Installation Manual: Fire Rated Doors

Revision: 05

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Revision No: 05 **Dated: August 1, 2022**	**Prepared by: Narinder Singh, AGM** **Approved by: Prakash Malode, GM**	

1. Introduction

This Manual is prepared in order to provide assistance and guidance during the planning and execution stages of contracts that involve installation of custom-made doors.

The Manual basically covers

- **Pre-Installation**
- **Preparation**
- **Site Reception**
- **Fixing types, quantities and locations**
- **Glazing**
- **Doors Installation**
- **Fire doors Identification**
- **Ironmongery**
- **Miscellaneous Installation Particulars**

of FIRE RATED DOORS supplied by Greenlam Industries Ltd.

A complete installed door assembly comprising doorframe, door leaves, other panels, hardware, seals and any glazing…plus, for fire doors… that when closed is intended to resist the passage of fire and smoke in accordance with specific performance criteria.

Whereas, the Doors/Door-sets/Door frames are manufactured and supplied in conformance to the agreed designs received and specified by customers and since the supplying plant does not have any control on the actual installation methods adopted, the guidelines given here are exclusive and in lieu of all other warranties, expressed or implied, in fact or by operation of law or otherwise, or arising by course of dealing or performance, installation or repair or use.

To maintain a door/door-set as Q-Mark certified, no changes or modifications to the door/door-sets are permitted, except for those allowed under the parameters identified within the certification data sheets.

The global assessment can be made available from the manufacturer upon request.

A list of common tools and tackles that should be used for Installation is given below:

Installation kit (standard tools & tackles required)

- Drilling machine (Reverse/forward) (Hilti/De-Walt/Bosch or equivalent) Capacity 10mm-1 No.
- Electrical/battery operated (Hilti/De-Walt/Bosch or equivalent)
- Hammer drilling machine (Hilti or equivalent)-1 No.
- Concrete drill bit (Hilti or equivalent)-1 Set
- HSS drill bits 2.7mm, 3.0mm, 4.0mm- 2 Packets of each
- PH2-1 Pkt.
- PH1-1 Pkt.
- Anchor fastener FR HRD-C 8x140 (Hilti, Germany or equivalent)- as per the requirement
- Torx end driving key (standard matching to the anchor fastener)-1 box
- PU Fire Foam (Mc-Coy SOUDAL or equivalent
- Application gun for PU foam (SOUDAL)-1 Nos.
- Gun & foam cleaner (Mc-Coy or Equivalent)-1 bottle
- Quick grip 600-900mm (Irwin)-4 Nos.
- Quick grip 900-1200mm (Irwin)-2 Nos.
- Measuring tape 3-Mtr. /5-Mtr. (Stanley)-1 No.
- Lazar Tool (HILTI or equivalent)
- Water level 600mm (Stanley)-1 No.
- Standard Plumb line-1 Nos.
- Screw jack 600-900mm & 900mm-1200mm-1 Nos. each
- Brad nails gun (Electrical/Pneumatic) 16 SWG capacity - One unit.
- Brad nails 16 SWG x 40mm & 50mm long (Kaymo or Equivalent)-1 box each
- Air compressor single cylinder, 2hp, 220 volts-1 No.150 liter tank capacity
- PU air hose ø6/ø10mm x 20-25 meter long-1 No
- Electrical extension line 2.5mm-4mm square 3 core cable-1 Unit, Complete with 16-Ampere electrical top and 20-25 meter long cable
- Silicon sealant (Clear)-1 No.
- Application gun for Silicon sealant-1 No.
- Block plane 6”-1 No.
- Hand saw-1 No.
- Triangular file 4” long including handle-1 No.
- Chisel (12mm, 19mm, 25mm) Stanley-1 Set
- Hammer 100-gms-1 No.
- Rubber mallet-1 No.
- PVC mallet-1 No.
- Retractable utility knife (Stanley) Model: 10-175/099-1 No.
- Heavy duty utility blade (Stanley) Model: 11-921 H-1 Box
- Tri square 200mm (Stanley or equivalent)-1 No.
- Cushion grip nail set (Stanley Model: 58-930 or equivalent) -1 Set

For further information please refer to the BM TRADA global assessment of door/door-sets for detailed information relating to the following aspects:

- **Maximum gaps between leaf and frame or at meeting stiles of pairs**
- **Maximum allowable trimming of door edges**
- **Sealing requirements between frame and wall**
- **Intumescent seal requirements between frame and door and meeting stiles of pairs**
- **Specification, position and intumescent protection required for ironmongery**

1. Installer Qualifications

It is strongly recommended that the installer is a member of a recognized quality assurance scheme to ensure that best practice is used.

In respect of fire doors, inspection authorities may require evidence that the installation process complies with the tested specification including:

- Intumescent systems
- Compliance of the glazing with tested detail supplied by the door leaf manufacturer
- The size of operating gaps
- Intumescent protection around hardware and the quality of the preparations
- The quality of supporting construction and the prepared opening
- The fixing of the fire door
- Fire and smoke-stopping methods used in fitting-in gaps and voids

2. Pre-installation Preparation

2.1

a. Read and understand the latest version of BS 8214 and understand the implications for tolerances
b. Any sign-offs associated with the door openings and floor levels should be agreed before starting.
c. Ensure that the correct screws, packers, back filling materials and appropriate PPEs are used during installation.

2.2 First or second fix

Best practice is a second-fix operation with openings prepared as construction proceeds and pre-hung door assemblies installed later. The advantages are:

- Operating gaps (which may contain edge seals) can be maintained
- Doors are delivered when site conditions are suitable

- **2.3 Points to be cared during fixing/installing:**

- Remove packaging and ensure loose items such as perimeter seals, pellets and ironmongery are not lost.

- Carefully remove doors/Door sets from the packaging and place upright beside the opening, ensuring both walls and Door sets are protected to avoid any damage

- Flat pack frames will need assembling. Joints will have been pre-drilled and appropriate fixings supplied. Check the internal frame dimensions match the doors, allowing for appropriate gaps around the perimeter of the leaves.

- Refer to the fixings section for fixing position and consider pre-drilling timber framing before offering into location with wood bits, therefore when in location only masonry/fixing drilling is required, thus avoiding any safety issues changing equipment. It may be possible to fix behind seals and the stop to conceal the fixing points.

- Offer the frame into the opening and pack the hanging jamb to make it plumb to both structural opening and wall face.

- Fix the hanging jamb, making sure that it is plumb both to the structural opening and wall faces, making allowances for any floor level discrepancies. For example, if the floor is out of level, it may be possible to keep the hanging jamb above the floor screed but still concealed by floor coverings such as carpet.

- Check and adjust the level of the frame head. Position the second jamb, ensure that it is plumb both ways and parallel to the hanging jamb.

- Pack and insert two fixings only to the second jamb and one in the head if paired situation or if the frame is wider than 1050mm. This allows adjustments to be made.

- Hang the door(s) on the hinges or pivots and achieve the required clearances by increasing or decreasing the packing thickness between the frame and wall. Check alignment to ensure there is no twist. Adjust the second jamb as appropriate.

- Insert all remaining fixings and apply timber pellets or flush discs over visible fixing points.

- Planted stops, for Cubith and Barum frames, should be pinned in place allowing for applicable seal gaps.

- Gaps at the back of the frames must be fully sealed prior to application of the architraves.

NOTE: where the frame is of a two part construction, like the Cubith or split-Barum, the secondary section is installed in the same method as the primary section and is lined up with the primary section by means of splines. The secondary section does not require back-filling to comply with fire certification. Similarly, the rear of the extension linings do not need to be protected.

