



## Fire Doors and Fire Door Hardware



Technical Guide  
TG- 005

Version 1b—January 2006

Alliance for Fire and Smoke Containment

The Alliance for Fire and Smoke Containment is a group formed to increase the profile of passive fire and smoke containment systems and their benefits to the Building and Construction Industry and the Community as a whole.



The complex nature of Australia and New Zealand Standards, Fire Safety Engineering methodologies, building control legislation and regulations means that The Alliance for Fire and Smoke Containment can assist its members in understanding the requirements, by providing a unified voice to integrate into relevant reform initiatives.

At the same time, where legislation and regulations are lacking or conflicting, the Alliance can draw on the resources of its members to develop Technical Guidance Notes (TGN's) and Industry Best Practice Guides (IBPG's). These are developed with other relevant industry groups (Insurance Companies, Testing Laboratories, Manufacturers and Consumers) and government organisations (Fire Brigades and Local Councils) to ensure they are representative of all relevant party interests.

The Alliance for Fire and Smoke Containment provide a number of ancillary services, including:

- A comprehensive and user friendly web site for:
  - Find-a-product web listing
  - Find-an-installer web listing
  - Find-a-consultant
  - Technical Papers
- Technical and Legislative Overviews
- Marketing Guidelines
- Passive News: Quarterly Industry Newsletter
- E-News Update: Industry Updates as they occur
- Industry Forum: Quarterly Members Meeting
- Trade Exhibition Representation

Although care has been taken to ensure, to the best of our knowledge, that all data and information contained in this publication is accurate to the extent that it relates to either matters of fact or accepted practice or matters of opinion at the time of publication, The Alliance for Fire and Smoke Containment assumes no responsibility for any errors in or misinterpretations of such data and/or information or any loss or damage arising from or related to its use.

## PREFACE

This publication has been prepared by The Alliance for Fire and Smoke Containment with the kind support of member companies who are actively involved in the Fire Door and Fire Door Hardware Industry.

It presents a list of commercially available Fire Doors and Fire Door Hardware along with a summary of the respective company's available fire test data as supplied at the time of compilation.

**Part 1** provides general information relating to fire doors and fire door hardware, mandatory Building Codes and relevant Australian Standards requirements as well as useful terminology and its application

**Part 2** is a guide to using the Supplier Product Guides

**Part 3** contains the Technical Guides which includes listings of the Fire Door and associated Fire Door Hardware, the product category and a summary of approvals

This publication will provide a useful reference document for architects, designers, manufacturers, suppliers, installers, maintenance personnel, building approval officers, insurance underwriters or surveyors, risk management consultants, or building owners and operators.

### Acknowledgements

I would like to thank the Fire Door and Fire Door Hardware members of The Alliance for completing the relevant surveys and providing detailed information on their materials and systems without which this publication could not have been prepared.



John Rakic  
Executive Officer  
The Alliance for Fire and Smoke Containment

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### Disclaimer

*This publication was prepared by J-RAK Consulting for The Alliance for Fire and Smoke Containment (The Alliance). Information provided within is based on data provided by the respective suppliers by way of a survey issued in August 2005. Product listings do not signify that the products listed are endorsed in anyway by The Alliance. The user is urged to contact the supplier and request data sheets and technical assistance for the application at hand.*

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## THE ALLIANCE FOR FIRE AND SMOKE CONTAINMENT

Alliance member companies involved in fire doors and fire door hardware

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Architectural Seals



## PART 1

### General information relating to Fire Doors and Fire Door Hardware

#### Introduction

Fire doors are an important piece of fire equipment and are designed and installed in most building types. In the early days, fire doors were large, heavy, cumbersome and ugly, consisting of tin clad door leaves, manufactured to old insurance industry requirements, but today, most people, unless they are from the fire protection industry, would not be able to distinguish the fire doors from the non-rated doors. However, the role of the fire door, even if they are now more aesthetically pleasing, has not changed, and it is imperative that fire door installations are completed in accordance with fire-tested specimens and approved variations to these.

This Technical Guide (First Edition) has been prepared by the Alliance for Fire & Smoke Containment (pfpa) to provide a basic overview on fire doors and fire door hardware. It provides specific information for these items, such as the Building Code of Australia requirements, the relevant Australian Standards for design, installation, and maintenance, as well as outlining some of the types of fire doors, inbuilt features and fire

door hardware. It also covers some basic discussion on training, accreditation and licensing. Most importantly it includes a list of tables for approved hardware by proprietary door type.

We would like to stress, that we have prepared this document in good faith to try and provide a starting point for end users, and the Approved Hardware Tables themselves have been compiled from information provided by the manufacturers and suppliers themselves, and the readers are urged to contact the relevant manufacturers and suppliers and to do their own due diligence in relation to the products listed. We take no responsibility for any errors or omissions and we reserve the right to change this document without any notice.

Like any other publication produced by the Alliance for Fire & Smoke Containment, we would be happy to receive constructive criticism and feedback from readers so we can improve future versions.

#### About the Alliance

The Alliance for Fire and Smoke Containment (The Alliance) was formed in early 2002 with the support of founding members to provide a uniform and **coordinated approach** for the passive fire protection industry.

The Alliance allows members to **deliver relevant information** to all building professionals via a web site, writing and disseminating technical papers, seminar presentations, quarterly newsletter and relevant electronic email updates.

Consultants, designers, installers, manufacturers, suppliers and maintenance providers are all encouraged to support and actively participate to **improve best practice** in the passive fire protection industry by becoming financial Alliance members. Please refer to the opposite page for our membership structure.

To learn more about the Alliance please visit our comprehensive website or phone to speak to one of our staff.

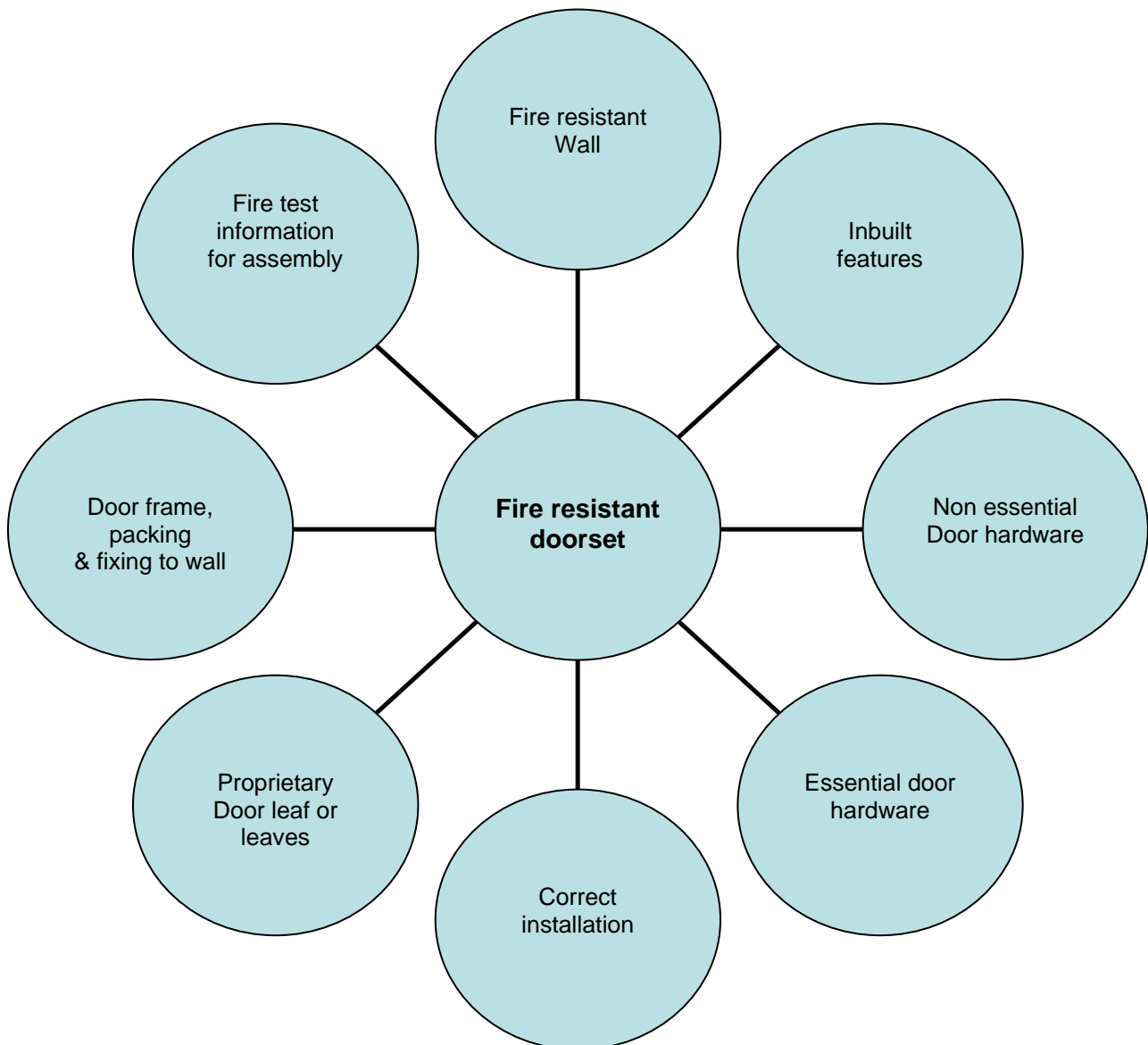
Visit  
[www.pfpa.com.au](http://www.pfpa.com.au)



