



Acoustic Information

Halspan Technical Support Manual



Introducing Halspan

Halspan is a long established company, with a reputation for innovation and quality. First, we developed an entirely new way of constructing doors using a unique 3-layer particle board. It took the industry by storm and hasn't been bettered since.

Halspan doors have been extensively tested for acoustic performance in combination with various perimeter sealing and glazing options in both single and double door configurations.

Today, Halspan is one of the world's leading suppliers of quality doorset components.

Fire Doors, Fabrication and a little about acoustics in general

For fire door applications or where fire performance is required in association with acoustic performance, refer to the relevant sections of the Halspan Technical Support manuals.

For general fabrication information, Safety data and Care and handling instructions, refer to the Technical support Manuals.

Issues relating to fire door performance should be considered prior to those of acoustics.

An Introduction to Acoustics

Acoustic protection (or noise reduction) may not have quite the same life-saving significance as fire and smoke resistance, but it's still important.

Why?

- Because of the demands of the built environment – we should ensure that living and working conditions are just as acceptable from a noise point of view as they are from a heating, lighting and ventilation perspective.
- Document E of the Building Regulations makes it quite clear what we need to do with a door assembly to achieve an acoustic level.
- We have a Duty of Care to ensure a comfortable sound level, especially in a residential environment.
- And lastly, we have to comply with privacy requirements.

Okay we know why acoustic protection is important. But where does it apply?

Document E applies to new build residential buildings in England and Wales only. But an acoustically rated door will only be needed in a flat or apartment.

- Dwelling houses and flats subject to a material change of use i.e when a large house changes from single occupation to multi-occupancy. Again, this applies to England and Wales only.
- Rooms for residential purposes in England and Wales, including hotels, Care Homes and student accommodation.
- In all the above building types, a minimum 29 dB Rw rating is required.
- Schools, but not every education building. This applies nationwide under BB93. A minimum of 30 dB Rw is specified.

Sound

Sound is a sensation picked up by the ear, caused by the vibration of surrounding air particles. This gives rise to rapid fluctuations in air pressure.

The transmission of sound happens in two ways. One is airborne and the other is structure-borne.

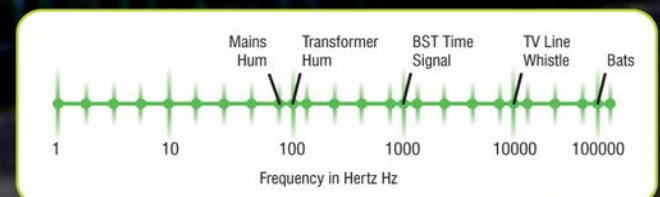
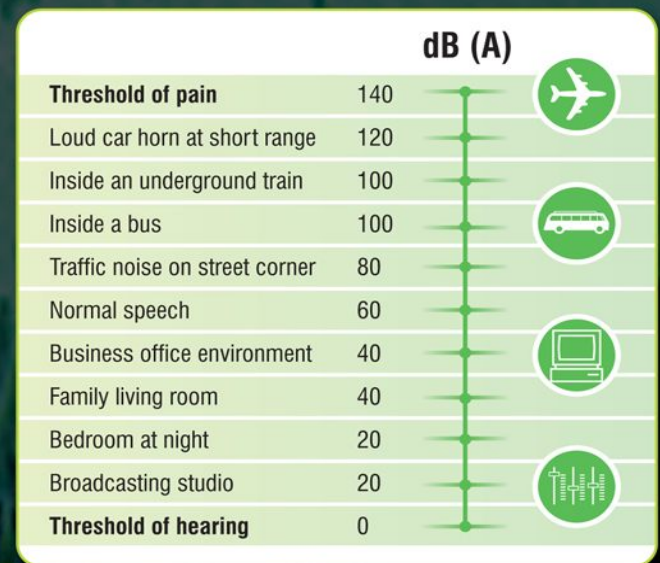
Airborne Sound

Door leaves only respond to airborne sound. The air molecules vibrate and oscillate. When they hit the door leaf, they cause it to vibrate.

Door construction therefore plays a vital part in achieving good levels of sound reduction.

The Decibel Scale

The decibel scale (dB) illustrates the response of the human ear to sound – the progression of this is logarithmic as opposed to linear.





Relevance in respect of doorsets?

