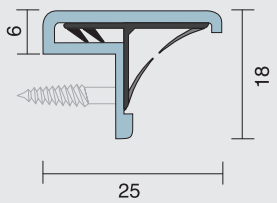


For DS information – see page 15
For IS8010 si information – see page 13

IS7061 Perimeter Seal

Incorporating the IS1212K kerf fitting Batwing® seal, this unique product brings all the acoustic and smoke sealing benefits of the Curved Fin Batwing® to the meeting stiles of double leaf doors.

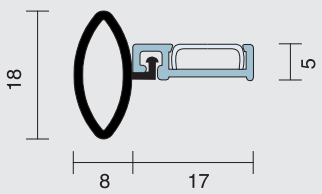
- **Acoustically tested** in accordance with BS EN ISO 140-3: 1995
- Suitable for use on **plain or rebated stiles**



IS7120 si Perimeter Seal

The IS7120 si provides effective acoustic containment as the seal is squeezed between the door and the stop when the door is closed, thus compensating for warped or unevenly hung doors.

- **Superior acoustic performance** – tested in accordance with BS EN ISO 140-3: 1995
- **Easily installed** without removing the door



Lorient Acoustic and Smoke Seals

for non-fire rated doors

Although non-fire rated acoustic doors do not have to meet any fire performance requirements, they must still provide the relevant acoustic rating under Approved Document E (England and Wales). Even if acoustic performance is not demanded, it may be desirable for reasons of privacy and quality of life. Accessibility requirements must be considered for these doors too.

This is where the Integrity® range of seals comes into its own. They have been extensively tested to not only ensure protection against sound, but also to provide minimal resistance to opening and closing in everyday service.

integrity®
Architectural Seals

IS7020 si

The Integrity® IS7020 si perimeter seal has a neat, tamper-proof, snap-on cover plate that conceals the fixing screws and presents an exceptionally smooth external finish.

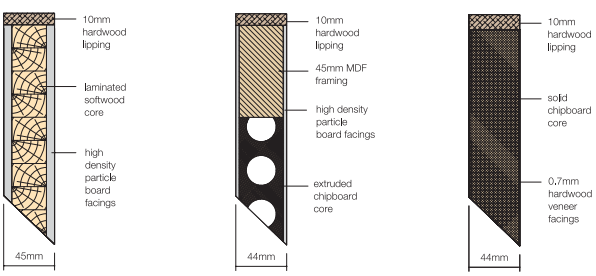
This product has been cycled under the CERTIFIRE certification scheme for durability and features a highly resilient silicone bulb as standard. The cover plate can be supplied in special colours using a powder coated finish for additional aesthetics.

Door Constructions

For testing purposes, a variety of door types in common use in many countries were chosen as follows:

- Laminated softwood core with particle board facings – 45mm
- Extruded chipboard core – 44mm
- Solid chipboard core – 44mm

Since there were only minor differences in acoustic performance results between these door types, the solutions shown are based on the laminated softwood door construction in 45mm thickness. The maximum dB rating for the door in a completed caulked state is 33dB Rw, compared with an unsealed door rating of 22dB Rw.



Accreditations

Where relevant, products covered by British Board of Agrément and/or CERTIFIRE certification are indicated by the presence of the logos.

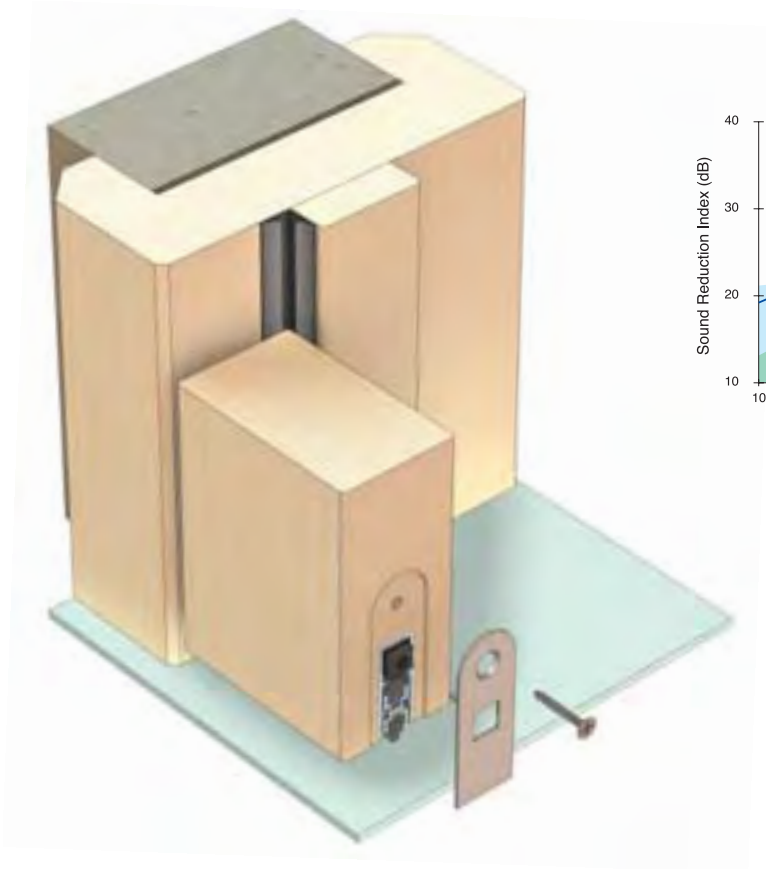
BBA BRITISH BOARD OF AGRÉMENT
CERTIFICATE No. 92/2841