## What is a fire resistant doorset?

Probably the most fundamental building block of understanding fire doors is to understand the concept of fire resistant **doorsets**. The Fire Rating Level (FRL), more commonly referred to as the “fire rating”, applies to the overall fire door assembly or system as installed, not to the individual components.

Figure 1 below, shows pictorially the concept of a fire resistant doorset, which consists of a complete assembly involving all the relevant components and is of course contingent upon compliant installation.



*Figure 1 – Pictorial representation of fire resistant doorset*

## Fire resistant wall

The first component is the fire resistant wall in which the fire door is installed. It must have a fire rating in its own right.

There are many different types of wall configurations that have been successfully fire tested and provide a known fire rating (FRL).

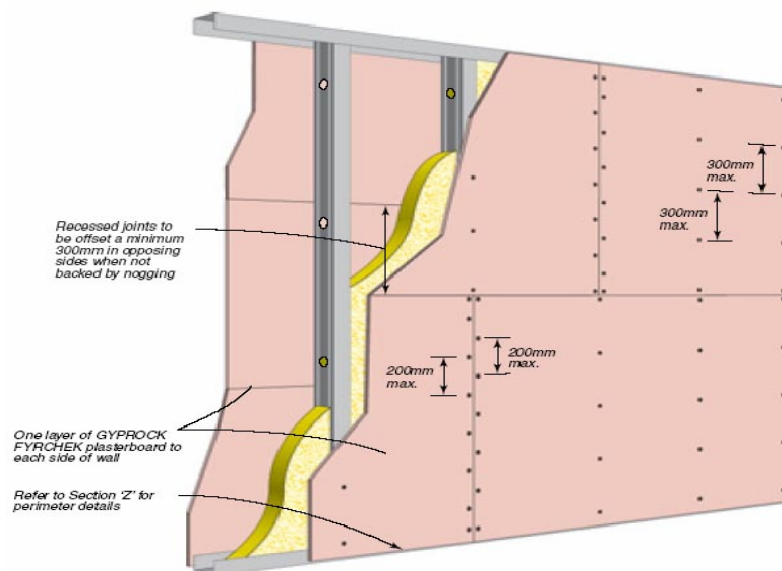
It is important that the wall type has also been fire tested with an opening and incorporating the different proprietary types of fire doors, to show that the wall and fire door, can operate together to resist the passage of hot flames and gases in the advent of a fire.

The differential deflection of the wall and door can lead to a gap forming and premature failure during fire testing if other means are not taken to prevent this gap from forming.

As fire doors are not typically load bearing, the wall construction must be suitable to carry a load imposed by the dead and live load of the door installed in the wall.

Some of the different types of wall types include:

1. Concrete and Masonry
2. Lightweight blocks
3. Drywall or plasterboard
4. Proprietary wall types



Installation detail for an internal fire-rated wall system



Deflection measurements being taken during a fire test

### Door frame, packing and fixing to the wall

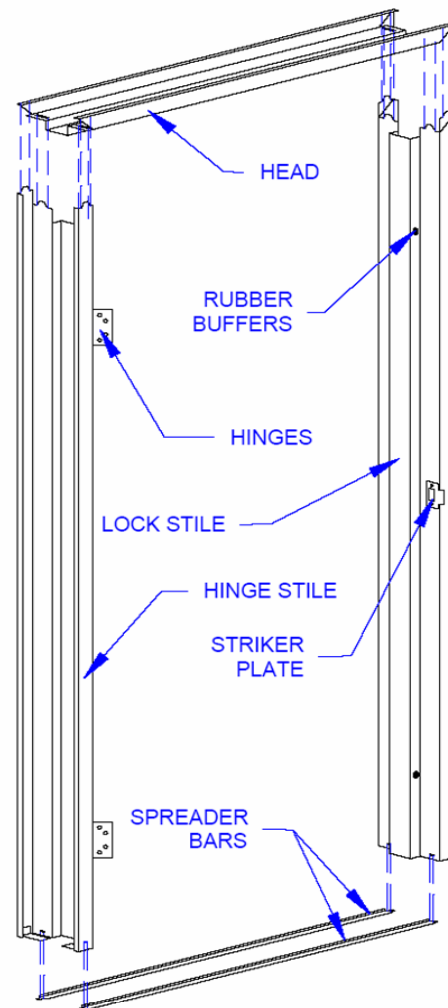
The frame in which a hinged or pivoted door is hung, swings or pivots, is the second component of a fire resistant doorset.

Conventional Australian fire doors are plywood or timber faced leaves, hung in steel door frames.

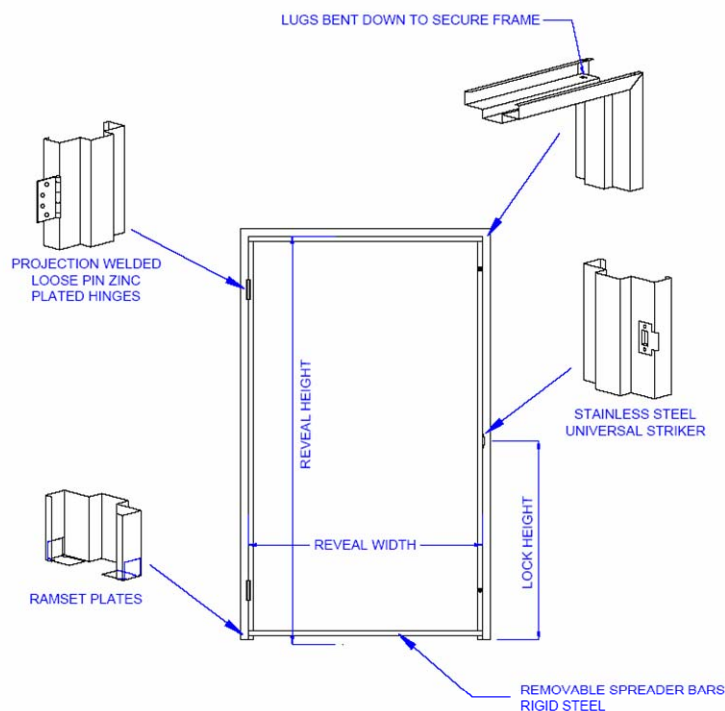
Steel door frames for fire doorsets traditionally contained a one inch or 25mm nominal door stop and this salient feature was one way to differentiate a fire doorset from a non fire rated door.

With the advent of intumescent fire door seal technology, there are now many proprietary fire door constructions that utilise standard half inch or 12mm nominal door stops.

Steel door frames can be fixed into the wall in many ways and often backfilling materials such as concrete mortar, plaster or other materials to assist with fire ratings and acoustic properties of the door assembly are used.