Door leaves only respond to airborne sound. The air molecules vibrate and oscillate when they hit the door leaf, these will send the door leaf into vibration. Therefore the door construction plays a vital part in achieving good levels of sound reduction.

What makes a Good Acoustic Door?

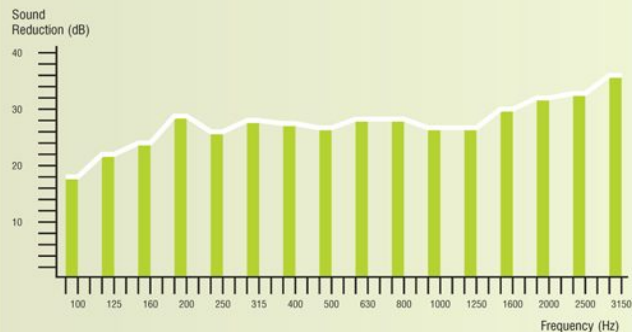
When these air molecules hit a very dense or moderately flexible door leaf it is harder to set the door into vibration, therefore making a good acoustic barrier. Conversely, a less dense or excessively stiff door leaf will be easier to set into vibration and will be a poor acoustic barrier.

The influence of the door leaf and the sealing systems must work in harmony with each other, in order to achieve an acoustic rating. It is also necessary to take into account the closing forces needed to shut the door. i.e. acoustic seal performance and wear and tear considerations.

Too much friction from the sealing system will result in a difficult to operate door and a less than perfect acoustic rating with poor durability.

BS EN ISO 140-3

Diagram of sound reduction values "R" for a typical door assembly and various frequencies.



Acoustic Testing

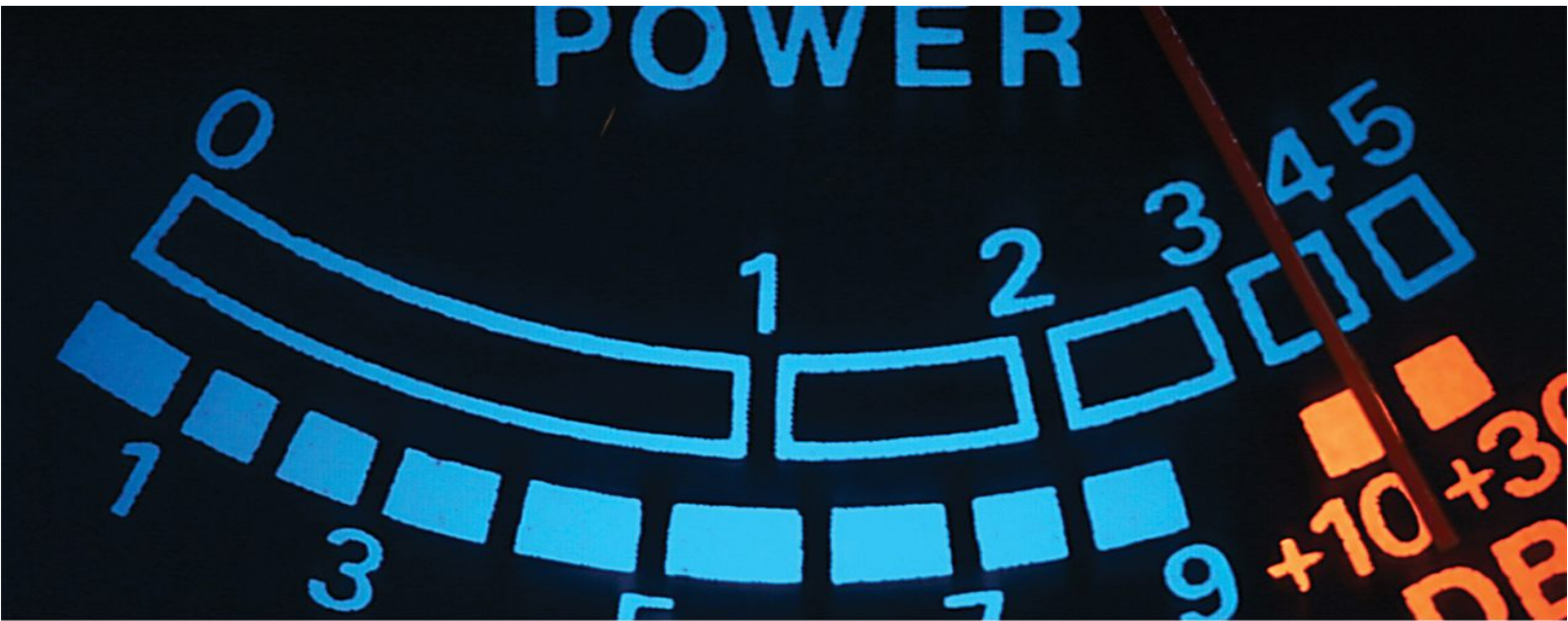
The standard test chamber has a source room which is equipped with a loud speaker, known as the sound generator. The door for testing is built into a standard wall, the other side of the door is the receiving room which is equipped with a sensitive micro-telephone. It is then possible to measure the amount of sound reduction from one side of the door to the other.