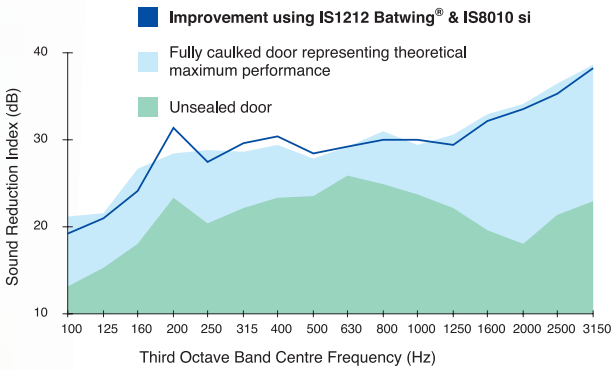
certifire
CERTIFIRE
CF330/CF341/CF136

IS1212 or IS1212K & IS8010 si

Single Leaf / Single Swing

31dB Rw STC

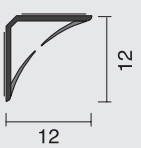




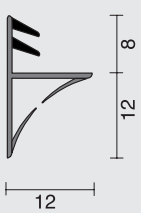
For IS8010 si information – see page 13

IS1212/IS1212K Batwing® Acoustic and Smoke Perimeter Seal

IS1212



IS1212K



The Batwing® seal minimises the opening and closing resistance of the door leaf due to its unique, curved elastomeric fins, which provide ongoing performance and durability in service.

- Symmetrical design ensures fins are always in contact with two surfaces of the door leaf, creating an air chamber to provide **excellent acoustic performance** – tested in accordance with BS EN 1634-1: 2000

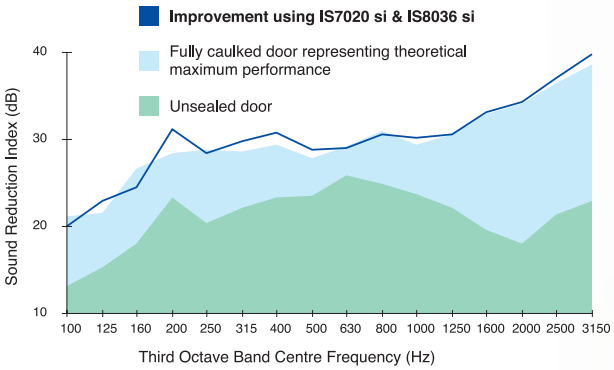
- **Proven smoke performance** from ambient up to 200ºC
- **Highly durable** – has achieved over 1,000,000 cycles on a full size door assembly
- **Variety of standard colours** to blend with door designs

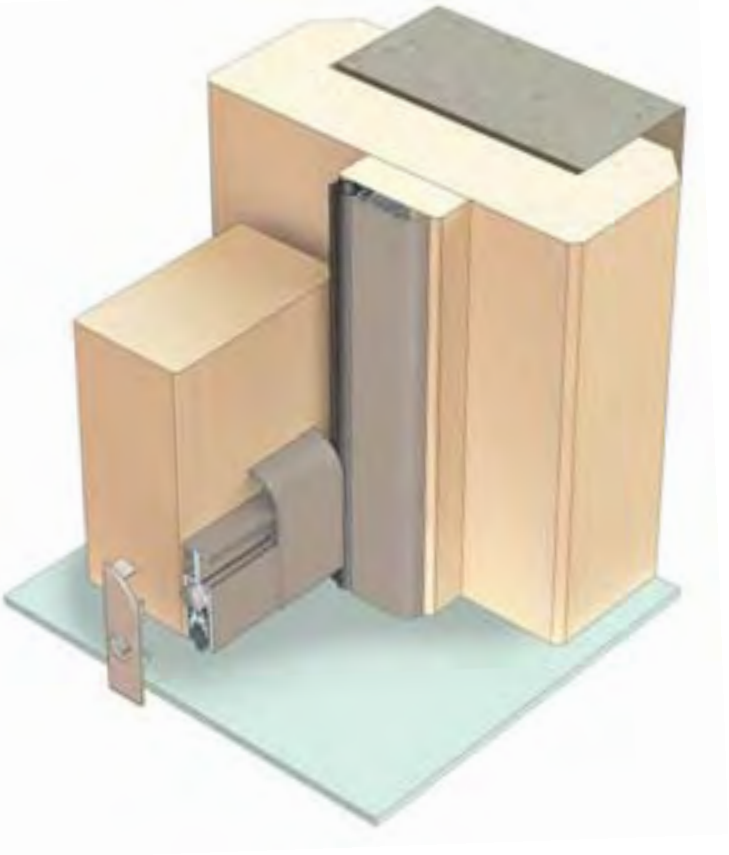
certifire
CERTIFIRE
CF136

IS7020 si & IS8036 si

Single Leaf / Single Swing

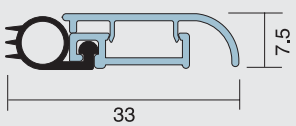
Rw
STC 32dB





For IS8036 si information – see page 23

IS7020 si Perimeter Seal



Tamper-proof perimeter seal.

- **Superior acoustic performance** – tested in accordance with BS EN ISO 140-3: 1995
- Meets the **smoke leakage performance requirements of BS 5588** when tested in accordance with BS 476: Pt.31.1: 1983
- **Highly durable** – has achieved 1,000,000 cycles on a full size door assembly
- **Neat snap-on cover plate** to conceal fixing screws – provides an exceptionally smooth external aspect
- **Special colours** can be supplied using a powder coated finish for additional aesthetics