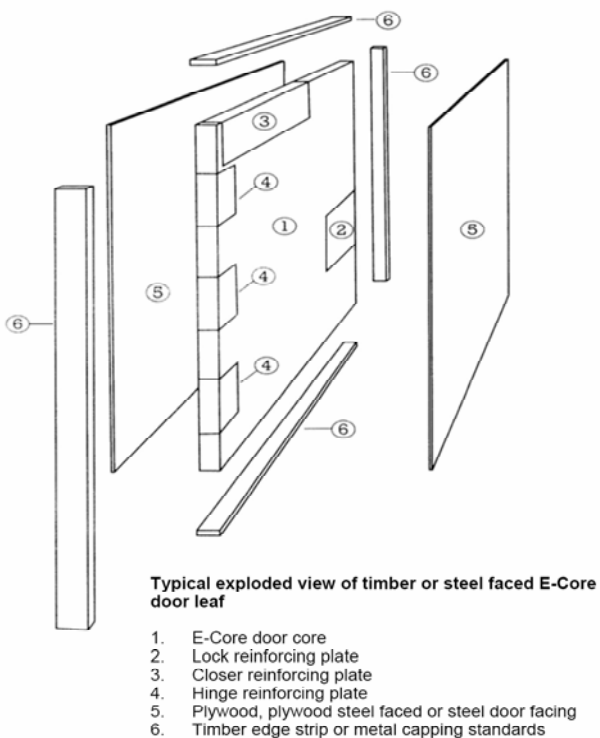


*Typical knock down type steel door frame*



## Proprietary door leaves

Although there can be many different door constructions, which of course result from the proprietary nature of fire resistant doorsets, the most prevalent construction is that of a non-combustible core, such as Vermiculite board, reinforced at hardware fixing positions (for the hinges, lock, closer and panic exit devices) with perforated metal reinforcing plates, clad with plywood or MDF facings and of course incorporating concealed edge strips or lippings, which allow the door to be trimmed on site to fit into openings where the steel frames are installed slightly out of square.



Exploded view of conventional fire door leaf assembly

## Inbuilt features

Inbuilt features include items which typically involve large cut outs in the door leaf or leaves. These include for example:

- Vision panels
- Air transfer grilles
- Wicket (access) doors in sliding door leaves



Fire door featuring vision panels and air transfer grilles



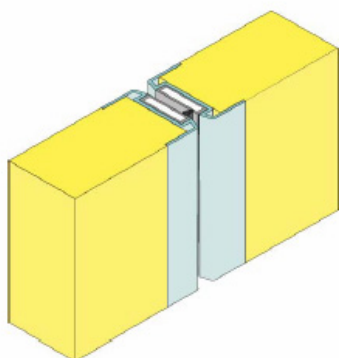
Fire door testing incorporating a vision panel

## Essential door hardware

Essential door hardware consists of those items of hardware which are required for the fire resistant doorset to achieve its fire rating (FRL); that is by removal of one or more of these items, the fire rating (FRL) could not be achieved or the door would not comply with the design considerations in AS 1905 Part 1. For example those items that allow the door to be self-closing and self-latching.

Essential door hardware includes:

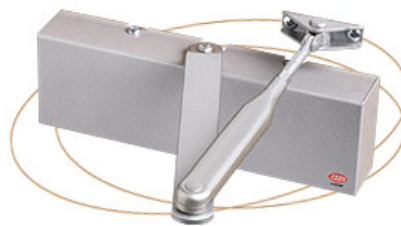
- door locks
- door strike
- door closers
- door hinges for single hinged doors
- door pivots for pivot doors
- door meeting stile details for pairs of doors
- sequence selectors for pairs of doors
- panic Exit devices on egress doors
- intumescent fire door seals when required to achieve FRL
- track, roller carriages and counterweight system for sliding doors



Aluminium meeting stiles



Panic Exit Device



Door closer



Tubular door lock

## Non essential door hardware

Non essential door hardware are items of hardware that are incorporated for additional functions or for aesthetic reasons and which are not essential door hardware items as discussed above. These include for example:

- acoustic, smoke and weather seals
- door viewers
- door furniture
- moulding and trims
- push / pull plates
- kick plates



Door furniture

## Correct installation

It is imperative that the fire resistant doorset encompassing all the items discussed above, is installed correctly. This is an important item, and although not a physical item of the doorset itself, is nonetheless a very important item in its own right.

Issues such as gaps or clearances, operational forces and good workmanship all form an important part of this attribute.

Ironically quite often this is where the system or assembly breaks down and the Alliance for Fire & Smoke Containment, through Accredifire, intend to deliver training and accreditation of installers. This will be discussed in more detail later.



## Fire test information for the assembly

The last component, like installation, is another intangible item but probably the most important item. It is imperative that the entire fire resistant doorset and all the tangible components listed above, have been fire tested and there is sufficient documentation to allow the assembly to be tagged (labelled) and certified.

The nature of this information is proprietary to each manufacturer / supplier of door leaves or door type. For example, E Core or Pyropanel core materials, carry their own field of application covering wall types, frames types, door constructions, maximum sizes, approved inbuilt features, hardware and the like.

Typically the fire core material principals, such as Trafalgar Building Products and Pyropanel Developments publish to their installation network the relevant field of application documentation such as a "Door Book" or "Technical Door Compendium".



## Membership Structure

**Manufacturer/Supplier member**  
**Installer / Maintenance provider**  
**Associate member**  
**Consultant member**

### Typical membership benefits include;

- Opportunity to participate in enhancing industry best practice relating to fire and smoke containment
- Representation on international and local AS/NZS standards committees
- Representation through the Alliance as official corresponding member to the Australian Building Codes Board (ABCB) industry liaison committee.
- Input to all initiatives of The Alliance
- Attendance to all regional and national committee meetings
- A company listing on the Alliance web site and link to your web address (if available)
- Product or service listings under the "find a product" or "find a service provider" section of the Alliance web site
- Subscription to the quarterly news letter
- Licence to use the Alliance logo on promotional literature
- Framed membership certificate

### Contact John Rakic for further details

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## Types of fire doors

There are several different generic types of fire resistant doorsets, categorised by their mode of operation.

These include:

**Hinged doors** – these are the most common category of fire door consisting of single or double leaf doorsets

**Pivoted doors** – these are commonly referred to as double action doors, which operate by way of top and bottom pivots and can swing in either direction

**Sliding doors** – these incorporate a track and roller carriages and slide across a door opening.

### Hinged doors

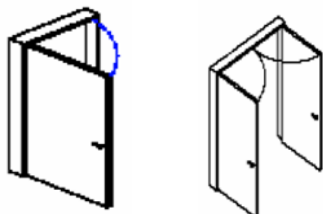
Hinged doors account for the majority of fire doors and can be either single door leaves, or double door leaves.



Hinged doors as discussed earlier in the technical requirements are required to incorporate door hinges, a door closer, a door lock and a door strike ensuring the door leaves are self-closing and self-latching.

Double leaf doorsets or pairs also incorporate meeting stiles or astragals where the two respective door leaves meet, as well as sequence selectors for doors with “T-Bar” or rebated meeting stile edges.

Note: Hardware is discussed in more detail later in the door components section.



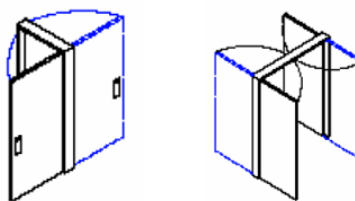
Single leaf hinged doorset (left) and double leaf (pair) hinged doorset (right)

### Pivoted doors (double action doors)

Pivoted doors or “double action” doors are typically found in hospitals and can swing through 180 degrees or in both directions around top and bottom pivots.

Like hinged fire doors, these doors are also required to be self-closing and therefore incorporate a floor mounted or transom mounted spring-loaded pivot to bring the doors back to the fully closed position after release. To allow them to swing in both directions, “double action” doors are not required to be self-latching.

They can be either single or double leaf doorsets.