2.4 Doorframe Design

The door frame must allow for secure fixing

Note:

1. Fixing from 25mm from the edge of masonry
2. Fixings into metal stud partitions should be made top and bottom with others a maximum of 500mm <3
3. Care should be exercised when fixing doorframes to ensure that Jambs and head are fitted both plumb and square (in the horizontal and vertical plane) to prevent any issues with bowing or twisting frame sections, that may then have a detrimental effect on the optimal 3mm gap tolerances recommended by Door sets for Fire, Smoke, DDA and acoustic performance.

2.5 Coordinating dimensions

The co-ordination height, width and thickness of prepared openings, the fitting- in margin and allowance tolerances must be planned. This information must be available before the start of door frame manufacture.

2.6 Prepared openings

Prepared openings must be plumb, square, built to the coordinating dimensions subject to a tolerance of +5/-0mm at each jamb and +5/-0mm at the head and be of constant co-ordination thickness around their perimeter within a tolerance of +/-3mm. It is vital to control partition thickness if architraves are to be fitted without excessive trimming and scribing.

Check accuracy of prepared openings as early as possible so that any remedial work can be completed before any attempt is made to manufacture or install doors.

2.7 Undercut tolerances

Additional guidance on undercuts can be found in BS8214 but the following are guidelines recommended by Greenlam.

Fire only doors 10mm maximum undercut from top of finished floor finishes to underside of door.

Fire and smoke controlled doors - 3mm maximum undercut from top of finished floor to underside of door - this can be increased up to 10mm with the use of a suitable threshold sealing system Door sets understand the tight tolerances specified, by the rules of BS8214,

for smoke controlled doors and recommend that contact be made with Local Building Control or Fire Officer to seek a solution agreeable to all parties prior to door set manufacture.

2.8 Recesses for floor mounted closer boxes

Plan pockets to receive closer boxes in reinforcement, floors and screeds.

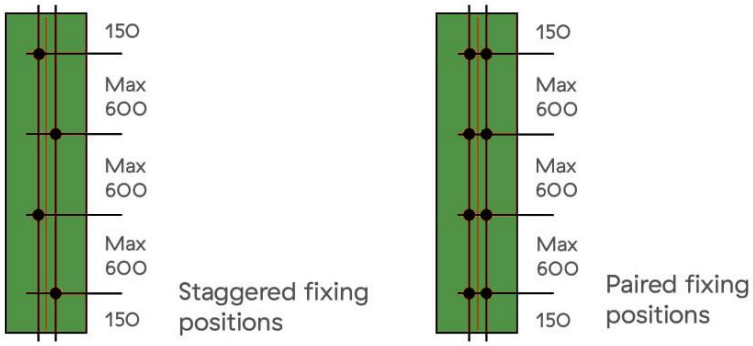
The pockets must be formed and located with great accuracy to co-ordinate with the doorframe position.

For projects where underfloor heating is employed the planning of closer boxes, within the floor construction, and consideration for fixing of doorstops in advance is critical.

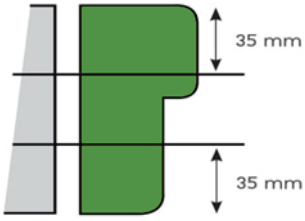
3.0 Fixing types, quantities and locations

3.1 To comply with Greenlam's performance certification the installer is required to have fixings positioned no more than 150mm from the top and bottom of the door frame jambs, with a maximum spacing between them of 600mm. On pairs of doors or frames over 1050mm wide, an additional fixing is required to the centre of the frame head. On split frames, the section holding the door is required to be fixed in this manner, whilst the secondary section can be fixed in any manner which securely fixes it in place.

• Staggered fixing positions down the jamb are recommended, increased to pair fixing positions for heavier doors, unless specialist fixings are used appropriate to the door weight. Equally, with appropriate and secure fixings, a single row of fixings can be used.



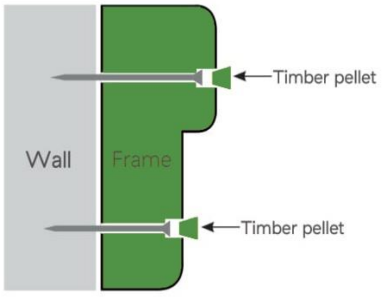
• All fixings need to be made into a solid material with a minimum of 50mm of penetration into the wall construction (70mm for heavy door sets). Soft mortar joints are not suitable fixing points as they will work loose with time. Steel studs should be reinforced with timber as part of the erection of the wall. When fixing to timber/steel stud partitions, screws must be of a sufficient length to penetrate the timber stud, or timber reinforcement within the steel stud.

Fixings should be kept in from the partition faces to stop the wall material breaking away; we recommend a **minimum of 35mm**, although this is determined by the wall and facing construction	

- Screws/bolts should have a minimum shank of no less than 4mm unless the fixing manufacturer states their fixings are suitable for the load to be applied to them.

- Fixing screws and panel pins are not supplied by Greenlam Industries Ltd.
- Failure to follow our fixing recommendations may invalidate our warranty, affect performance certification or cause the products not to operate as specified.

Timber pellets need to be trimmed with a sharp chisel, sanded and finished to match the frame. Refer to Plasform section for flush discs (section 9.9 of this manual)



3.2 Frame to wall fixing packers:

PVC packers have been tested for all fire ratings as per the table below:

Door set rating	18mm Thick Architraves		No Architraves
	Full width PVC Packers#	PVC Packers cut back 10mm	PVC Packers cut back 10mm
FD 30	Yes	Yes	Yes
FD 60	Yes	Yes	Yes
FD 90	Not Certified	Yes	Not Certified
FD 120	Not Certified	Yes	Not Certified

 # Fire only, a 10mm depth of TS3 intumescent sealant is required over the packers in acoustic or smoke situations.

Additional frame packing material types:

NR/FD30	Softwood, ply, MDF, hardwood
FD60	Hardwood, hardwood ply
FD90 & FD120	Hardwood, non-combustible (e.g Calcium silicate board)

3.3 Frame to wall abutment gaps

Greenlam Door sets' fire certification directly covers the use of TS3 intumescent acrylic sealant. This is in conjunction with the TS Guard or mineral rock fiber for larger gaps as per the table below:

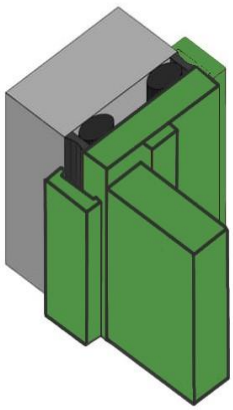
Door set rating	Mono/ Barum			Cubith	Shadow Gap
	Up to 10mm	Up to 20mm	Up to 25mm	Up to 10mm	Up to 20mm
FD 30	TS3 sealant only required-TS guard optional	TS3 sealant and TS guard	TS3 sealant and TS guard	TS3 sealant and Intumescent strip	TS3 sealant and TS guard
FD 60				TS3 sealant plus mineral rock fibre & Intumescent strip	TS3 sealant plus mineral rock fibre & Intumescent strip
FD 90	TS3 sealant and TS guard		Not certified	Not certified	Not certified
FD 120					

TS Guard may be replaced with tightly packed mineral rock fiber.
TS3 sealant should be applied at a depth of 10mm to ensure compliance with certification.

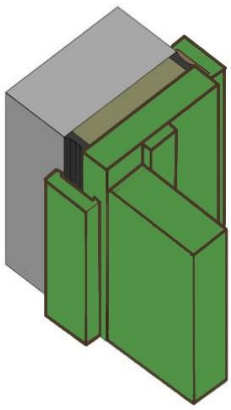
Note: Mineral rock fiber FD 60- other materials can be used to protect the gap between the frame and the wall, but care must be taken to ensure that they comply with all requirements of fire certification, with final approval from Building Control.