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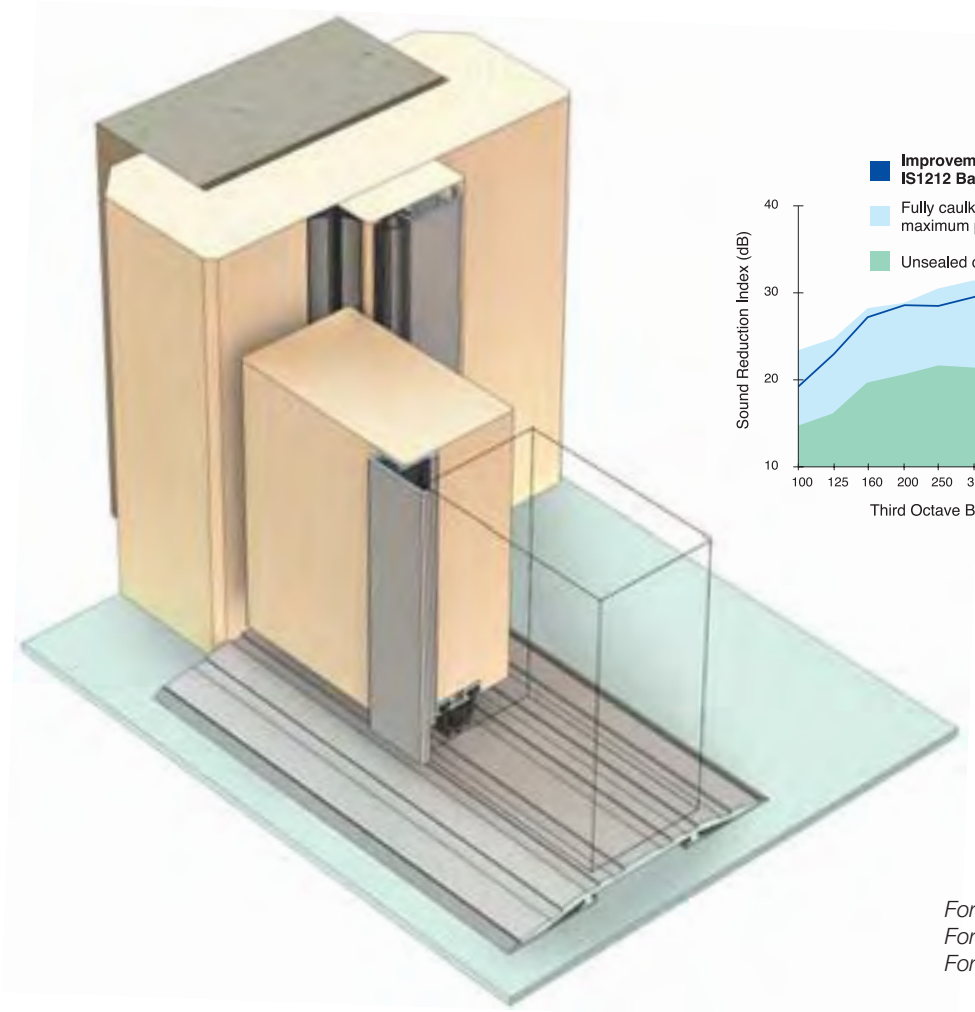
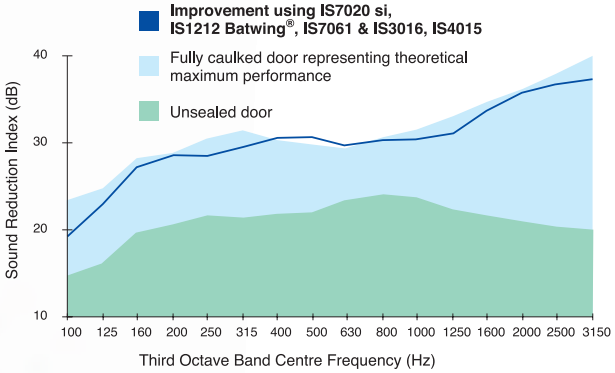
CF136

IS7020 si, IS1212 & IS7061 & IS3016 si, IS4015

Double Leaf / Single Swing

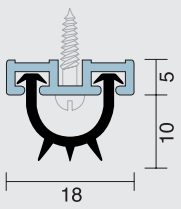
31dB Rw STC





For IS7020 si information – see page 21
For Batwing® information – see page 20
For IS7061 information – see page 17

IS3016 si Threshold (Door Bottom) Seal



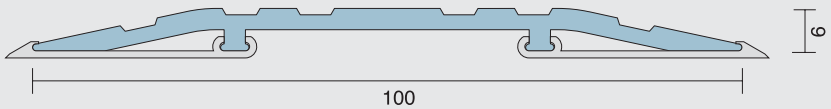
A versatile threshold seal that can be used with practically any threshold plate (Integrity® 4000 series).

- **Acoustically tested** in accordance with BS EN ISO 140-3: 1995
- **Unique push-fit design** – once the carrier is fixed, the rubber gasket can be snapped easily into place

IS4015 Threshold Plate

A low profile threshold plate – only 6mm high.

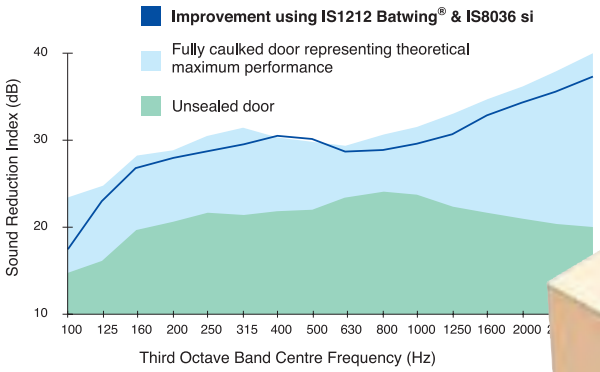
- **Prevents rain, draught and smoke penetration** when used in conjunction with a threshold seal
- Vinyl feet to provide **cushioning and levelling** on uneven surfaces