Single and double leaf pivoted or ‘double action’ doorsets

### Sliding doors

Sliding doors incorporate a sliding door track and roller carriages which allow the door leaf or leaves to slide across the opening to open and/or close as appropriate.

Sliding doors, where permanently open, are required under the Building Code of Australia to be held open by an electro-magnetic door holder, and connected to a smoke detector. Upon activation of the detector in fire alarm mode, the magnetic door holder automatically releases, and a counter weight and guide roller system then closes the door.



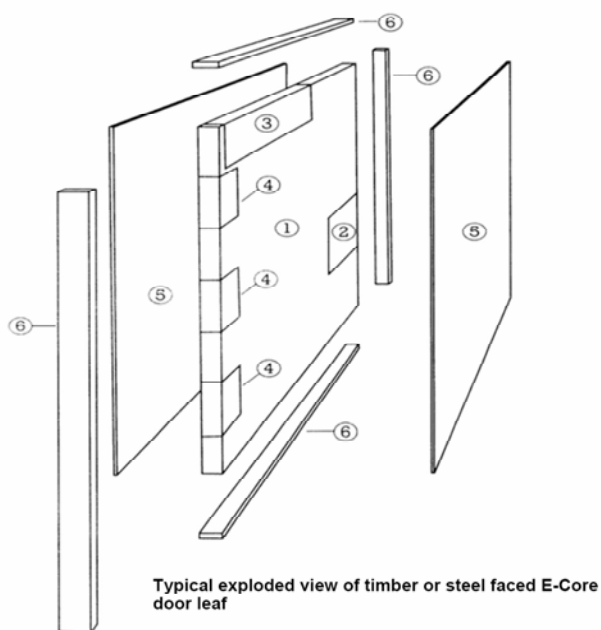
Typical sliding door configuration

## Core materials

Conventional fire doors have typically consisted of non-combustible core materials such as Vermiculite based core materials (E Core) and mineral fibre core materials (Pyropanel)

For the one hour unit entry door market and for newer life safety doors which often only require a 30 minute fire rating (as well as known smoke leakage ratings) we have seen the introduction of other core materials such as lightweight calcium silicate based core materials and cellulosic or timber based core materials.

Unlike the UK and the USA, in Australia, probably due to the size of our market and the costs of all the fire testing, we do not have too many suppliers of fire door core materials.



1. E-Core door core
2. Lock reinforcing plate
3. Closer reinforcing plate
4. Hinge reinforcing plate
5. Plywood, plywood steel faced or steel door facing
6. Timber edge strip or metal capping standards

eore

**PYROANEL**<sup>®</sup>



Vermiculite based core material



Calcium silicate based core material



Mineral fibre based core material



Cellulosic (timber) based core material

## Door hardware

Door hardware of course plays an important role in achieving a compliant and operational fire resistant doorset. It is also used to allow the architect to achieve the aesthetics they are looking for and to provide additional functions such as smoke, sound and weather sealing for example.

Although this concept is not one you will find documented anywhere else it makes good sense to consider door hardware on fire doors as “Essential Door Hardware” and “Non Essential Door Hardware”. These items were defined previously in the “What is a fire resistant doorset?” section.

All items of hardware, whether essential or non essential are required to comply with the fire test requirements as governed by AS 1905 Part 1, determined by fire resistance testing to AS1530 Part 4. Both these Australian Standards will be discussed in more detail later, but it is safe to say they are the foundation of the fire door industry. Unlike core materials, there are myriads of options for fire door hardware and it is important to take heed of the fact that fire ratings for door hardware are not generic and apply to specific constructions of proprietary fire door leaf or leaves.

**The Tables in the back of this Technical Guide, include the items of door hardware supplied by member companies of the Alliance for Fire and Smoke Containment and their respective approvals by proprietary door construction type.**

## Australasian Regulatory Requirements

### Building Code of Australia

In each State & Territory of Australia, the Technical Provisions relating to Building Code Control are contained within the Building Code of Australia, commonly referred to as the BCA.

The BCA divides building into Classes, which relate to the use of the Building, and for each building Class, the Type of Construction is determined from the rise in storeys for the building in question. For a given Class, and construction Type, (eg Class 2, Type A Construction), the BCA in the deemed-to-satisfy or prescriptive provisions, provides the relevant fire rating (FRL) for different compartment barriers.

### Building Code of New Zealand

The New Zealand Building Code (NZBC) works in much the same manner as the BCA using Purpose Groups in lieu of Classes.

### Compartmentalisation

The BCA works on dividing buildings into discrete fire compartments consisting of fire barriers, such as fire rated walls, floors, and ceilings. The fire safety objective here is to limit a fire to a discrete area. In case of a fully developed fire scenario, the fire will be maintained within this area, minimising the effects of the fire on the occupants, the building, and the business itself.

Effective compartmentalisation is maintained when all openings in fire rated barriers, those for access (doors, access panels and hatches), those for light (windows) and those for services and control joints (metal & plastics pipes, cable and cable trays and ducting) have compliant (fire tested), fire-stopping elements installed so as the integrity of the fire barrier in question is not compromised.

The BCA uses Fire Resistance Levels to nominate the required fire rating for different fire resistant barriers within a given fire compartment.



*Photo of a brewery fire showing successful compartmentalisation by way of a fire wall*

## Fire Resistance Levels (FRL's)

The Fire Resistance Level, (FRL) for a specific fire resistant wall or partition, in which a fire resistant doorset would be installed, is determined in accordance with Section C of the Building Code of Australia (BCA) following the basic principles discussed above.

The BCA definition of an FRL is as follows:

**Fire-resistance level (FRL)** means the grading periods in minutes determined in accordance with Specification A2.3, for the following criteria—

- (a) *structural adequacy*; and
- (b) *integrity*; and
- (c) *insulation*,

and expressed in that order.

### Notes:

A dash means that there is no requirement for that criterion.

For example, -/90/30 means there is no requirement for an FRL for structural adequacy, and -/-/- means there is no requirement for an FRL at all.

In principle, the fire resistant doorset must have the same FRL as the wall or partitions in which it is installed, but due to the fact that fire doors are not structural elements, they are not required to have a rating for structural adequacy and this part of the FRL is usually designated with a dash ("-").

The BCA also provides a generic non-exposed side temperature rise or insulation concession, allowing fire doors to only require 30 minutes insulation as part of the required FRL.

For a load-bearing wall, say in a fire rated stairwell, which has an FRL requirement of 120/120/120, the required fire resistant doorset is typically referred to as a "2 hour door", as it is required to have an integrity rating of 2 hours (120 minutes), would have an FRL of -/120/30.

Similarly for a non-load bearing partition with a -/60/60 FRL, a "1 hour door" is required, as it is required to have an integrity rating of 1 hour (60 minutes) and the FRL for this doorset would be -/60/30.

Fire campaign chiefs say safety is paramount

# Doors that saved inferno building

FIRE bosses have released photographs taken in the aftermath of the Trago Mills blaze to show how fire doors can save lives.

The pictures graphically illustrate how the area on one side of a set of protective doors was devastated by the fire but, on the other, items escaped almost unscathed.

Now fire chiefs have warned that business premises take heed of their effectiveness.

Inspections at many buildings reveal fire doors wedged open, leaving the premises at the mercy of a fast-spreading blaze.

Station Officer Ray Harris explained: "This just goes to show how well fire doors work."

"Often, when we are inspecting properties, we find fire

By ELLEN GRINDLEY

doors wedged open, sometimes using fire extinguishers to prop them open.

"Every business person should be thinking that fire doors will save their property but, more importantly, can save lives."

### Intact

These photographs taken at Trago Mills show the effectiveness of double fire doors.

One set were destroyed, but the second set remained intact, protecting a neighbouring room containing dining tables and chairs and a row of grandfather clocks.

Mr Harris added: "Instead of grandfather clocks, just think they could be a real grandfather, whose life could be saved

by having fire doors and keeping them closed."

He pointed out that installing £800 fire doors is a waste of money unless they are kept shut.

As well as protecting property from the worst of the fire damage, the fire doors also helped firefighters, providing protection for them as they fought the fire in the room beyond.