Mono / Barum:

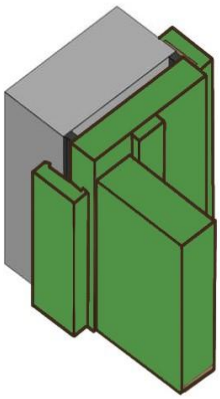
TS Guard
FD30, FD60, FD90, FD120



Mineral rock fibre
FD30, FD60, FD90, FD120

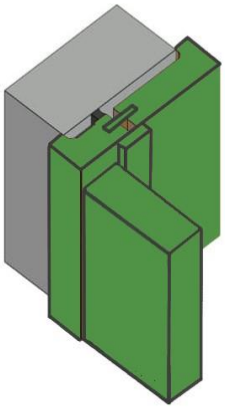


Sealant only
FD30, FD60

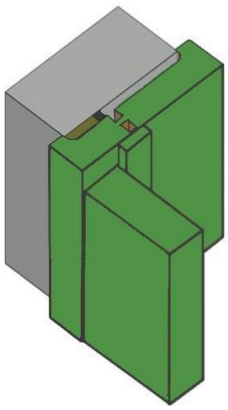


Cubith:*

Sealant only
FD30



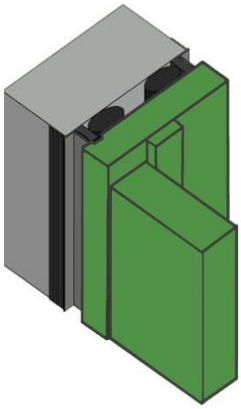
Mineral rock fibre
FD60



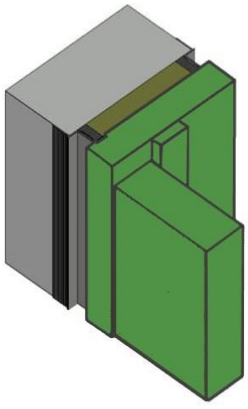
**Intumescent seal is pre-fitted to the rear of the primary Cubith frame section.*

Shadow Gap:

TS Guard
FD30



Mineral rock fibre
FD60



Note: other materials can be used to protect the gap between the frame and the wall, but care must be taken to ensure that they comply wi all requirements of fire certification, with final approval from Building Control.

3.4 Acoustic door sets:

Door sets up to 34 RwdB can be sealed with TS3 intumescent sealant in conjunction with TS Guard backing material. For performance levels higher than 34 RwdB, the frame to wall gap should be tightly packed with mineral rock fiber and capped off with TS3 intumescent sealant to ensure an air tight gap.

3.5 Smoke Door sets:

Smoke sealing is achieved using 'mastic capping' to the gap between the frame and the wall. As the TS3 and TS Guard are used in combination to achieve the fire resistance, smoke performance, by default is achieved.

3.6 Architraves:

Softwood, hardwood, MDF or PVC wrapped architraves can be fitted to frames if required. Architraves should be fixed at max 400mm centers. Architraves supplied by Greenlam Door sets are mitered for immediate fixing.

Note: *PVC-U architraves are **not allowed** unless there is specific test evidence to support their use for the door set type and substrate type in question. This is also the case even when architraves are not required for fire stopping as PVC-U architraves/trims may pose a risk to the integrity of the door set unless proven to be acceptable by fire test evidence*.

3.7 Fitting gaps

It is critical to the performance of the door set that the perimeter gaps are set up correctly.

- The minimum clearance for all Door sets is 2mm for top and sides. In addition to this, the door must be able to close fully without excessive force being applied.

- Maximum gaps
  - Sides and top of doors = 4mm (manufactured to allow 3mm)
  - Meeting stile gap = 4mm (manufactured to allow 3mm)
- Bottom of door to finished floor covering
  - 10mm for 30 and 60 minute fire rated Door sets
  - 6mm for 90 and 120 minute fire rated Door sets

- When fitting the door

  Single Door- Door surface to Frame surface should flush (Tolerance ±1 mm)

  Double Door – Primary Door surface to Secondary door surface should flush (Tolerance ±1 mm)

- Door sets designed to meet smoke control requirements should be sealed along the bottom edge whilst observing the gap requirement above. If this is not practicable, a maximum 3mm unsealed gap is allowed.

- Refer to the acoustic section for more detailed information on acoustic threshold sealing.

3.8 Fire stopping requirements.

Greenlam recommends fire stopping materials that are being used during installation must have the appropriate documentary evidence to ensure that they are fit for purpose:

- Mineral fibre/ceramic fibre: Euroclass A1 or A2 to EN 13501-1 and heat resistant to at least 1000˚C.

- Intumescent mastic: Tested to EN 1366 part 4, BS 476 part 22, BS 476 part 20 or EN 1364-1. Test duration must be at least the same or higher than the integrity period of the fire door set being fitted.

- Expanding foam: This is **not recommended** to be used due to the variability of the installation and the more complex understanding of whether the test evidence is suitable for use. However, where there is test evidence to EN 1366 part 4, BS 476 part 22, BS 476 part 20 or EN 1364-1, with the test duration being at least the same or higher than the integrity period of the fire door set being fitted, then expanding foam may be used.

4.0 Site Reception

4.1 Moisture content

Timber doors are manufactured with moisture content of 10-12% for internal use and 12-14% for external use. The application standard on this subject is BS EN 942:1996 Timber in joinery. General classification of timber quality

Do not bring joinery to site until moisture readings are between 40 and 60% RH and until after forced-drying procedure has been completed

The table below illustrates acceptable and unacceptable levels of humidity:

Humidity Guidance of Timber Based Products:

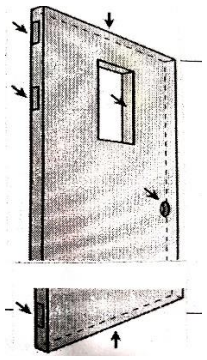
Relative Humidity Rating (%)	Effects
Below 40%	Materials are susceptible to "Case Hardening". Where the cell structure of the material collapses, results in deformation (Bowing/Warping) of the material structure.
40-60%	This level is the "Optimum" period, to sustain conditioned manufactured joinery, whereby Atmospheric Moisture is at "Equilibrium"
60-75%	Timber being "Hydroscopic", being to absorb moisture, resulting in "Un-controlled" expansion, and de-stabilization of the material
Above 75%	Materials are now exposed to high level of Atmospheric Moisture, Deformation of the cell structure and un-controlled excessive swelling resulting in size/shape alterations to the Manufactured joinery, the details of which may not return to their original shape after Atmospheric Stabilization.

KEY Acceptable Levels of Atmospheric Moisture Control Measures Required
Activity Must Not Continue/Commence, Residual Risk to Materials

4.2 Storage area

The store must be clean, level, suitable for stacking doors and provide sufficient space for doors to be moved around, sorted and re-stacked as installation proceeds. The floor should be suitable to allow the use of pallet moving equipment.

4.3 Priming and sealing: The applicable British Standard Is BS 6150:1991 Code of Practice for painting buildings:

• Prime or seal all items supplied in the white immediately following delivery including top and bottom edges, apertures and preparations for hardware. • Apply further coats within a reasonable time and before door leaves are hung or assemblies are installed	

4.4 Handling

Avoid bruising and damage caused by heavy contact with the ground. Wear clean gloves to avoid leaving finger marks.

4.5 Stacking

4.5.1 Door Leaves

Do not store door leaves standing upright or leaning as this cause bowing.

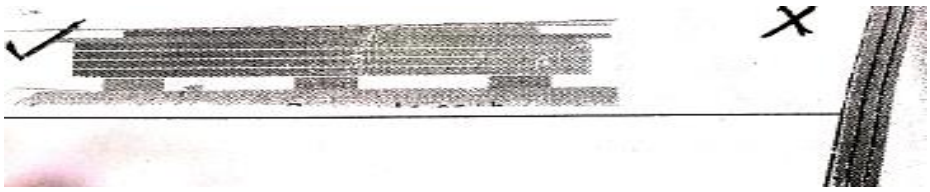
Stack horizontally on level supports that extend across the full width of the bottom door leaf. Provide at the center and at 300mm from each end if over 2150mm in height, provide a second intermediate support.