This diagram shows how the door responds differently at different frequencies. Testing is at a variety of different levels. The difference in sound pressure levels measured at these designated frequencies gives us the sound reduction index or R.

The R Value varies according to frequencies used. It is beneficial to have single figure rating, rather than considering lots of different data. As a consequence, a rating standard is applied to the test values.

BS EN ISO 717-1 - This standard weights the sound barrier performance of an assembly according to the more commonly encountered frequencies.

The result is a single easily comparable performance guide, known as the Weighted Average Sound Reduction Index or R_w .



Laboratory Results Versus Site Performance

As in fire situations, the tested door set up is rarely replicated on site. Therefore, if there is a measurement of sound reduction on site, the results will depend on a number of factors – volume and occupancy of transmitting room, volume and occupancy of receiving room, area of wall /partition, performance of all/partition, accuracy of installation of doorset, floor and wall finishes etc...

Inevitably, in practise, the potential sound reduction of a doorset is never achieved on site.

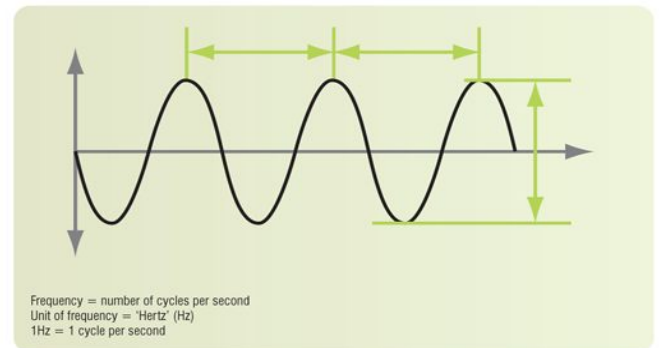
It is worth considering the site application and specification. High performance acoustic requirements call for specialist sealing arrangements and sometimes specialist constructions of door leaf.

This can bring with it's own issues in respect of the operation of such doorsets in a building.

- Fire alarm systems if situated in association with high performance acoustic doors cannot necessarily be heard.
- Door operation and self closing – there will be greater frictional resistance from the acoustic seals than from regular door installations leading to difficulty of operation for the young and the infirm, and the potential fire risk if doors cannot close satisfactorily.

Halspan and Acoustic Performance

Halspan has been extensively tested using various perimeter sealing options in single and double door configurations, including glazing. This laboratory data is translated in the following suite of specifications based on our testing and expert 3rd party opinion from Sound Research Laboratories.



Halspan and Acoustic Performance – Fabrication

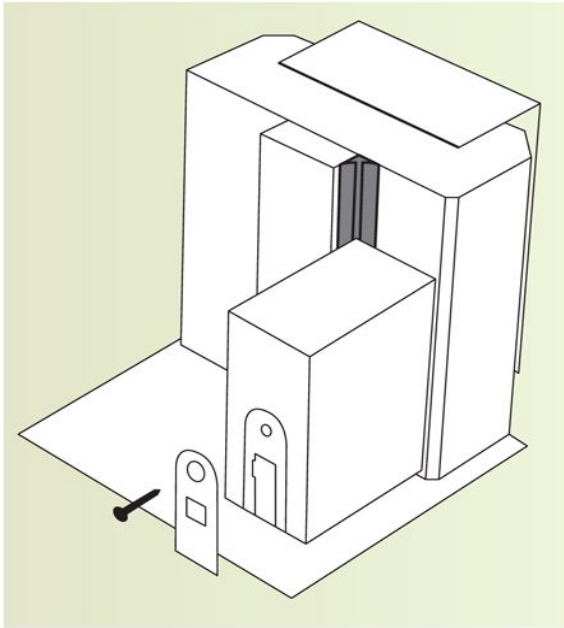
In general terms, there is no special preparation required in the fabrication of Halspan door leaves for acoustic performance – follow the relevant sections for the FD30 & FD60 Technical Support Manuals. Critical to the successful installation of an acoustic door assembly is accuracy of installation. Any gaps in sealing, for example, will significantly prejudice performance.