In the case of Trago Mills, the presence of the doors helped the fire crews to such an extent, they were effectively able to save two thirds of the property. In business, industrial premises and all work premises, fire doors can reduce the seriousness of fire damage.

Keeping internal doors closed at home, even though they are not specially designed fire doors, can also give limited protection and give occupants time to get out.



**IMPORTANT MESSAGE:** Above, devastation caused by the fire at Trago Mills. On the other side of the fire door, which held back the fierce blaze, grandfather clocks are saved from damage.

PHOTOS: HZ803740 SUB\_002/1

*Fire doors with proven FRL ratings will work in real-life situations*

## Fire testing and AS1530 Part 4

The fire test method used here locally in both Australia and New Zealand is AS1530 Part 4. This test method follows the basic principles of International Standards, ISO834 Part 1 and ISO3008.

All proprietary fire resistant doorsets and fire door hardware are required to have been fire tested together to the requirements of this Standard.

Essentially the fire testing consists of building and mounting a representative specimen (or prototype assembly) onto the front of a fire test furnace and burning the assembly against standardised time versus temperature criteria and with given pressure differential conditions across the assembly.

Measurements are taken to determine the time taken to exceed specified criteria for integrity, insulation and radiation as applicable from which fire ratings can be determined for compliance against Building Codes in Australia and New Zealand.

### Full scale testing of fire door assemblies

Door assemblies are tested in a full scale test, which consist of a nominal 3 metre x 3 metre assembly, consisting of a portion of fire resistant wall and of course a door assembly consisting of door frame, leaf or leaves, relevant inbuilt features and of course essential door hardware.



*Photo showing typical full scale fire test on two single leaf door assemblies in a masonry wall construction*

### Pilot scale testing of door hardware

Door hardware can be tested as part of full scale test assemblies as discussed above, but typically door hardware is tested on a pilot or small scale furnace. These are typically 2 metres x 1 metre in size, or 1 metre x 1 metre, depending on the laboratory.

In essence, the pilot scale test simulates a portion of the door, and provides real fire performance data, which can then be applied to the proprietary door construction it is fire tested with.



*Photos of typical door hardware components being fire tested*

## Australian Standard – AS1905 Part 1

The fire door code as it is commonly referred to is Australian Standard AS 1905 Part 1.

This is effectively the back-bone document of the fire door industry, of course along with AS1851 for inspection & testing and maintenance.

The objective of these Standards is:

*“to provide manufacturers, suppliers and installers with a set of requirements for the construction and installation of fire resistant doorsets designed to protect the openings in walls and elements of construction which are required to resist the passage of fire.”*

The BCA requires all fire doorsets to comply with BCA Specification C3.4.

### BCA SPECIFICATION C3.4

#### FIRE DOORS, SMOKE DOORS, FIRE WINDOWS AND SHUTTERS

##### 1. SCOPE

*This Specification sets out requirements for the construction of **fire doors**, smoke doors, fire windows and fire shutters.*

##### 2. FIRE DOORS

*A required fire door must-*

*(a) comply with AS/NZS 1905.1; and*

*(b) not fail by radiation through any glazed part during the period specified for integrity in the required FRL.*

.....

AS 1905 Part 1 provides relevant information pertaining to the design of fire doors, stipulating design requirements such as self-closing and self-latching of fire doors, guidance relating to acceptable variations from fire tested specimens, installation requirements, requirements for marking or “tagging” and relevant documentation used for certification purposes.

Anyone working with fire resistant doorsets must have a thorough understanding of this Standard.

Obviously in a short form Guide like this we cannot provide any detailed information here regarding AS 1905 Part 1.

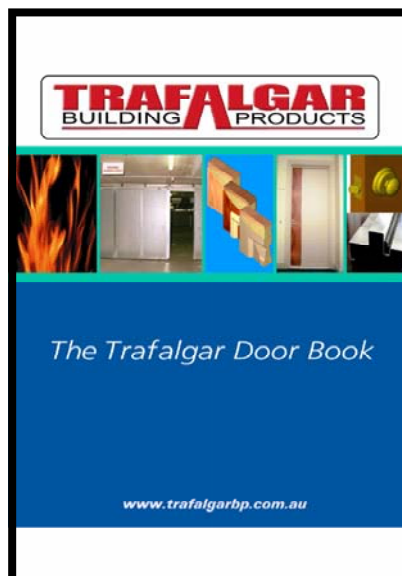
## Manufacturer’s fire test approvals

Although not the best choice of terminology, the common term to reflect all of the fire testing and approved variations for an entire suite of available fire doorsets for a given manufacturer or supplier, is their “fire test approvals”.

A manufacturer’s “fire test approvals” portfolio, will typically consist of the following:

- full-scale baseline fire tests,
- pilot-scale supporting fire tests for hardware items
- formal technical letters of opinion or technical assessments from Registered Testing Authorities, outlining specific and allowable variations from the fire tested specimens as per the specific requirements of AS1905 Part 1.

Typically, manufacturers and suppliers will provide summaries of the “fire test approvals” by way of “Technical Door Books” allowing them to communicate to all those involved in design, installation, certification and subsequent maintenance activities, what limitation in wall types, door types, finishes, inbuilt features, door hardware and furniture apply to the different models of fire doorsets in their ranges.



## Fire door design requirements

It is very hard in a few pages or few minutes to cover very much on fire resistant doorsets and their design and function, so the approach adopted here is to provide a basic summary of key points, entitled “Fire Doors 101”.

### Fire Doors 101

#### Construction

As discussed earlier most conventional Australian fire doors consist of non combustible core (infill) materials clad with timber or MDF facings and incorporating timber edge strips or lipping materials to allow for ease of fitting into steel door frames which might be slightly out of plumb, or to accommodate irregular floor finishes (refer to figure showing exploded view of conventional fire door leaf).

Essential items of door hardware, such as hinges, door closers and locks for example, are fixed in to metal reinforcing plates as a rule.

#### Self closing and self latching

This is probably the most fundamental aspect of fire door design. Fire doors must be closed to be effective and must latch so that the pressure in the fire cannot force the door open and allow premature flame spread.

Self-closing or automatic door closers are fitted to provide the closing function and door locks / latches and door strikes are utilized to ensure a positive latching function.

Note—Dead bolts or other hardware which can render a door non-self latching are not permitted. These should not be confused with dead latches. There is a very fundamental difference.

#### Proprietary nature of fire doors

Although there are some similarities in different manufacturers and suppliers of fire doors, they are a proprietary product, and the fire test data and field of application for each type is different. Most fire door manufacturers provide user manuals (such as the Trafalgar Door Book for example) which outlines the different sizes and configurations of fire doors as well as the approved fire door hardware makes and models.

## Clearances

Clearances, clearances, clearances, clearances.....

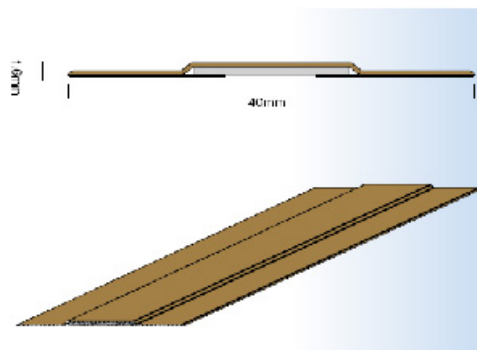
Yes, we are labouring this point. Attainment of the allowable clearance should be fairly straight forward but inspections in the field reveal this is not the case and often we see larger clearances than the 3mm allowable perimeter (head, lock and hinge stiles) and 10mm at the bottom of hinged doors.

Care must be taken during installation and competent installers used to ensure these clearances or gaps are maintained.

In recent times we have seen the use of clever intumescent upgrade products which can at least salvage doors with non compliant and excessive clearances.



HP4002 Retro-fit onto a steel door frame.



Lorient Australia – HP 4002 product – an example of an self-adhesive type intumescent perimeter seal for use on doors with excessive gaps

#### Operational forces

The opening and closing forces are also becoming more and more important with issues relating to access and egress for the disabled and of course for doors to fire rated stairwells where stair pressurization systems are employed.