Cover the supports with cardboard or similar to prevent marking.

Stack with the largest door leaf at the bottom with size reducing up the stack. Plain flush door leaves can be stacked to a maximum of around 20 door leaves. When door leaves have projections such as glazing beads or pre-fitted hardware, provide level intermediate battens between door leaves to allow clearance.

4.5.2 Assemblies

The same principles apply when storing door assemblies. Stack with the door leaf in the closed position on the doorframe doorstop. Separate each assembly with level battens to ensure that projection such as hinge knuckles do not cause damage.



4.6 Covering

Exposure to light will fade timber, Cover stacks with opaque sheeting to prevent fading and keep doors clean. This is very important for veneered doors.

It is strongly recommended that any door set requiring the ITS96 system should have this product, and its associated intumescent gasket system, supplied and installed by door sets under factory conditions to ensure full compliance measure are maintained.

Door sets certification only covers the use of proprietary intumescent seal pack and not that provided by the closer manufacturer

4. 7 Hardware

4.7. 1 Preparation for hardware

Before installation, prepare doors to receive hardware using instruction provided by the hardware manufacturer or supplier.

Note: Preparations are often available from the door manufacturer. These may be supplied 'off machine' i.e. with corners not squared out. Factory assembled doors can be made available fully prepared for hardware with the doors leaves hung in position though possibly removed for transit.

4.7.2 Fitting hardware

- Fit hardware using instructions provided by the manufacturer or supplier.
- Fit morticed hardware before hanging door leaves or installing door assemblies
- Fit intumescent material exactly in accordance with details supplied.
- Fit face fixed hardware at any convenient stage in the installation program.

Note: This work is often done immediately prior to handover to avoid the risk of loss or damage.

The drilling of door leaf faces for latch spindles and keyways or cylinders is best left until there is no risk of further adjustment to the position of the lock cases or keeps.

Lubricate hardware as required by manufacturer's instructions.

5. Glazing

The applicable standard is BS 6262:1982 Code of practice for glazing buildings. Glaze fire doors strictly in accordance with the specification for each type provided by the supplier and supported by evidence of test or assessment by a recognized authority.

Apertures cannot be cut into our fire rated doors on site. We strongly recommend that all aperture preparation is carried out in our works, and cannot accept responsibility for later problems caused by site cutting of apertures. Some of our doors have metal linings to their cores or require special internal framing prior to manufacture.

6. Door Installation

Install doors only when site conditions are suitable.

6.1. Hinges

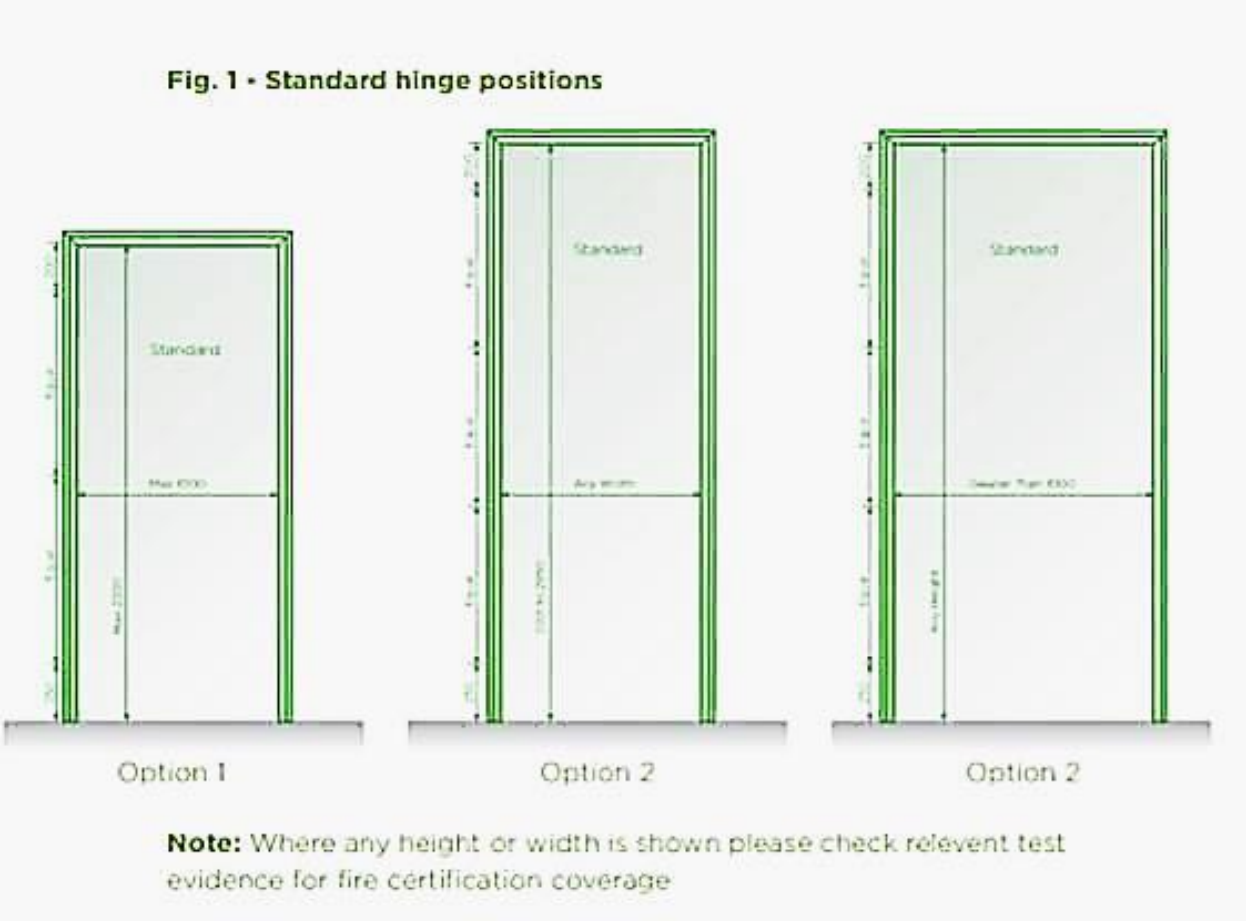
Hinges must be able to support loads imposed by the door leaf and hardware functions such as self-closing and back check. Consult the hardware supplier if necessary.

Use 3 hinges per door leaf for all fire doors or when above 1000mm in width unless otherwise specified.

When door leaves exceed 2200mm in height or 160kg consult the hardware supplier. One or more additional hinges may be required.

Also, for recommendations on positioning of hinges, please check with the hinges manufacturer.

Figure 1 below is a guidance.



6.2 Installing second – fix

6.2.1 Packing

Pack between the doorframe and the prepared opening immediately above each fixing position, Ensure that the door assembly when in position is perfectly plumb and square. The best practice is to use the hung leaf as a template. Avoid later shrinkage by using packing that is durable, hard and stable, proprietary trouser leg packers are best, Alternatives are off cuts of laminate, metal shims or plywood.

Ensure that jambs are straight, operating gaps are even and in tolerance and that fixing screws cannot distort the frame when tightened.

6.2.2 Fixing

When the doorframe has been packed into the prepared opening, remove door leaves if necessary to facilitate fixing.

Fix doorframe in masonry in conjunction with plugs and woodscrews with minimum 50mm Penetration into the masonry.

Fix doorframe in metal stud partitions with wood drilled a pilot hole through the Stud into the timber stud filler. Ensure that the doorframe fixing pulls the timber filling Tightly into the stud and pulls the stud tight against the packing.