N.B. if fire and acoustic performance is required – apply the technical parameters for fire performance first then the acoustic parameters. Data sheets follow which outline the various performance levels applicable to door types and configurations.

44mm / 54mm Halspan Prima/Optima

(Please refer to Lorient Polyproducts Ltd technical information for full details and test evidence)

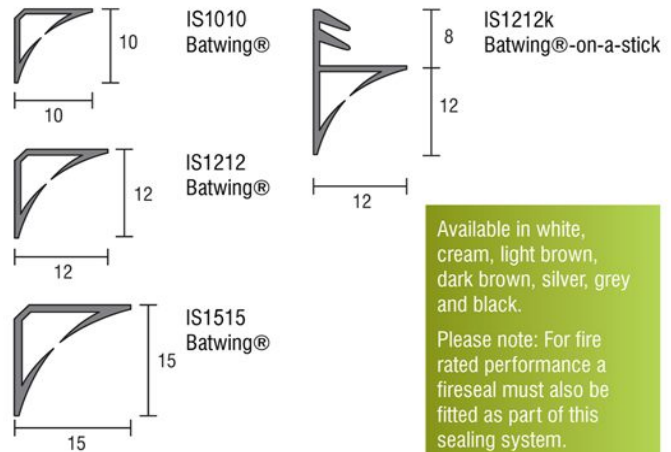
Up to **30dB** _{Rw} (Unglazed)



Inc IS8010si



IS1212 Batwing® Acoustic and Smoke Perimeter Seal

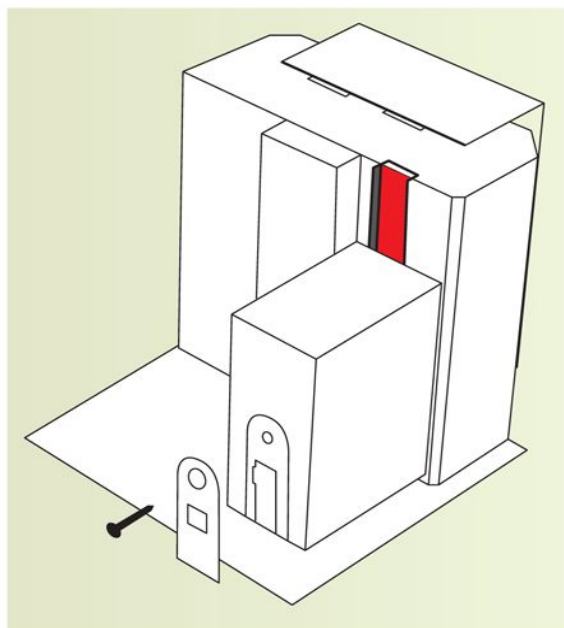


Available in white, cream, light brown, dark brown, silver, grey and black.
Please note: For fire rated performance a fireseal must also be fitted as part of this sealing system.

44mm / 54mm Halspan Prima/Optima

(Please refer to Lorient Polyproducts Ltd technical information for full details and test evidence)

Up to **30dB** _{Rw} (Unglazed)