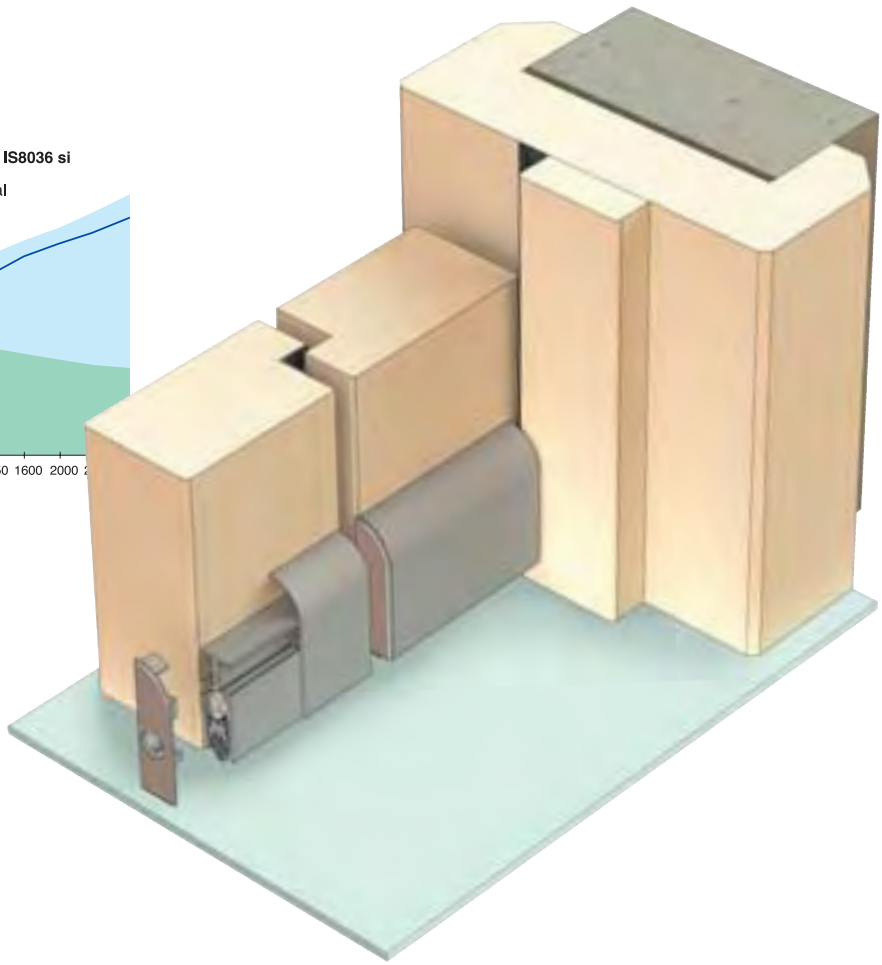


IS1212 & IS1212 & IS8036 si

Double Leaf / Single Swing

Rw
STC 32dB





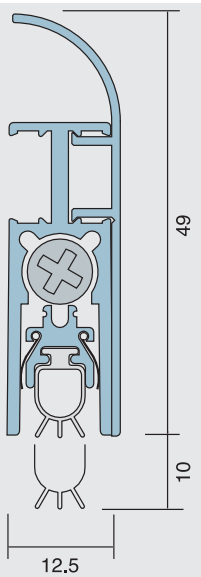
For Batwing® information – see page 20

IS8036 si Automatic Threshold (Door Bottom) Seal

A medium duty, automatic threshold seal featuring a high efficiency mechanism. The seal is lifted clear of the floor as soon as the door is opened by a few millimetres – resulting in exceptional low door operating forces.

- **Internal fins** provide superior acoustic properties – tested in accordance with BS EN ISO 140-3: 1995
- Meets the **smoke leakage performance requirements of BS 5588** when tested in accordance with BS 476: Pt.31.1: 1983
- **Highly durable** – has achieved 1,000,000 cycles on a full size door assembly
- Aluminium snap-on cover plate provides an **exceptionally smooth aspect**
- **Special colours** can be supplied using a powder coated finish for additional aesthetics

certifire
CERTIFIRE
CF136



LORIENT

Lorient Acoustic and Smoke Seals

for specialist acoustic doors

Where there's a requirement for greater acoustic security, for example, in medical surgeries, multiple occupancy buildings or school music rooms, the door construction needs to meet a higher acoustic rating to ensure privacy.

Working in partnership with specialist door manufacturers, Lorient has tested a selection of seals to meet these requirements, while taking into account accessibility needs to ensure the doors are operable in everyday service.

integrity® Architectural Seals

IS1212 Batwing®

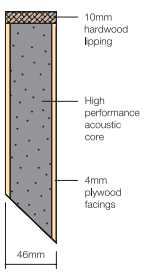
The unique curved design of the Lorient Batwing® perimeter seal provides easier door operation and increased durability while retaining all the smoke and acoustic containment benefits. The fins are subtly curved to work with the door leaf, providing minimal frictional resistance so the door remains easy to operate, contributing to Approved Document M requirements.

Door Constructions

Although we have tested our seals on a variety of specialist acoustic door cores, the solutions shown here are based on doors kindly supplied by Hazlins of Ludlow.

The solutions are based on a 46mm thick high performance door core with 4mm plywood facings and 10mm lippings.

The maximum dB Rw rating for the acoustic door in a completed caulked state is 40dB Rw, compared with an unsealed door rating of 22dB Rw for double doors and 26dB Rw for single doors.



Accreditations

Where relevant, products covered by British Board of Agrément and/or CERTIFIRE certification are indicated by the presence of the logos.