Re-hang door leave. Check and adjust for correct and operation of seals.

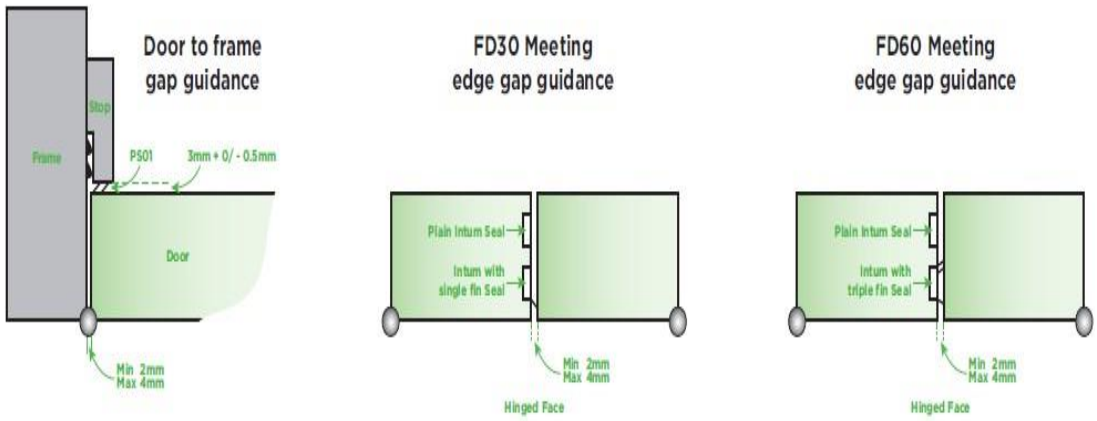
Note:

- Adjustment to the fit of door leaves at the installation stage should be deferred until the site is
- Completely dry when the defect will be fully apparent and can be remedied in a single operation:

- Adjustments made too early can result in excessive gaps as the building dries.

- If possible, carry out adjustments by reducing packing. Alternatively, pack out behind hinges or recess them further.

- Do not attempt trimming of door leaf edges for any adjustment.



Refer above figure for gap guidance.

6.2.3 Doorstop

Fix loose doorstop after all adjustments. Fit to suit the shape of the door leaf, permit an easy latching action and ensure any seals are in correct contact with the door leaf face

6.2.4 Stopping the fitting-in gap

Fill the fitting in gap between the frame and wall substrate to suit fire smoke or acoustic requirements before fitting architraves.

Note:

1. To prevent cold smoke leakage the filler must completely close the gap and have some flexibility.
2. When the fittings in gaps is constant and does not exceed 10mm the options include
    - Gun – applied Intumescent mastic suitable for both fire & smoke stopping
    - Intumescent strip (with conventional mastic for smoke)
3. Large or irregular gaps and voids can be filled with cementitious material packed with mineral wool or sealed with Intumescent material. The Intumescent options for gaps up to 35mm that can accommodate some movement and close voids in the case of fire are Intumescent plasters, acrylic emulsions and dry foams.

    For architraves only when any required stopping is complete.
    For full guidance notes on the fire stopping requirements of each of our brands please refer to the relevant Fire assessment for that product.

6.2.5 Concealment of fixing

Dress exposed fixings of doorframe, doorstops and architraves as specified. Note:

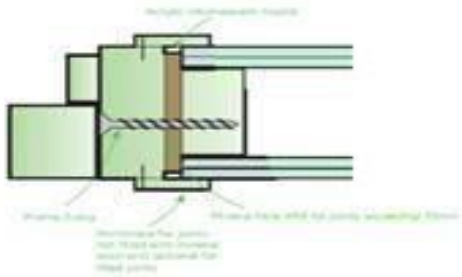
1. This operation and the final fitting of architraves should be left until all Adjustments to gaps and door leaf operation have been made.

2. Screws are normally concealed with timber or plastic pellets, Pine are punched and filled with hard beeswax colored to match.

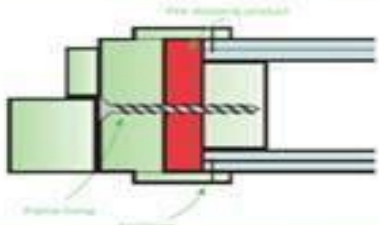
6.2.7 Sealing to Structural opening

1. Gaps up to 10mm must be sealed on both sides with a 10mm depth of acrylic intumescent mastic, fire tested for this application to BS 476: Part 22: 1987 or BS EN 1634-1: 2000. Joint must be fitted with 15mm thick architraves overlapping at least 15mm each side.

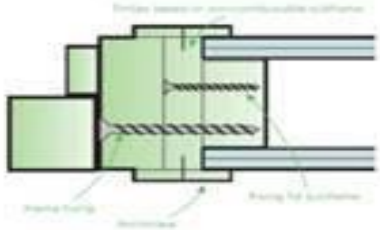
2. Gaps between 10mm and 20mm must be tightly packed with mineral fibre capped on both sides with a 100mm depth of acrylic intumescent mastic, fire tested for this application to BS 476: Part 22: 1987 or BS EN 163-1: 2000. Architraves are optional.



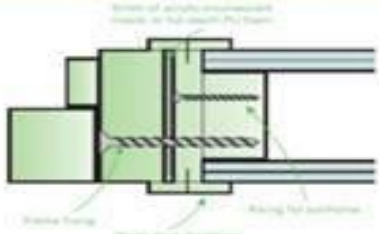
3. Gaps up to 20mm filled with proprietary fire stopping product (e.g expanding PU foam or preformed compressible intumescent foam). Products must be tested for this application to BS 476: Part 22: 1987 or BS EN 1634-1:2000. Joint must be fitted with 15mm thick architraves overlapping at least 15mm each.



4. Timber based or non-combustible subframe upto 50mm thick, with no gaps between the components. Joint must be fitted with 15mm thick architraves overlapping at least 15mm each side.



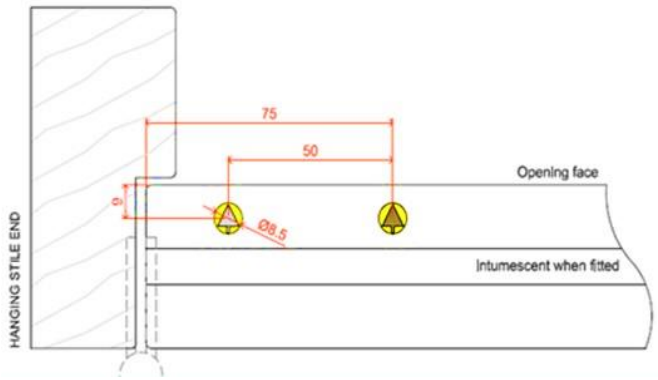
5. Timber based or non-combustible subframe up to 50mm thick, with gaps up to 10mm between the components filled on both sides with 10mm depth of acrylic intumescent mastic or full depth expanding PU foam, fire tested for this application to BS 476: Part 22: 1987 or BS EN 1634-1: 2000. Joint must be fitted with 15mm thick architraves overlapping at least 15mm each side.



Guidance for various methods of sealing the frame to structural opening gap is also given in BS 8214: 2008 "Code of practice for fire door assemblies", which may be referred to where appropriate.
Note: Drawings are representative of doorset installation only.

7.0 Fire door identification- Q Mark Plug Positioning:

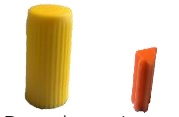
BM TRADA certificated door sets are identified using a colored dowel system. The outer color of the fire dowel signifies the fire rating of the door set.



INNER TREE COLOUR - WHEN DOWEL FIXED TO DOOR

Approved Door (FD30 & FD60 Only) - Intumescent not Yet Fitted = Red tree. Intumescent to be fitted by others onsite to frame.