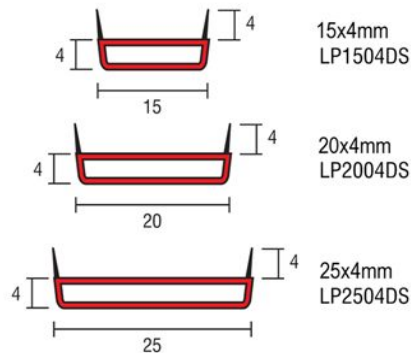


Graphics courtesy of Lorient Polyproducts Ltd

Inc IS8010si



DS Acoustic, Smoke and Fire Perimeter Seal



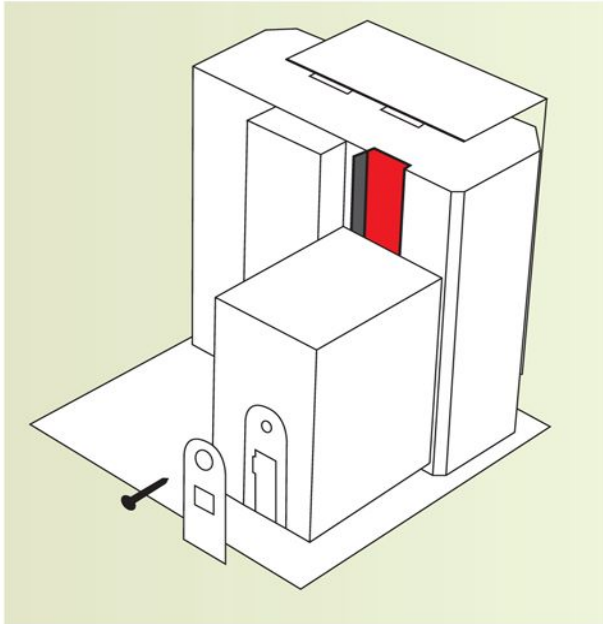
Available in a range of standard colours, with black fins – to blend or contrast with surroundings as required.

Acoustic Information

54mm Halspan Prima/Optima

Glazed Door (Please refer to Lorient Polyproducts Ltd Technical Information for full details, including required glazing)

Up to **34dB*** R_w (Glazed)
* Dependant upon glazing



DS Acoustic, Smoke and Fire Perimeter Seal

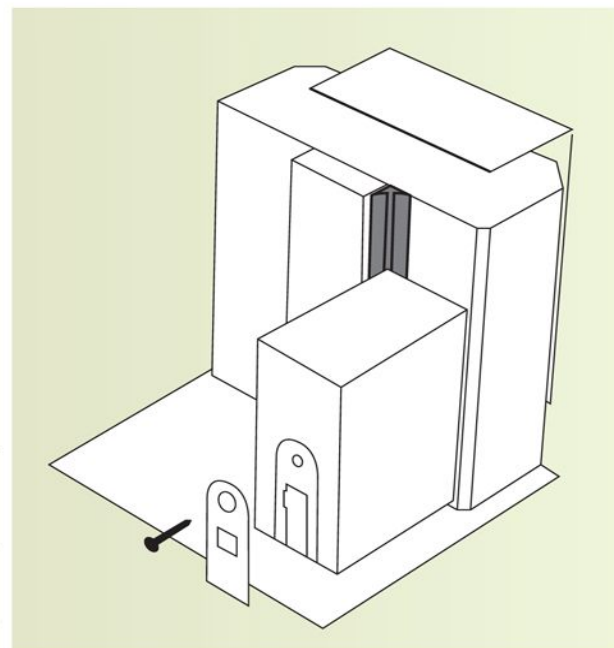
The DS is a unique product combining three seals in one; offering the ultimate in acoustic, smoke and fire containment, coupled with outstanding properties of low friction and high durability.

- 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 & BS 476: Pt.31.1: 1983.

54mm Halspan Prima/Optima

Glazed Door (Please refer to Lorient Polyproducts Ltd Technical Information for full details, including required glazing)

Up to **35dB*** R_w (Glazed)
* Dependant upon glazing



IS8010si 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 – ensuring the door remains easy to operate.

- 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.