BBA BRITISH BOARD OF AGRÉMENT CERTIFICATE No. 92/2841

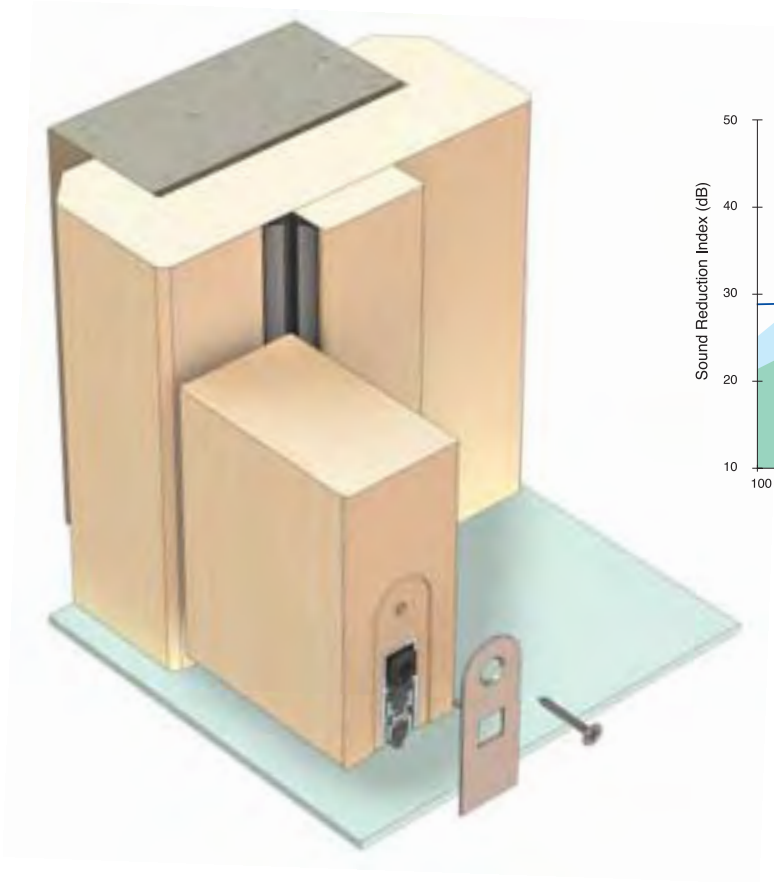
certifire

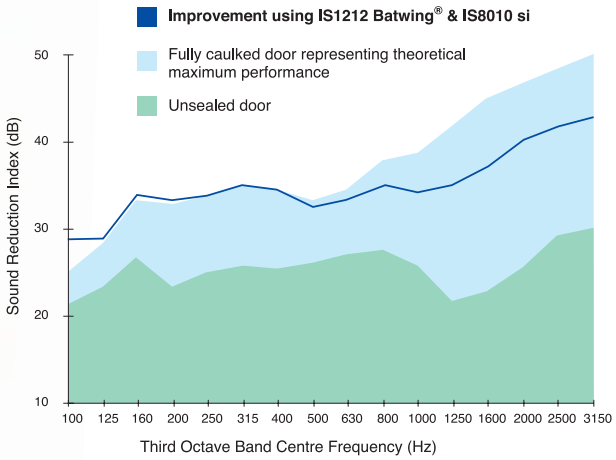
CERTIFIRE
CF330/CF341/CF136

IS1212 or IS1212K & IS8010 si

Single Leaf / Single Swing

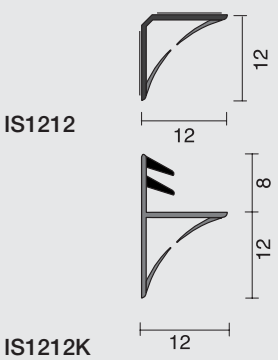
37dB Rw STC





For IS8010 si information – see page 27

IS1212/IS1212K Batwing® Acoustic and Smoke Perimeter Seal



The Batwing® seal minimises the opening and closing resistance of the door leaf due to its unique, curved elastomeric fins, which provide ongoing performance and durability in service.

- Symmetrical design ensures fins are always in contact with two surfaces of the door leaf, creating an air chamber to provide **excellent acoustic performance** – tested in accordance with BS EN ISO 140-3: 1995

- **Proven smoke performance** from ambient up to 200ºC
- **Highly durable** – has achieved over 1,000,000 cycles on a full size door assembly
- **Variety of standard colours** to blend with door designs