Approved Door - Intumenscent Fitted In Doorset (door or frame as required) by Manufacturer In the Factory - Green

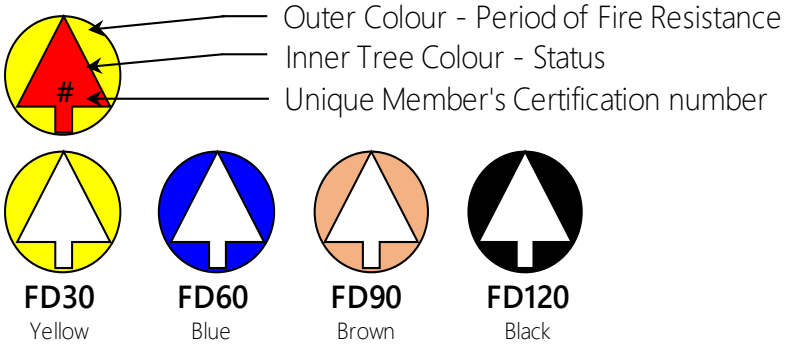


Approved Factory Fitted Glazing - Orange

Certified Factory Hung Doorset - Silver

Certified Installed Doorset - Gold

DOWEL COLOUR - INDICATING FIRE RATINGS



Greenlam uses the internal green indicator to identify that the door set is potentially incomplete and may need additional work to be carried out on site. If the door is glazed an additional dowel will be fitted to the door with an orange core to it.

(Green)	• Fitted with the appropriate outer plug to a door leaf or door frame to identify that it is a Q-Mark approved door leaf or door frame. The leaf and frame could come from different Q-Mark certified fire door manufacturers. • The door leaf or door frame may not be in a finished state. It must be fully prepared for all the required intumescent strips around the perimeter gap, which can be either fitted or supplied loose but must be supplied. If the intumescent strips are supplied loose, they must be clearly identified to the appropriate door leaf or frame to which they will be fitted. • The door leaf or frame might not be fully prepared for all of the appropriate hardware, in which case it must be clearly specified which hardware and any required associated intumescent protection is to be finally fitted at a later date by others • Clear instructions for the further processing and installation of the door assembly must be supplied by the Q-Mark certified fire door manufacturer relating to a specific initial type test or global assessment within their scope of certification.
(Orange)	• Fitted within the appropriate outer plug to a door leaf only if glazing is in the door leaf. This plug is in addition to all other required plugs, to identify that glazing has been specified and fitted to the door leaf by a Q-Mark certified fire door manufacturer as per the same initial type test or global assessment used to manufacture the door leaf. If glazing is included within a sidelight or fanlight (not within the door leaf), then the glazing system may be finally fitted on site, in which case clear installation instructions must be provided by the Q-Mark certified fire door manufacturer relating to a specific initial type test or global assessment within their scope of certification. •

8.0. Ironmongery Installations

With the vast array of ironmongery components available to enhance the performance and aesthetics of any door set, Greenlam Door sets cannot cover all associated parts in our array of test certificates. We can however recommend the following is always considered **before** proceeding with any installation and or fixing of associated parts.

- Ironmongery falls into two specific categories - essential and non-essential. Essential ironmongery is required to enable the doors to perform its fire resisting function. Non-essential ironmongery may be needed to enable other functions to be achieved, but the elements involved could prejudice fire resistance.
- It is vitally important to consider the influence that all ironmongery may have on fire resistance and establish that products being used/considered are compliant.
- Full listings of components that Greenlam Door sets are approved to use for fire and smoke leakage doors can be found in our certification that is available upon request.
- Care should be taken to ensure that when installing ironmongery with the use of battery operated tools, the correct torque settings are applied to minimize the risk of over tightening or spinning of screw fixings.
- Ironmongery is to be fitted in accordance with the ironmongery manufacturer's instructions and the product data sheet that is provided with each door/door set, as this identifies maximum dimensions, material specification and intumescent protection requirements.
- Flush fitting ironmongery can be factory installed (locks/flush bolts/strike plates) where specified. Where required, surface mounted hardware is supplied loose with your delivery.
- If installing flush bolts or locks not supplied by Greenlam Door sets into fire rated doors, please ensure that all the intumescent are fitted around the product as identified in the product data sheet. Please ensure items comply with all rules stated in product data sheets.
- Please take care to unpack all contents ensuring no loose items are lost/discarded, any intumescent protection must be installed to maintain the fire certification.
- When positioning a hold open device please make sure you place the hold open unit, so it lines through with the position of the door closer, either at the top or bottom of the door. This ensures that if the door is held open for prolonged periods, the danger of the door

twisting will be reduced.

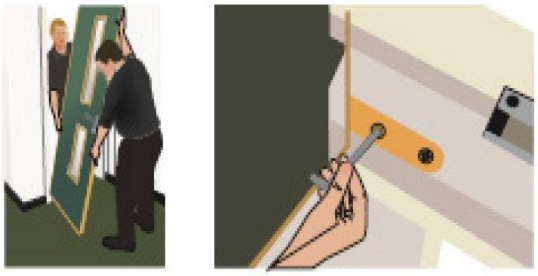
- Some FD30 & all FD60 Door sets and above require intumescent protection to hinges to meet fire certification. If not fitted, the fire certification is invalidated. Please refer to the appropriate fire door data sheets supplied for details.
- When fitting concealed door closers such as the Geze Boxer or Dorma ITS 96, please ensure the supplied intumescent/seal packs are fitted as instructed. This is critical to achieving the product's fire rating. Without fitment of the intumescent in the door and frame, the certification is invalid. The door and/or frame constructions will need to have been upgraded to receive this type of ironmongery to meet fire certification and mechanical strength test data

9.0 Miscellaneous Installation particulars:

9.1 "Guard" door sets:

To hang the door into the frame, first ensure the door(s) is the right way up with the profiled section to the opening face, and with the door at 90 degrees to the frame. Lift the door and place it on to the bottom pivot of the frame. Align the top of the door with the top center in the frame and with an Allen key, extend the pin into the top of the door. To release the door from the frame, reverse this process.

Ensure stops are only fitted to the lock jamb and head. No stop should be fitted to the hanging edge, as this will cause a finger trapping hazard.



When fitting a "Guard" door set in wide partitions, extra fixings may be required on the hanging jamb.

If the bottom bracket is not in contact with the structural floor, include packing shims as required; where possible, and always in severe duty situations, include additional fixtures in the bottom of the bracket into the floor. Please check for under floor pipes and/or other services prior to drilling.

9.2 Shadow gaps:

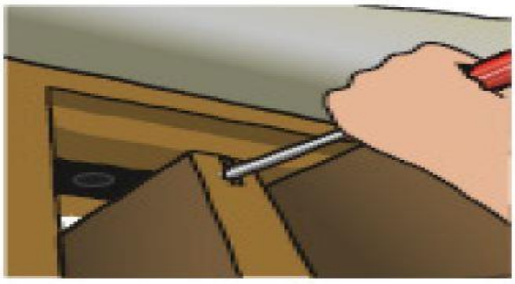
Shadow gaps should be formed by sacrificial plasterboard layer and QIC trims R10 and R20, trims are for 10mm and 20mm shadow gaps respectively. The trim butts up to the rear of the frame forming the shadow gap. The frame is installed and sealed in the normal manner prior to the trims being fitted, projecting the frame from the wall,

allowing for the additional plasterboard layer to be applied bringing the wall flush with the frame.

9.3 Pivot:

To hang the door into the frame, ensure the door is positioned at 90 degrees to the frame. Lift the door and place it on to the bottom pivot of the frame. At the hanging edge of the door, you will notice a sprung pin which can be depressed downwards using a screwdriver thus retracting the pivot pin. With the pin retracted, position the door under the pivot in the frame head and release the sprung pin, allowing the door to engage with the frame. Position the roller bearing within the slide channel, close to the small leaf. With the large leaf at a slight angle, insert the pin projecting from the top of the large leaf into the bearing, bringing the bottom of the door into its correct position.