Graphics courtesy of Lorient Polyproducts Ltd

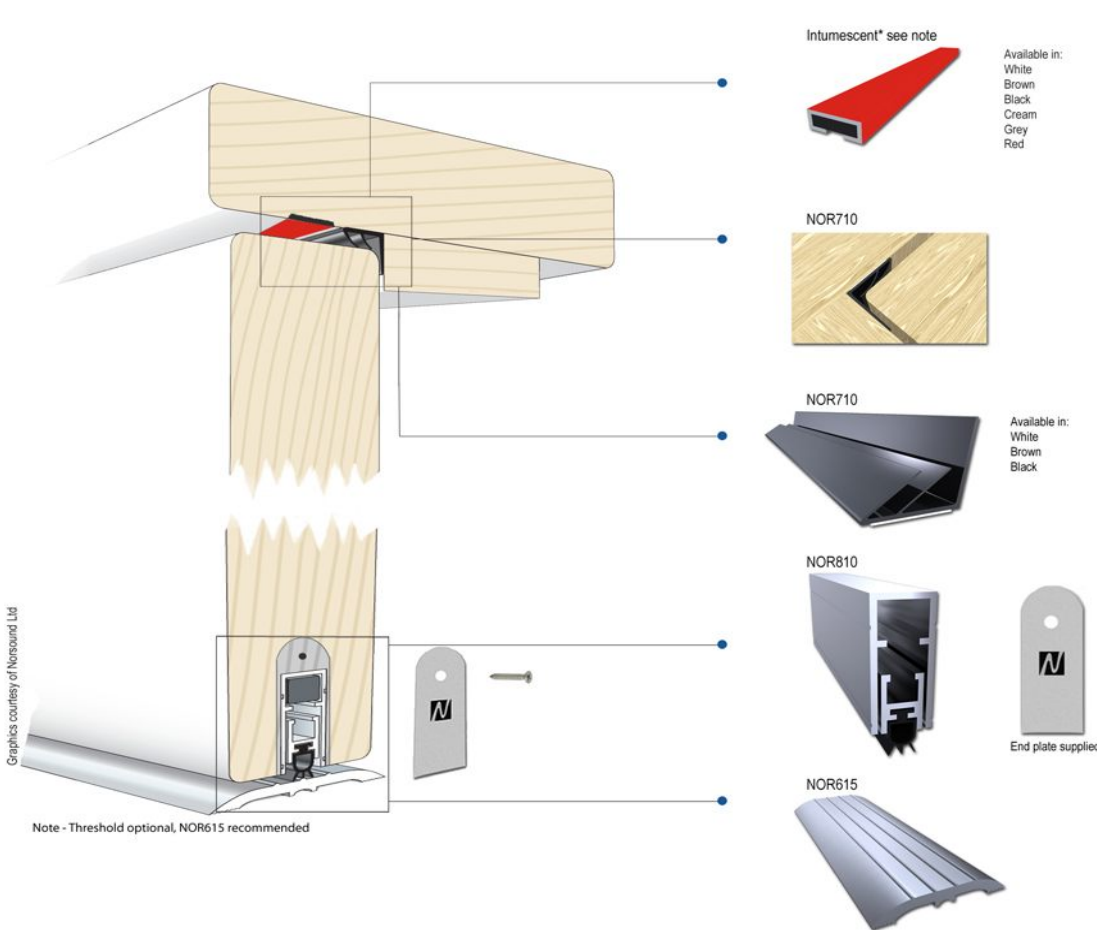
Please note: For fire rated performance a fireseal must also be fitted as part of this sealing system.

34dB_{Rw} (Glazed)
32dB_{Rw} (Unglazed)

44mm Halspan Prima/Optima

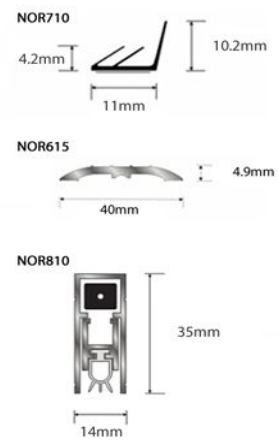
Door configuration: single leaf, single action

Please refer to Norsound Ltd technical information for full details, including required glazing. www.norsound.co.uk +44(0)1661 831 311



Norsound acoustic seals

- Suitable for latched or unlatched doorsets
- Tested in accordance with BS EN ISO 140-3 : 1995
- Cold smoke BS 476 PT 31:1
- UKAS approved product test
- Norsound seals have been proven to not compromise fire test performance under British Standard fire resistance testing



Jambs	Head	Threshold	Meeting stiles	Unglazed	Glazed
NOR710	NOR710	NOR810 & NOR615	-	32dB_{Rw} STC	34dB_{Rw} STC

Glazing options	
10mm Pyrodur	34dB_{Rw} STC
6mm Pyroshield	32dB_{Rw} STC

* For full intumescent details please refer to the latest Halspan technical manual
 Accepts all current Halspan intumescent details allowing maximum fire envelope
 Recommended gap tolerances between leaf and frame between 3mm - 4 mm