## Maintenance

Like all other items of fire safety equipment, fire resistant doorsets require regular inspection and testing consisting of measurements and adjustments, lubrication of moving parts and the like. These items are typically referred to as maintenance and are conducted to ensure that when there is a real fire, the fire resistant doorsets in question have the best possible chance of avoiding fire spread as per their intended design function.

Although the Building Code of Australia does not call up Australian Standard, AS1851 is typically called up by other means and in most cases provides the relevant frequency and inspection and testing schedules for fire resistant doorsets.

A new consolidated and all encompassing AS1851 suite has recently been published, and the requirements for fire resistant doorsets have not significantly changed, except possibly for the frequency of inspections.

## Smoke leakage through fire doors

It is a common misconception that a fire door will stop both flame spread and also the spread of smoke.

It is important to recognise that a so called tight fitting fire door will not provide effective smoke containment properties, as the typical 3mm perimeter clearance results in excessive smoke leakage even at modest pressure differentials.

**A fire tested door or any other fire test component does not mean this product will stop smoke leakage or keep tenable conditions on the non exposed side for the duration of the fire rating (FRL).**

There are different test methods, such as AS/NZS1530 Part 7 that deal specifically with smoke leakage capabilities of assemblies. There are quite a few manufacturers of both door technology and door seal technology that have in fact developed and conducted testing for both AS1530 Part 4 and AS/NZS1530 Part 7, to provide combined fire and smoke doors.

Note – Many of the combined fire and smoke doors, and especially those with lower FRL rating, such as 30 minutes for example, are being promoted as Life Safety Doors and are being used in building incorporating Alternative Solutions developed by qualified Fire Safety Engineering organisations.



Smoke leakage during testing of tight fitting fire door



Smoke door being tested to AS 1530.7

## Solid core doors

Although this Guide focuses on fire resistant doorsets, it is appropriate to dispel the myth for once and for all regarding the perceived performance of so-called tight fitting solid core doors.

Standard solid core timber doors, especially in steel door frames perform very poorly in terms of smoke leakage (no different to a tight fitting fire door) and also in terms of burn through (flame spread).

This has been well documented and the readers are urged to read the technical articles on the [www.pfpa.com.au](http://www.pfpa.com.au) web site in relation to this specific topic.

## Training, Accreditation and licensing

### Training

As we discussed above, fire resistant doorsets are complete assemblies and those people who install and carry out maintenance (service) of fire doors, need to have a good understanding of all the requirements relating to fire doors.

In many ways it is surprising that those who work with fire doors, which as we know are an important item for safety of occupants and protection of property and business, do not have to have a specific trade or qualification to work in this specialised area.

Things are starting to change, but the changes are very much at a Regional State or Territory level, underpinned by National Competency based Training materials.

We will not discuss the specific competencies in any detail here except to say as part of the initiatives supported by the Alliance for Fire and Smoke Containment (PFPA), Accredifire has been launched to deliver training and provide accreditation for installers and service personnel who provide maintenance of fire doors. This Accredifire business aims to provide training encompassing all areas of Passive Fire and Smoke Containment area, not just fire doors.

### Accreditation and Licensing

Queensland as many of you know requires all fire door installers and service providers to be accredited and licensed under the Queensland Building Services Authority Act and Regulations.

Licensing in the author's opinion is inevitable in all States and Territories.

FPA Australia in conjunction with the Alliance Fire and Smoke Containment, (PFPA) have been working hard on a Strategic Document which can be sourced from either organization, which discusses a National approach to accreditation, and Occupational Licensing for the overall fire protection industry.



**Accredifire**

## Training for the Passive Fire Protection Industry



**Accredifire**

[www.accredifire.com.au](http://www.accredifire.com.au)

## **PART 2 How to use this Guide**

The Technical Guidance Tables are arranged to be user friendly and should be reasonably self-explanatory.

There are the following Technical Guidance Tables:

Table 1—Doorset types

Table 2—Locksets

Table 3—Door seals

Table 4—Electric door strikes

Table 5—Hinges

Table 6—Panic exit devices

Table 7—Closers

Table 8—Hardware for pairs of doors

Table 9—Hardware for sliding doors

Table 10—Other items of hardware

In essence, the tables that follow, which will be updated regularly, hope to provide an all encompassing list of fire door types and the relevant door hardware approvals by proprietary door type.

Prepared by J-RAK Consulting for The Alliance for Fire and Smoke Containment. Information provided here is based on data provided by respective suppliers. Product listings do not signify that the products are endorsed in any way by the Alliance. The user is urged to contact the supplier and request data sheets for technical assistance for the application at hand.

These tables are current at the time of listing and are subject to change without notice. If you would like to be listed or make changes in future versions of this Technical Buyer's Guide, please contact The Alliance for Fire and Smoke Containment on (02) 9416 0451.

## PART 3—Supplier Product Tables

<b>Doorset types</b>	<b>ECore</b>	<b>Pyropanel</b>
<b>Mini doors (nominal 38mm thick)</b>		
<b>Single hinged doors</b>		
MDF & Plywood faced	✓	✓
Timber mouldings	✓	✓
Moulded panel door	✓	
<b>Maxi doors (nominal 48mm thick)</b>		
<b>Hinged doors</b>		
	✓	✓
Single doors	✓	✓
Pairs of doors	✓	✓
Masonry wall	✓	✓
Plasterboard wall	✓	✓
MDF & Plywood faced	✓	✓
Steel sheeted	✓	✓
Decorative plastic laminates	✓	✓
Timber mouldings	✓	✓
Air transfer grilles	✓	✓
Vision panels	✓	✓
Panels over with transom	✓	✓
Panel over without transom	✓	✓
Timber door frames	✓	✓
<b>Double action doors</b>		
Single doors	✓	✓
Double leaf doors	✓	✓
<b>Sliding doors</b>		
Masonry walls	✓	✓
Plasterboard walls	✓	✓
Steel sheeted	✓	✓
Timber faced	✓	✓
Wicket doors	✓	✓

**Table 1—Doorset types**

<b>Locksets</b>				
			<b>Fire test approvals</b>	
Model	Supplier	Description	E Core	Pyropanel
<b>Cylindrical or tubular locks</b>				
Efco 7000 Series	Assa Abloy Australia Pty Ltd	Cylindrical lock	✓	✓
Efco 5300 Series	Assa Abloy Australia Pty Ltd	Cylindrical lock	✓	✓
Efco 5400 Series	Assa Abloy Australia Pty Ltd	Cylindrical lock	✓	✓
Lockwood 500 Series	Assa Abloy Australia Pty Ltd	Cylindrical lock	✓	✓
Lockwood 529 Series	Assa Abloy Australia Pty Ltd	Entrance set	✓	✓
Lockwood 530 Series	Assa Abloy Australia Pty Ltd	Dead latches - tubular	✓	✓
Lockwood 7850 Series	Assa Abloy Australia Pty Ltd	Tubular lever lock	✓	✓
Lockwood 7870 Series	Assa Abloy Australia Pty Ltd	Tubular lever lock	✓	✓
Lockwood 8530 DB	Assa Abloy Australia Pty Ltd	Double bevel latch	✓	✓
Lockwood 930 Series	Assa Abloy Australia Pty Ltd	Cylindrical lock	✓	✓
Lockwood 950 Series	Assa Abloy Australia Pty Ltd	Cylindrical lock	✓	✓
Sentinel 1000 Series	Assa Abloy Australia Pty Ltd	Cylindrical lock	✓	✓
Sentinel 7000 Series	Assa Abloy Australia Pty Ltd	Cylindrical lock	✓	✓
<b>Mortice locks</b>				
Lockwood 3570 series	Assa Abloy Australia Pty Ltd	Mortice lock	✓	✓
Lockwood 3572 series	Assa Abloy Australia Pty Ltd	Mortice lock	✓	✓
Lockwood 3670	Assa Abloy Australia Pty Ltd	Mortice lock	✓	✓
<b>Rim Latches</b>				
Efco 500	Assa Abloy Australia Pty Ltd	Rim latch	✓	✓
Efco 507	Assa Abloy Australia Pty Ltd	Rim latch	✓	✓
Lockwood 507	Assa Abloy Australia Pty Ltd	Rim latch	✓	✓
<b>Latches (head and centre)</b>				
Lockwood 8530	Assa Abloy Australia Pty Ltd	Head latch	✓	✓
Lockwood 8530 DB	Assa Abloy Australia Pty Ltd	Double bevel centre latch	✓	✓
Lockwood 8530 / 305	Assa Abloy Australia Pty Ltd	Head latch with turn snib	✓	✓
Lockwood 8530 / 353	Assa Abloy Australia Pty Ltd	Head latch with turn snib	✓	✓
<b>Hotel locking systems</b>				
Efco L3613 E	Assa Abloy Australia Pty Ltd	Hotel electric mortise lock	✓	✓