The large leaf can now be fitted to the small leaf using the hinges provided. To release the door from the frame, reverse this process.



The bottom pivot bracket can be easily adjusted by loosening the lock nut and screwing the pivot in or out to adjust the height, you need to adjust it to achieve a gap of 3mm between the top of the door and the frame when the door is installed. A hole in the floor under the bracket will be needed to allow the bolt to be screwed downwards (remember to tighten the lock nut back up when adjustments are complete). Please check for under floor pipes and/or other services prior to drilling.

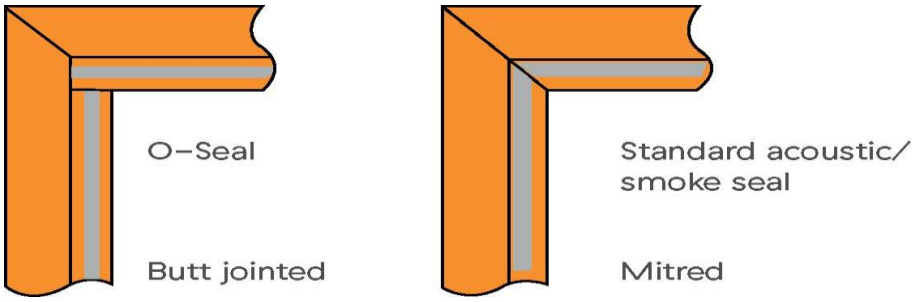
Pivot door closers are positioned differently to standard closers, to allow for the bi-folding action of the doors. Special drawings have been produced to show the correct positioning of the different closer types on the door sets, so please refer to them before installing the door closer.

9.4. Audi odors:

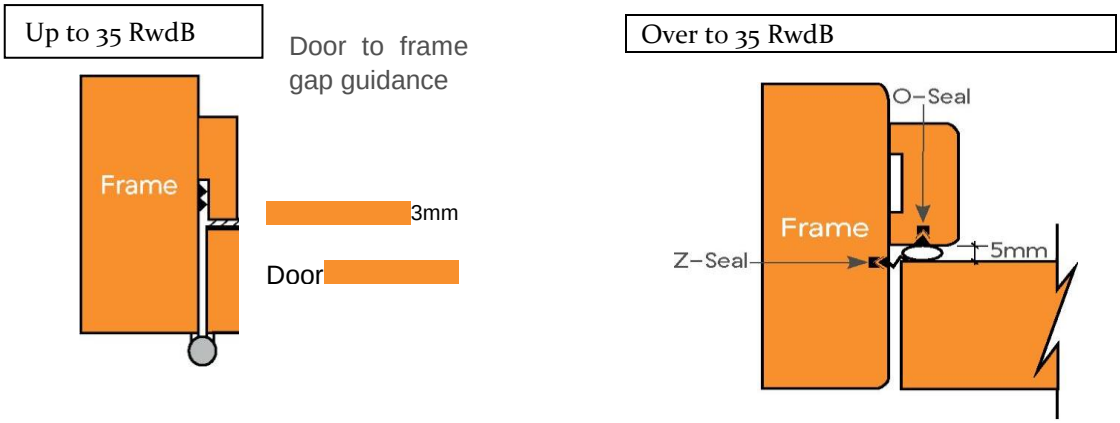
Extreme care must be taken not to damage the seals fitted in the bottom edge of the door. Any damaged seals will need replacing to achieve the door sets' optimum performance.

9.5. Doorstop seal arrangements

Apply the stop as normal with the door in the final closed position and then offer the stops up to the door face, ensuring an even gap of 5mm all around for stops fitted with the 'O' seal prior to the seals being fitted, or 3mm if fitting our standard acoustic/smoke seal. The 'O' seal stops need a bead of gap filling adhesive or mastic to the groove in the back prior to pinning the stop in position. The ends of the stops also need sealant applying to prevent any sound leakage.



The seals to the doorstops should make light contact with the door face. If the door face to stop gaps are too loose, this will reduce the acoustic performance of the door set. If the gaps are too tight, this will prevent the door from closing correctly.



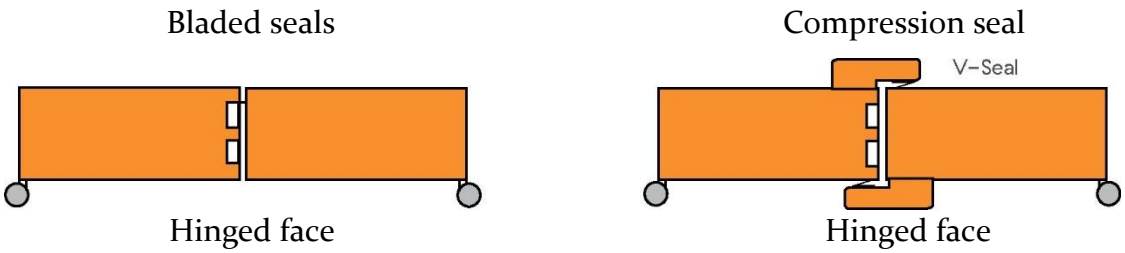
If required and not already fitted, insert the seals in the groove located in the frame or doorstop. The 'Z' seal top angles away from the door stop, they need to be mitred in the corners, so they abut the head/jamb seal neatly with no gaps.

Do not stretch the 'O' or 'Z' seal whilst fitting as the seal will return to its original length with time. Running the 'O' and 'Z' seal through a small amount of French chalk/talcum powder in the hand will reduce the friction on the seal when inserting, therefore reducing the chance of stretching the seal and ease the insertion of the seal.

The 'O' and/or 'Z' seals are only supplied with higher performance acoustic door sets.

9.6 Meeting stile arrangements

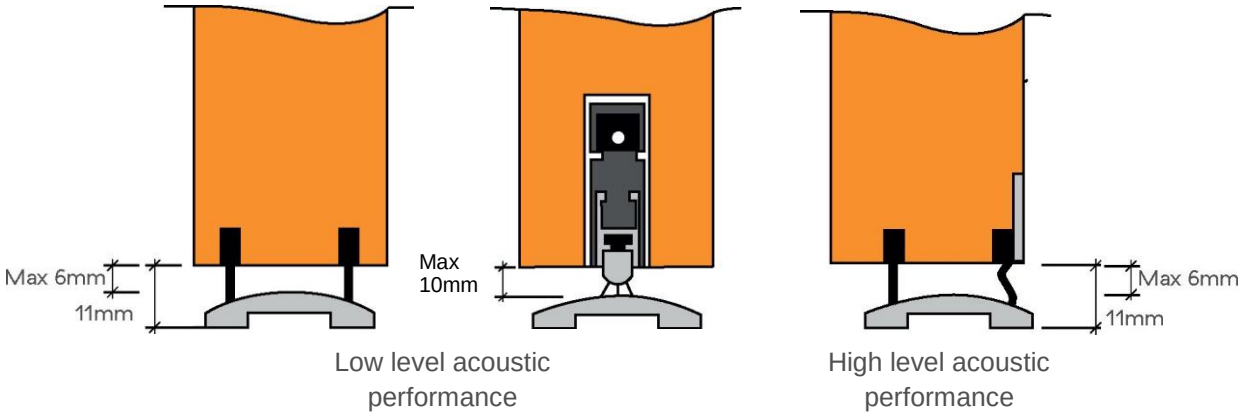
The seal arrangements will vary subject to your required performance needs.



Astragals arrive fully fitted to pairs of high level acoustic doors to ensure maximum performance. Please do not remove or adjust, as this will reduce the acoustic performance of the door set.