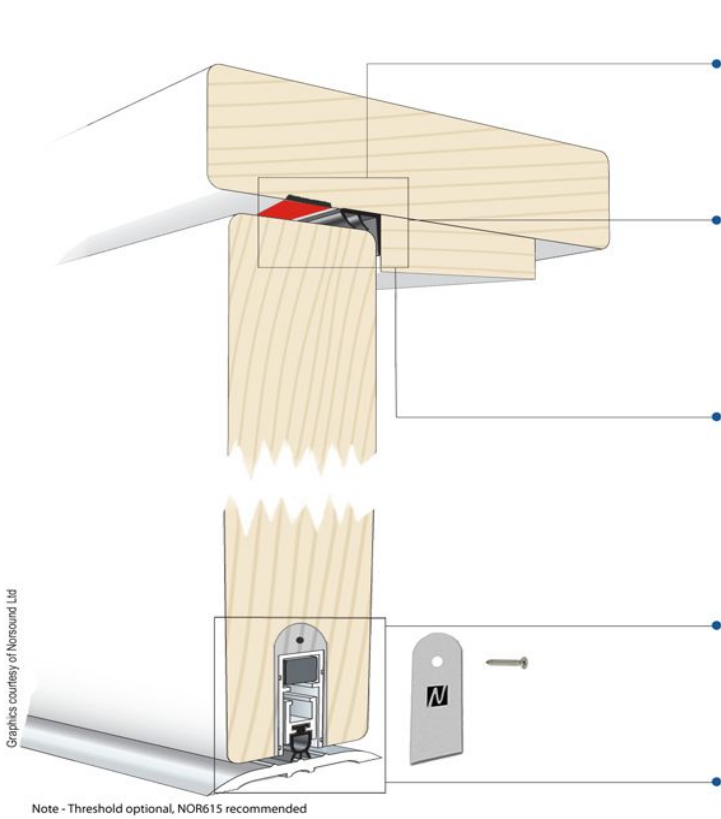
Acoustic Information

54mm Halspan Prima/Optima

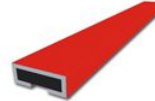
Door configuration: single leaf, single action

Please refer to Norsound Ltd technical information for full details, including required glazing. www.norsound.co.uk +44(0)1661 831 311

36dB_{Rw} (Glazed)
34dB_{Rw} (Unglazed)



Intumescent* see note



Available in:
 White
 Brown
 Black
 Cream
 Grey
 Red

NOR710



NOR710

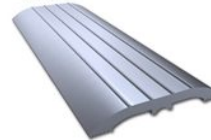


Available in:
 White
 Brown
 Black

NOR810



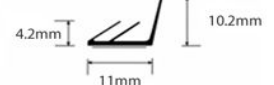
NOR615



Norsound acoustic seals

- Suitable for latched or unlatched doorsets
- Tested in accordance with BS EN ISO 140-3 : 1995
- Cold smoke BS 476 PT 31:1
- UKAS approved product test
- Norsound seals have been proven to not compromise fire test performance under British Standard fire resistance testing

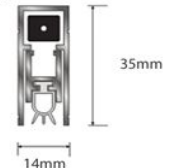
NOR710



NOR615



NOR810



Jambs	Head	Threshold	Meeting stiles	Unglazed	Glazed
NOR710	NOR710	NOR810 & NOR615	-	34dB_{Rw} STC	36dB_{Rw} STC