Table 2—Locksets

Door seals				
			Fire test approvals	
Model	Supplier	Description	E Core	Pyropanel
<b>Perimeter seals</b>				
IS7025si	Lorient	Surface mounted perimeter seal	✓	✓
IS7070si	Lorient	Surface mounted perimeter seal	✓	
IS7080si	Lorient	Surface mounted perimeter seal	✓	✓
IS7090si	Lorient	Surface mounted perimeter seal	✓	
LE1212	Lorient	Batwing - perimeter seal	✓	✓
LE1515	Lorient	Batwing - perimeter seal	✓	✓
LE0511	Lorient	Firtree - perimeter seal	✓	
RP10Si	Raven Products Pty Ltd	Surface fitted to door frame	✓	✓
RP23	Raven Products Pty Ltd	Surface fitted to door frame	✓	✓
RP24Si	Raven Products Pty Ltd	Surface fitted to door frame	✓	✓
RP25	Raven Products Pty Ltd	Surface fitted to door frame	✓	
RP26	Raven Products Pty Ltd	Surface fitted to door frame	✓	✓
RP39	Raven Products Pty Ltd	Surface fitted to door frame		✓
RP55	Raven Products Pty Ltd	Surface fitted to door frame	✓	
RP56	Raven Products Pty Ltd	Fitted to door frame or door leaf into groove.		✓
RP76Si	Raven Products Pty Ltd	Fitted into 10mm wide groove	✓	✓
RP78Si	Raven Products Pty Ltd	Surface fitted to door frame	✓	✓
RP93Si	Raven Products Pty Ltd	Surface fitted to door frame	✓	✓
RP94Si	Raven Products Pty Ltd	Surface fitted to door frame	✓	✓
RP120	Raven Products Pty Ltd	Surface fitted to door frame corner	✓	✓
RP150	Raven Products Pty Ltd	Surface fitted to door frame corner	✓	✓
RP1004	Raven Products Pty Ltd	Fitted into 10mm wide grove	✓	✓
RP1004S	Raven Products Pty Ltd	Fitted into 10mm wide grove	✓	✓
RP1004SA	Raven Products Pty Ltd	Fitted into 10mm wide grove	✓	✓
RP2004	Raven Products Pty Ltd	Fitted into 20mm wide grove	✓	✓
RP2004F	Raven Products Pty Ltd	Door perimeters seal 3mm thickness. Surface fitted or into 20mm wide grove	✓	✓
RP2004S	Raven Products Pty Ltd	Fitted into 20mm wide grove	✓	✓
RP2004SA	Raven Products Pty Ltd	Fitted into 20mm wide grove	✓	✓
<b>Door bottom seals</b>				
IS3080	Lorient	Door bottom sweep seal	✓	
IS8010si	Lorient	Automatic door bottom seal	✓	✓
IS8011si	Lorient	Automatic door bottom seal	✓	✓
IS8020si	Lorient	Automatic door bottom seal	✓	✓
IS8090si	Lorient	Automatic door bottom seal	✓	✓
IS8091si	Lorient	Automatic door bottom seal	✓	✓
IS8100si	Lorient	Automatic door bottom seal	✓	
RP3	Raven Products Pty Ltd	Surface fitted to door leaf		✓
RP4T	Raven Products Pty Ltd	Surface fitted to door		✓
RP8Si	Raven Products Pty Ltd	Fully morticed to door leaf	✓	✓

Table 3—Door seals

<b>Door seals (continued)</b>				
			<b>Fire test approvals</b>	
Model	Supplier	Description	E Core	Pyropanel
<b>Door bottom seals (continued)</b>				
RP26	Raven Products Pty Ltd	Surface fitted to door leaf	✓	
RP38Si	Raven Products Pty Ltd	Surface or semi morticed fitted to leaf	✓	✓
RP56Si	Raven Products Pty Ltd	Groove fitted with adhesive to the door leaf	✓	
RP60	Raven Products Pty Ltd	Surface fitted	✓	✓
RP99Si	Raven Products Pty Ltd	Either surface fitted, fully or semi morticed	✓	✓
RP114	Raven Products Pty Ltd	Surface fitted to door leaf	✓	✓
<b>Door meeting stiles seals</b>				
LP3107SS	Lorient	Bullnose meeting stile seal	✓	
RP63	Raven Products Pty Ltd	Bullnose meeting stile seal	✓	✓
RP76Si	Raven Products Pty Ltd	Bullnose meeting stile seal		✓
<b>Intumescent and fire door excessive gap upgrade products</b>				
HP4002	Lorient	Perimeter upgrade seal	✓	✓
HP1602	Lorient	Plain intumescent seal	✓	
LP1004	Lorient	Intumescent hot smoke seal	✓	
HP1602AS	Lorient	Combined intumescent fire & smoke seal	✓	
HP1602TF	Lorient	Combined intumescent fire & smoke seal	✓	
HP1612BW	Lorient	Combined intumescent fire & smoke seal	✓	
LP1004SS	Lorient	Intumescent hot smoke seal	✓	
LP1004AS	Lorient	Intumescent hot smoke seal	✓	
LP1004TS	Lorient	Intumescent hot smoke seal	✓	
FDBU20	Lorient	Door bottom upgrade seal	✓	✓
FDBU60	Lorient	Door bottom upgrade seal	✓	
RP1004	Raven Products Pty Ltd	Fitted into 10mm wide groove	✓	✓
RP1004S	Raven Products Pty Ltd	Fitted into 10mm wide groove	✓	✓
RP1004SA	Raven Products Pty Ltd	Fitted into 10mm wide groove	✓	✓
RP2004	Raven Products Pty Ltd	Fitted into 20mm wide groove	✓	✓
RP2004F	Raven Products Pty Ltd	Door perimeters seal 3mm thickness. Surface fitted or into 20mm wide groove	✓	✓
RP2004S	Raven Products Pty Ltd	Fitted into 20mm wide groove	✓	✓
RP2004SA	Raven Products Pty Ltd	Fitted into 20mm wide groove	✓	✓
RP114	Raven Products Pty Ltd	Bottom seal with intumescent infill for use with various height approved thresholds. Surface fitted to door leaf.	✓	✓

Table 3—Door seals

Door seals (continued)				
			Fire test approvals	
Model	Supplier	Description	E Core	Pyropanel
<b>Threshold plates</b>				
IS4010	Lorient	Threshold plate	✓	
IS4015	Lorient	Threshold plate	✓	
IS4020	Lorient	Threshold plate	✓	
IS4025	Lorient	Threshold plate	✓	
IS4070	Lorient	Threshold plate	✓	
IS4075	Lorient	Threshold plate	✓	
IS4110	Lorient	Threshold plate	✓	
IS4120	Lorient	Threshold plate	✓	
IS4130	Lorient	Threshold plate	✓	
RP29	Raven Products Pty Ltd	13mm high	✓	✓
RP91	Raven Products Pty Ltd	16mm high		✓
RP95	Raven Products Pty Ltd	3.5mm high	✓	✓
RP115	Raven Products Pty Ltd	6mm high	✓	✓