9.7 Threshold seal arrangements

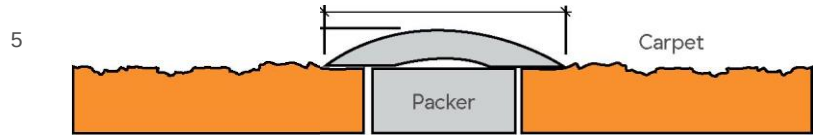
Please note that all gap dimensions shown are recommended to obtain optimum performance for acoustic solutions. The details shown relate to our most common designs. If your design varies from those shown below, please consult our technical



department for further guidance.
The seal arrangements will vary subject to your required performance needs.

Threshold strips are supplied with our Audiodor door sets. Where wipe seals are to be used, an even 11mm gap is required under the door, measured from the finish floor level to the bottom of the door, allowing the seal to contact across the full length evenly. Failure to do this will reduce the acoustic performance of the door set.

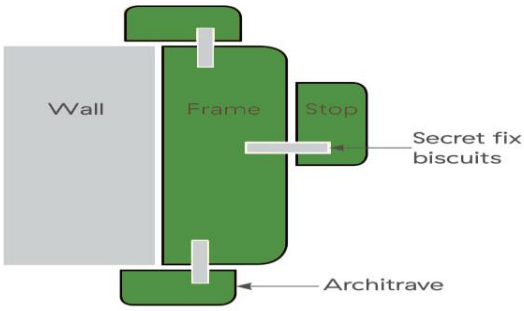
The threshold strip is sealed to the floor by applying a bead of silicone to the underside of the threshold and then screw-fixing it above the floor finished covering. Where soft floor coverings are used e.g. carpet, the floor covering will need cutting back and the threshold then must be packed out with hardwood accordingly, with the packer piece



also being sealed to the floor with silicone. These threshold strips come without fixing holes. Packers are not included.
Drop seals, dependent on the rating, can be used on some Audiodor door sets. These are best suited to solid, smooth floor surfaces to ensure maximum contact. If the door is an area with uneven surfaces, or carpeted etc. a threshold will be required in the same way as above, wipe seal details. The seal will require adjustment to ensure even, light contact with the floor covering is achieved. Simply open the door to 90° and screw the activation button clockwise or anti-clockwise to adjust the drop depth.

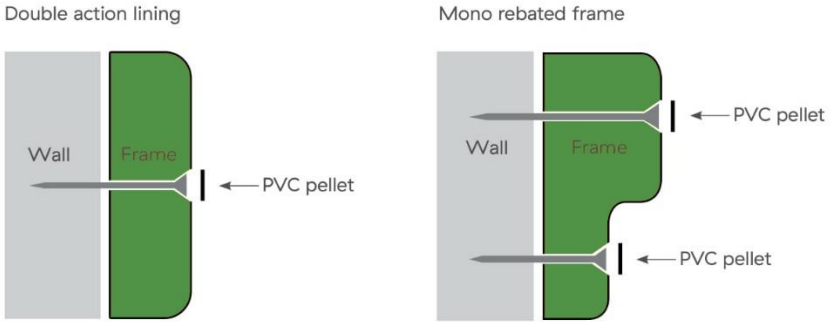
Threshold seals are cut 3mm longer than the door to both sides to seal the bottom corners.

9.8 Plasdor Frame:

Frames are screw fixed in place with fixings concealed behind the planted stop. The planted stop and architraves are fixed using the secret fix biscuits supplied with the door set, with the aid of 2-pack adhesive supplied with every frame.	

Unlike the Cubith and Barum frames, the once rebated Mono frame will have visible fixings, as will a double action frame. The screw fixing points are covered with a PVC pellet made from the same material as the frame finish, these discs need bonding in

place with a small amount of adhesive or silicone. Where 2-pack adhesive is supplied for the biscuits, this should not be used for fixing cover caps.



9.9 Security

All of our security door sets require deeper frame fixing anchorage in to the surrounding wall construction to a minimum depth of 70mm, and the wall must be of a construction to match the door set security performance level. Any alternative fixing method must be agreed prior to installation.

Please refer to the external door set section below for advice on fitting these products in external situations.

9.10 External

Apply a bead of external grade silicone to the underside of the threshold and screw-fix it. Ensure the threshold is level and parallel to the bottom edge of the door.

All recessing on external doors/door sets will require sealing to prevent moisture ingress.

We recommend the use of stainless steel or nylon coated door ironmongery. On coastal or very exposed areas we recommend grade-316 stainless steel ironmongery.

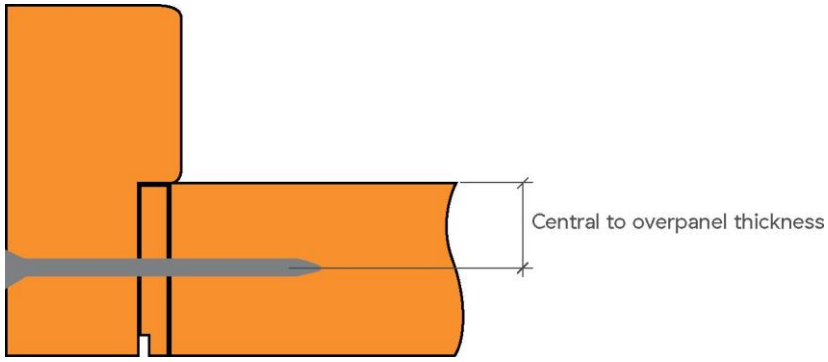
The decorative finish to door sets on south facing buildings should be of a light color to reduce the effect from the sunlight, as the door will move with the heat of the sun.**9.11**

9.11 Over panels

Wherever possible over panels are supplied factory fitted within the frame, however with some door sets this may not be practical due to weight and size. In these cases the over panel will be pre-fitted in factory and removed and delivered separately for site fixing.

Over panels require fixing prior to frame installation.

Over panels have a 3mm rebate to 3 or 4 edges to one side (both sides on double action), to represent gaps between the over panel and frame to match the gaps around the doors below them. The over panel should be positioned so it will line through with the door leaf, with the rebated face towards the opening side of the frame. Secure the panel in place by screwing through the back of the frame including across the transom (if fitted). Use a 5mm shank diameter screw (screw length must give 40mm of anchorage into the over panels), 100mm from each corner and maximum 400mm centers.



Double doors with over panels without a transom will require a metal or timber astragal to be fitted to the bottom of the over panels for the door leaves to stop against.

Metal astragals are 'L' shaped brackets recessed and screwed into the underside of the over panels. Positioned at 100mm in from the meeting stile of the doors, on fire rated door sets these will need bedding on 2mm Inter dens.

Timber astragals run the full width of the over panels and are surface fixed to the over panels overlapping the door leaf/leaves by 15mm. The astragals require gluing and screw fixing into place as they are subject to impact.

Due to the varying size, weight and detail of removable over panels/transoms and the height to which they are installed, a risk assessment needs carrying out prior to installation work.

9.12 Extension lining

Most extension linings fit into a groove on the frame and can be pulled in or out slightly to suit any variation in the partition thickness (for performance reasons on some frame types we cannot groove the frame for the extension lining and they will need butt jointing to the frame).

The extension lining is normally screw fixed to the wall in the same way as the frame. This would be our recommendation, but as this element does not effect the fire or other performance ratings it can also be bonded in place. Extension linings do not need back filling, however ensure the main frame section is back filled prior to fixing the extension lining in place.

9.13 Air transfer grilles

Fire doors can only be fitted with air transfer grilles that have been proven by test. Air transfer grilles must be installed in accordance with the manufacturer's installation instructions. Apertures cannot be cut into our fire rated doors on site. Non-fire rated doors can have apertures cut, however we would advise that you check on the door construction prior to starting any work, as some of our doors have metal or loose bonded cores which could give rise to problems on site