BBA

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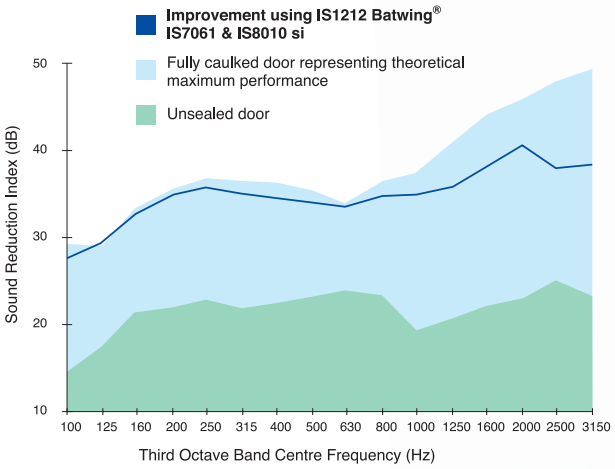
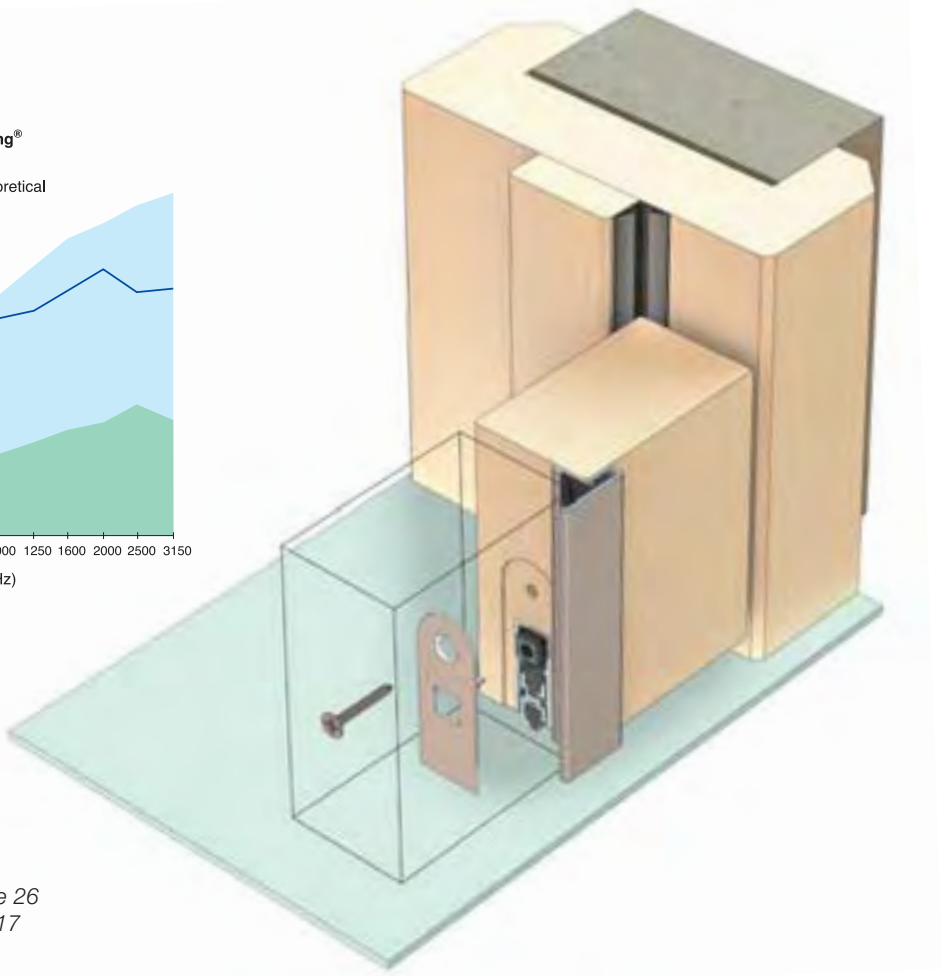
CF136

IS1212 & IS7061 & IS8010 si

Double Leaf / Single Swing

Rw STC 37dB





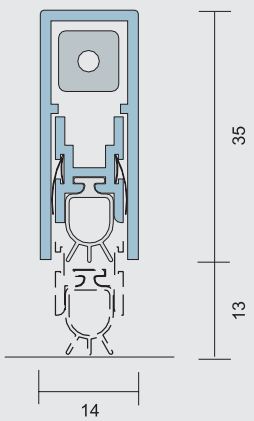
For Batwing® information – see page 26
For IS7061 information – see page 17

IS8010 si Automatic Threshold (Door Bottom) Seal

A medium duty, automatic threshold seal featuring a high efficiency mechanism. The seal is lifted clear of the floor as soon as the door is opened by a few millimetres – resulting in exceptional low door operating forces.

- **Internal fins** provide superior acoustic properties – tested in accordance with BS EN ISO 140-3: 1995
- Meets the **smoke leakage performance requirements of BS 5588** when tested in accordance with BS 476: Pt.31.1: 1983
- Also fire tested under the conditions of **BS EN 1634-1: 2000**
- Tested for up to 60 minutes under the conditions of BS 476: Pt.20/22: 1987 **without compromising fire resistance**
- Requires **no power connection** and is **self-levelling** on uneven surfaces
- **Highly durable** – has achieved over 1,000,000 cycles on a full size door assembly

certifire
CERTIFIRE
CF136



Fire Rated Doors – 30 minutes

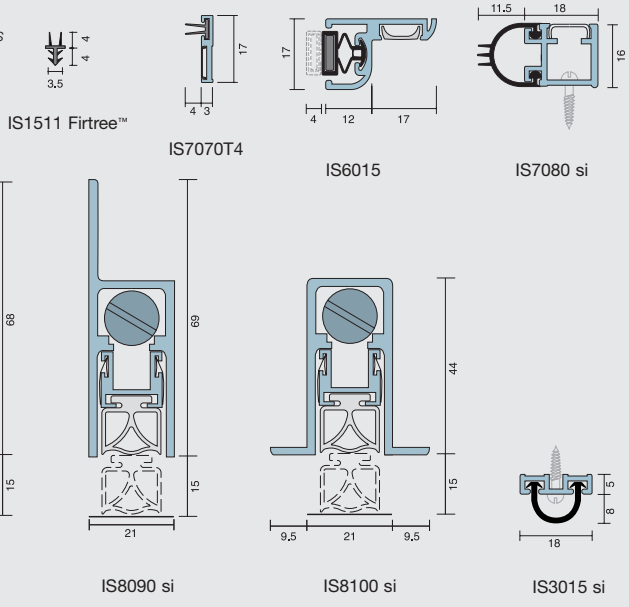
Acoustic rating	Unsealed door rating	Lorient Products
32dB RW STC Single Leaf/Single Swing Door	22dB	LP1504DS, IS1212 & IS8005 si
31dB RW STC Single Leaf/Single Swing Door	22dB	LP1504, IS1511 & IS8005 si
33dB RW STC Double Leaf/Single Swing Door	22dB	LP1504DS, IS7120 si & LP1504, IS7061 & IS8010 si

Fire Rated Doors – 60 minutes

Acoustic rating	Unsealed door rating	Lorient Products
32dB RW STC Single Leaf/Single Swing Door	22dB	LP1504DS x 2 & IS8005 si
31dB RW STC Single Leaf/Single Swing Door	22dB	LP2004DS & IS8005 si
33dB RW STC Double Leaf/Single Swing Door	22dB	LP2004, IS1212, IS7025 si & LP2004, IS7061 & IS8010 si

Product Cross-Sections The products below relate to the solutions shown on this spread and not detailed earlier.