Table 3—Door seals

Electric door strikes			Fire test approvals	
Model	Supplier	Description	E Core	Pyropanel
Lockwood EK35	Assa Abloy Australia Pty Ltd	SS body electric door strike	✓	✓
Padde EA	Trimec	Electric door strike	✓	✓
Padde ES 100A	Trimec	Electric door strike	✓	✓
Padde ES 200 Series	Trimec	Electric door strike	✓	✓
Padde ES 2000 Series	Trimec	Electric door strike	✓	✓
Padde ES 400 Series	Trimec	Electric door strike	✓	✓
Padde ES 4000 Series	Trimec	Electric door strike	✓	✓
Padde ES 8000	Trimec	Electric door strike	✓	✓

**Table 4—Electric door strikes**



**TRIMEC** 

**To be included in this publication please phone  
(02) 9416 0451 or email [hardware@pfpa.com.au](mailto:hardware@pfpa.com.au)**

<b>Hinges</b>				
			<b>Fire test approvals</b>	
Model	Supplier	Description	E Core	Pyropanel
<b>Hinges (normal)</b>				
Lockwood 100 series	Assa Abloy Australia Pty Ltd	Stainless steel butt hinges	✓	✓
<b>Power transfer hinges and accessories</b>				
Lockwood 9W 75 x 100	Assa Abloy Australia Pty Ltd	Power transfer hinge	✓	✓
Lockwood LC8810	Assa Abloy Australia Pty Ltd	Lead cover for power transfer hinges	✓	✓
Lockwood PWR lead series	Assa Abloy Australia Pty Ltd	Power transfer hinge	✓	✓

**Table 5—Hinges**



**To be included in this publication please phone (02) 9416 0451 or email [hardware@pfpa.com.au](mailto:hardware@pfpa.com.au)**

Panic Exit Devices				
			Fire test approvals	
Model	Supplier	Description	E Core	Pyropanel
Efco EO	Assa Abloy Australia Pty Ltd	Panic Exit device	✓	✓
Efco VEO	Assa Abloy Australia Pty Ltd	Panic Exit device	✓	✓
Lockwood 9000 series	Assa Abloy Australia Pty Ltd	Horizontal - single point locking	✓	✓
Lockwood 9000 series	Assa Abloy Australia Pty Ltd	Vertical - two single point locking	✓	✓

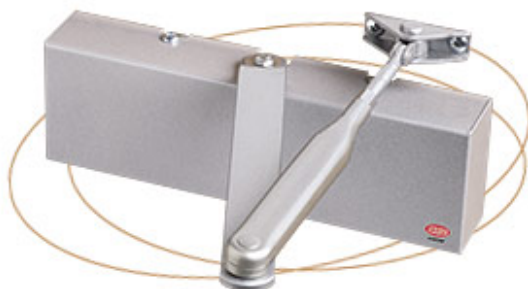
**Table 6—Panic exit devices**



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<b>Closers</b>				
			<b>Fire test approvals</b>	
Model	Supplier	Description	E Core	Pyropanel
<b>Surface mounted closers</b>				
Lockwood 737	Assa Abloy Australia Pty Ltd	door closer	✓	✓
Lockwood 747	Assa Abloy Australia Pty Ltd	door closer	✓	✓
Lockwood 8002	Assa Abloy Australia Pty Ltd	power spring operator	✓	✓
Lockwood 802 series	Assa Abloy Australia Pty Ltd	door closer	✓	✓
Lockwood Arrow 426/414 series	Assa Abloy Australia Pty Ltd	door closer	✓	✓
Lockwood Efc0 1300 series	Assa Abloy Australia Pty Ltd	door closer	✓	✓
Lockwood Efc0 LW 1830 Series	Assa Abloy Australia Pty Ltd	door closer	✓	✓
Lockwood 2000 series	Assa Abloy Australia Pty Ltd	door closer	✓	✓
Lockwood 2500 series	Assa Abloy Australia Pty Ltd	door closer	✓	✓
Lockwood MIWA M803	Assa Abloy Australia Pty Ltd	door closer	✓	✓
Lockwood MIWA 800 series	Assa Abloy Australia Pty Ltd	door closer	✓	✓

**Table 7—Closers**



**To be included in this publication please phone  
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<b>Hardware items for pairs of doors</b>				
			<b>Fire test approvals</b>	
Model	Supplier	Description	E Core	Pyropanel
<b>Floor springs</b>				
Lockwood Efc0 840 series	Assa Abloy Australia Pty Ltd	Floor spring and top pivot	✓	✓
Lockwood 7410	Assa Abloy Australia Pty Ltd	Double action floor spring	✓	✓
<b>Transom closers</b>				
Lockwood Efc0 OTC 5N Series	Assa Abloy Australia Pty Ltd	Overhead transom closer	✓	✓
<b>Sequence selectors</b>				
Lockwood Efc0 A3000 / 4000	Assa Abloy Australia Pty Ltd	Door co-ordinator	✓	✓
<b>Latches (head and centre)</b>				
Lockwood 8530	Assa Abloy Australia Pty Ltd	Head latch	✓	✓
Lockwood 8530 DB	Assa Abloy Australia Pty Ltd	Double bevel centre latch	✓	✓
Lockwood 8530 / 305	Assa Abloy Australia Pty Ltd	Head latch with turn snib	✓	✓
Lockwood 8530 / 353	Assa Abloy Australia Pty Ltd	Head latch with turn snib	✓	✓

**Table 8—Hardware items for pairs of doors**

**To be included in this publication please phone  
(02) 9416 0451 or email [hardware@pfpa.com.au](mailto:hardware@pfpa.com.au)**

Hardware items for pairs of doors				
			Fire test approvals	
Model	Supplier	Description	E Core	Pyropanel
<b>Roller carriages</b>				
<b>Track</b>				
<b>Speed limiting devices</b>				

**Table 9—Hardware for sliding doors**

**To be included in this publication please phone  
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Other items of hardware				
			Fire test approvals	
Model	Supplier	Description	E Core	Pyropanel
<b>Push - pull plates</b>				
Lockwood Efco 175 series	Assa Abloy Australia Pty Ltd	Brass push pull plate and handle	✓	✓
Lockwood Efco 194 series	Assa Abloy Australia Pty Ltd	Brass push pull plate and handle	✓	✓
<b>Door viewers</b>				
Lockwood 160	Assa Abloy Australia Pty Ltd	Security door viewer	✓	✓
<b>Door hold open devices</b>				
Lockwood XXX EMHSSS Series	Assa Abloy Australia Pty Ltd	Electromagnetic door hold open device	✓	✓
Smoke Control	DorGard	Audible door hold open device	✓	✓
<b>Electromagnetic locks</b>				
Lockwood GI300	Assa Abloy Australia Pty Ltd	Electromagnetic door lock	✓	✓

Table 10—Other items of hardware



## Supplier Contact Details

# ASSA ABLOY

**Assa Abloy Australia Pty Ltd**

### Victoria - Head Office:

50 Edward Street  
Oakleigh VIC 3166  
Phone: (03) 8574 3888  
Fax: (03) 8574 3788

[www.assaabloyasiapacific.com](http://www.assaabloyasiapacific.com)



### Raven Products Pty Ltd

18-22 Aldershot Road,  
PO Box 67 Lonsdale,  
SA 5160  
Phone: 1800 888 123 (toll free)  
Fax: (08) 8382 8885

[www.raven.com.au](http://www.raven.com.au)



### Lorient Australia

29/9 Powells Road  
Brookvale NSW 2100  
Phone: (02) 9907 3844  
Fax: (02) 9907 3855

[www.lorient.com.au](http://www.lorient.com.au)



### Smoke Control

Suite 18/12 Tryon Rd  
Lindfield NSW 2070  
Phone: 1300 665 471  
Fax: (02) 9416 0657

[www.smokecontrol.com.au](http://www.smokecontrol.com.au)



### Pyropanel

122 - 124 Beresford Road  
Lilydale, VIC 3140  
Phone: (03) 9735 5688  
Fax: (03) 9739 5772

[www.pyropanel.com.au](http://www.pyropanel.com.au)



### Trafalgar Services / Building Products

25 Mitchell Road  
Brookvale NSW 2100  
Phone: (02) 9938 5499  
Fax: (02) 9938 7019

[www.trafalgarbp.com.au](http://www.trafalgarbp.com.au)