Glazing options

15mm Pyrostop	36dB_{Rw} STC
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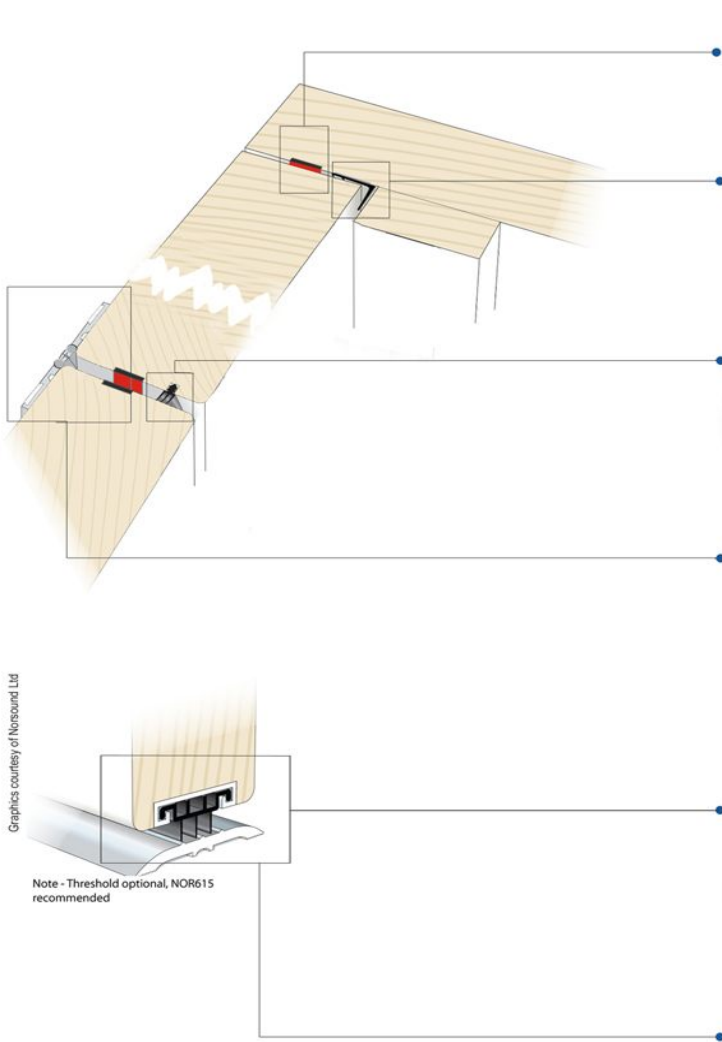
* For full intumescent details please refer to the latest Halspan technical manual
 Accepts all current Halspan intumescent details allowing maximum fire envelope
 Recommended gap tolerances between leaf and frame between 3mm - 4 mm

44mm / 54mm Halspan Pairs Prima/Optima

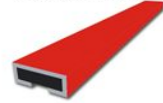
Door configuration: double leaf, single action

Please refer to Norsound Ltd technical information for full details, including required glazing. www.norsound.co.uk +44(0)1661 831 311

35dB_{Rw} (Glazed)



Intumescent* see note



Available in:
White
Brown
Black
Cream
Grey
Red

NOR710



Available in:
White
Brown
Black

NOR720



Available in:
White
Brown
Black

NOR755

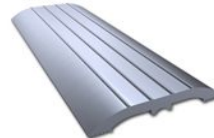


NOR850



End plate supplied

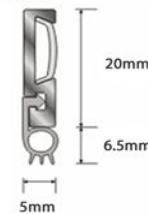
NOR615



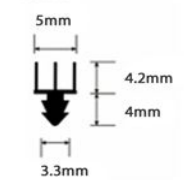
Norsound acoustic seals

- Suitable for latched or unlatched doorsets
- Tested in accordance with BS EN ISO 140-3 : 1995
- Cold smoke BS 476 PT 31:1
- UKAS approved product test
- Norsound seals have been proven to not compromise fire test performance under British Standard fire resistance testing

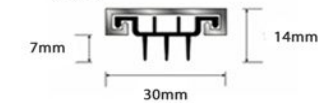
NOR755



NOR720



NOR850



NOR615



NOR710



Note - Threshold optional, NOR615 recommended

Jamb	Head	Threshold	Meeting stiles	44mm Glazed	54mm Glazed
NOR710	NOR710	NOR850	NOR720 & NOR755 x2	35dB Rw STC	35dB Rw STC

Glazing options	44mm Glazed	54mm Glazed
10mm Pyrodur	35dB Rw STC	-
15mm Pyrostop	-	35dB Rw STC

* For full intumescent details please refer to the latest Halspan technical manual
Accepts all current Halspan intumescent details allowing maximum fire envelope
Recommended gap tolerances between leaf and frame between 3mm - 4 mm



Installation

As discussed previously, proper installation of an acoustic door leaf is critical to maintain performance. Hardwood, softwood or MDF door frames are approved. The installation gaps should be as detailed and back of frame to wall junction fully sealed. In respect of ironmongery, then the conventions for installing ironmongery into fire doors should be recognised. Detailed ironmongery installation guides are available in the Halspan FD30 and FD60 Technical Support Manuals. Refer also to the Safety Data sections and Installation Guides in the Technical Support Manuals.

Surrounding Structure Detail

The gap between the sub-frame/structural opening and the rear face of the door frame should not exceed 10mm and be filled with non-combustible material and capped off with either Norsound 'Nor-coustic' acoustic fire rated mastic or similar approved product.