All dimensions are in mm



Use of Alternative Threshold Seals

A selection of threshold seals was separately tested using a high performance acoustic door construction with fully caulked perimeter gaps. The choice of seal is therefore up to the specifier, be it face-fixed, semi-mortised or completely concealed underneath the door.

IS8010 si:	Rw = 37dB
IS8020 si:	Rw = 35dB
IS8090 si:	Rw = 35dB
IS8091 si:	Rw = 35dB
IS3016 si:	Rw = 35dB

Note: For fire door applications, only the IS8005 si, IS8010 si or the face-fixed automatic threshold seals are suitable. IS8010 si was tested with an intumescent cladding kit on 60 minute doors.

Non-Fire Rated Doors

Acoustic rating	Unsealed door rating	Lorient Products	
33dB RW STC Single Leaf/Single Swing Door	22dB	IS6015 & IS8100 si	
33dB RW STC Single Leaf/Single Swing Door	22dB	IS7025 si & IS8010 si	
33dB RW STC Single Leaf/Single Swing Door	22dB	IS7120 si & IS8020 si	
32dB RW STC Single Leaf/Single Swing Door	22dB	IS7080 si & IS8005 si	
31dB RW STC Single Leaf/Single Swing Door	22dB	IS7090 si & IS8090 si	
33dB RW STC Double Leaf/Single Swing Door	22dB	IS7070T4 x 2 & IS7070T4 x 2 & IS8010 si	
33dB RW STC Double Leaf/Single Swing Door	22dB	IS7025 si & IS7061 & IS7025 si	

Specialist Doors

Acoustic rating	Unsealed door rating	Lorient Products	
37dB RW STC Single Leaf/Single Swing Door	26dB	IS7120 si & IS8010 si	
37dB RW STC Single Leaf/Single Swing Door	26dB	IS7025 si & IS8010 si	
35dB RW STC Single Leaf/Single Swing Door	26dB	IS7020 si & IS8091 si	
37dB RW STC Double Leaf/Single Swing Door	22dB	IS7120 si & IS7061 & IS8010 si	
37dB RW STC Double Leaf/Single Swing Door	22dB	IS7070T4 x 2 & IS7070T4 x 2 & IS8010 si	
33dB RW STC Double Leaf/Single Swing Door	22dB	IS7020 si & IS7061 & IS3015 si	

Everything you need to know about Approved Document E (England and Wales) is set out below. The information includes regulatory requirements, relevant standards, clauses and a glossary of terms and abbreviations.

Regulatory Requirements: Approved Document E

The requirements for acoustic containment are presented in Approved Document E to the Building Regulations (England and Wales), and the required acoustic performance of door assemblies in a number of situations is detailed.

Requirement E1 states:

'Dwelling-houses, flats and rooms for residential purposes, shall be designed and constructed in such a way that they provide reasonable resistance to sound from other parts of the same building and from adjoining buildings.'

Further clauses in Approved Document E (2.26, 4.20 and 6.6) relate this requirement to door assemblies:

'Ensure that any door has good perimeter sealing (including the threshold where practical*), and a minimum mass per unit area of 25kg/m^2, or a minimum sound reduction index of 29dB Rw (measured according to BS EN ISO 140-3: 1995 and rated according to BS EN ISO 717-1: 1997). The door should also satisfy the Requirements of Building Regulation Part B – Fire safety.'

*** The sealing system must include the threshold. Despite the recommendations of Approved Document E to seal the threshold 'where practical', research shows that it is essential to do so in order to achieve the 29dB Rw minimum requirement.**

Approved Document E also covers acoustic conditions in schools. Requirement E4 states:

'Each room or other space in a school building shall be designed and constructed in such a way that it has the acoustic conditions and the insulation against disturbance by noise appropriate to its intended use.'

Section 8 of Approved Document E recognises Building Bulletin 93, 'The Acoustic Design of Schools' as an Approved Document, and the normal way of satisfying Requirement E4.

Building Bulletin 93 also emphasises the importance of good perimeter and threshold sealing in achieving the required acoustic performance of the door assembly (sections 3.5; 3.12.5; 3.13; 3.13.1; also figures 3.11; 5.7; and 5.8).

Specific requirements are also stated, in Table 1.3:

'Performance standards for airborne sound insulation between circulation spaces and other spaces used by students: minimum sound reduction index Rw:

All spaces except music rooms	30dB Rw
Music rooms	35dB Rw

It is therefore now essential to take into account the requirements of Approved Document E when specifying and installing door sealing systems.

Door Related Considerations

A typical architectural door leaf with FD30 fire performance has a mass of only 18-22kg/m^2 – below the requirement stated in Approved Document E. Therefore, to meet the requirements of Approved Document E it is essential to establish the acoustic performance of the doorset to at least 29dB Rw.

Door construction can help to some extent. Because sound is created by pressure fluctuations, it is the vibration of the door leaf that causes some of the sound to be transmitted. A very dense or moderately flexible door leaf is harder to set into vibration – providing a better acoustic barrier. However, even a heavier door, without seals, will not meet the minimum 29dB Rw requirement. This is because although some sound will be transmitted through the door leaf itself, the majority of the sound passes through the gaps around the perimeter of the door leaf.

The reference to Approved Document B should also be noted. In many residential situations, the door that must provide acoustic protection will also need to provide fire and smoke protection . For most purposes, a standard FD30 door leaf will provide a good basis for an acoustic door assembly to meet the 29dB Rw minimum requirement of Approved Document E. However, without a sealing system the acoustic performance will only be in the region of 22dB Rw. Fitting a traditional brush-type smoke seal will offer only a minor improvement in acoustic performance, still falling well below the 29dB Rw minimum required by Approved Document E.

Therefore, for any door assembly, a professionally designed and engineered sealing system for acoustic, smoke and fire containment must be incorporated in order to ensure that the door assembly will comply with the requirements.

A 'good' sealing system can only be determined by testing against the referenced standards, using a full size door assembly, and observing at all times the benchmark of 29dB Rw minimum for the whole assembly.

Relevant Standards

The following standards relate to acoustic sealing for doors:

BS EN ISO 140-3: 1995: Methods of measurement of sound insulation in buildings and of building elements. Part 3 Laboratory measurement of airborne sound insulation of building elements
BS EN ISO 717-1: 1997: Rating of sound insulation in buildings and of building elements. Part 1 Airborne sound insulation

ASTM-E413-04: Classification for rating sound insulation

Test Method

The BS EN ISO 140-3: 1995 (BS 2750 Pt. 3) test involves placing the door construction within a brick dividing wall between a sound source room and a receiving room. Sound waves are produced in the source room and measurements of the sound pressure levels are made in both rooms at one-third octave intervals in the frequency range 100 to 3150 Hertz (Hz). The ASTM method follows the same principle but performance is measured over a slightly different frequency range, 125 to 4000 Hz.

Several microphones are used to obtain a good average of the sound pressure level in each room. From these measurements, the Sound Reduction Index (R) is derived.

The Sound Reduction Index is an expression of the laboratory sound transmission performance of a particular element or construction. It is a function of the mass, thickness, sealing method and installation, and is independent of the overall area of the sample. When a door is installed on site the actual sound insulation performance will depend on surface area: the larger the area the greater the sound energy transmitted, as well as the absorption in the receiving area.

Glossary of Terms and Abbreviations

dB Decibel. A comparative figure generally indicating a decrease in sound level between two points (source and receiver). The dB scale is logarithmic so a reduction from 33dB to 30dB is not a 10% improvement but a 100% improvement.

dBA A single figure denoting sound intensity at a particular point.

R Sound Reduction Index. Expressed in dB and defined as the number of decibels by which sound energy, randomly incident on the test sample, is reduced in passing through it.

Hz Hertz. Unit of frequency indicating the number of cycles per second of a sound wave. (Low frequency; boom, high frequency; scream).

Rw Weighted Sound Reduction Index. A single figure performance indicator derived from measurements over a range of frequencies in accordance with BS EN ISO 717-1. If the sound level in the source room is for example, 80dBA and a sound level in the receiving room of 50dBA is required, then a door assembly Rw of at least 30dB will be needed.

STC Sound Transmission Class. A single figure performance indicator very similar to Rw but derived from ASTM-E413 Classification for rating sound insulation.

The Rw or STC rating indicates acoustic performance of a door/seal assembly over a wide spectrum of sound frequencies. Reference to the graphical performance diagrams will give more specific performance at particular frequencies if they are known. This may be higher or lower than the Rw or STC rating.

Acoustic Testing

Test Reports

Documented test evidence is required to verify the acoustic performance of a door assembly. When looking at any acoustic test report for a doorset or sealing system, it is important to remember the relationship and inter-dependency between the door and the sealing system.

Door manufacturers' test reports should always indicate how the door perimeter was sealed, especially the threshold.

Seal manufacturers' test reports should always indicate the kind of door used to evaluate the sealing system and **indeed if a real door was used at all.** It is also important to consider how cost-effective and user-friendly the door and sealing solution is in practice.

Continuing Professional Development Seminars

Lorient offers two fully accredited CPD seminars. Impartially presented by knowledgeable speakers, the seminars are structured to be technically informative.

CPD CERTIFIED
Construction CPD Certification Service

Performance Door Design: The Basics of Sound Reduction

Effective acoustic containment helps to improve the quality of the built environment, preserving privacy as well as excluding unwanted noise. With changing regulations, it is essential to be informed of the relevant requirements and the implications for door assemblies.

The acoustic CPD seminar covers:

- The nature of sound, examining airborne transmission of sound
- Regulatory requirements and British Standards that relate to acoustic performance
- Test procedures and interpretation of test reports
- Effective design of door assemblies for acoustic performance, including door construction and the influence of sealing systems
- Design conflicts between acoustic performance, durability and ease of operation of the door
- Independent accreditation

The Role and Performance of Fire and Smoke-Resisting Door Assemblies

The importance of fire and smoke-resisting door assemblies is illustrated by the 491 annual deaths in fire tragedies in the UK alone. Apart from the human toll, property losses each year approach £3.3 billion.

The fire and smoke containment CPD seminar covers:

- Hard facts concerning deaths, injuries and property damage caused by fire and smoke
- Regulatory requirements for fire and smoke-resisting door assemblies
- The nature and behaviour of smoke
- Effective design of door assemblies for smoke containment, including the threshold gap
- Design conflicts between fire containment, smoke containment, durability and ease of operation of the door
- Independent accreditation

Both Lorient seminars are certified by the Construction CPD Certification Service and each is valued at one hour. Comprehensive notes are provided and attendance certificates awarded.

If you are interested in booking either seminar, please contact the Lorient Marketing department or e-mail cpd@lorientuk.com

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Lorient continues to lead the way in research and development with an enviable reputation for innovation and technical excellence, something that only 30 years of experience can bring. As leaders in the design and manufacture of a wide range of sealing systems, our experts are on hand to listen, help and advise on your acoustic needs.

comprehensive support

Technical Services

Lorient provides specialist advice on acoustic, smoke and fire protection for refurbishment and new build projects. If you need assistance, you can call our telephone help line.

Alternatively, we can arrange a site visit to get a clearer idea of your needs and how we can help you. We also provide copies of test reports and samples where needed and can give guidance on how best to meet Building Regulations and Standards.

Customisation

If you have a particular requirement which isn't covered by the applications in this brochure, we may be able to supply an existing non-standard item, or even develop a customised solution for you.

Web Support

We have a comprehensive, user-friendly website which features our extensive range of products, CAD drawings and details on the services we offer. Lorient's entire collection of brochures can be downloaded as can copies of certification and specification texts.

Technical Services

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www.lorientuk.com

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