Mechanical Performances - General:

When considering door assemblies for public buildings or dwellings there is a tendency to concentrate on a particular secondary performance e.g. fire performance, acoustic properties etc. This can lead to an oversight of the basic function of a door which is to provide a means for 'traffic' to pass from one side of a wall to the other.

To perform satisfactorily and to provide for other performances, the door must work reliably over a long period of time and often under conditions where the doors are subjected to abuse. If the door does not operate properly then all of the other performances that might otherwise be attributed to the particular location are likely to be undermined.

The term 'Mechanical Performance' is used in this section to identify a wide range of door assembly loading and durability testing that my be specified in general or specific terms to suit the requirements of a particular project including requirements for security doors.

It is important to appreciate that tests of this nature apply to the door assembly as a whole and in some cases the testing is specific to a particular design including all related hardware and glazing.

Pacific Rim Wood UK Ltd. have carried out numerous tests with various partners where the FLAMEBREAK™ door core was used as the basic door leaf construction. This evidences provides confidence with regard to the potential performance of the FLAMEBREAK™ core.

DD171:
Strength and durability testing for door assemblies is defined by reference to DD171 - '*Guide to specifying performance requirements for hinged or pivoted doors (including test methods)'.*

More recently, European standards have been introduced to replace some of the tests described in DD171. ***(See page 11.2).***

The testing of door assemblies using FLAMEBREAK™ door cores has been carried out by Chiltern Dynamics using all of the DD171 tests but substituting the particular DD171 tests with the alternative EN tests where applicable. For the European tests, BS EN 947 ~ 950 describe the test methods with classifications defined by reference to BS EN 1192.

NOTE: Door assemblies using FLAMEBREAK™ based doors have been tested to performances that exceed the DD171 / BS EN 1192 minimum requirements for 'Severe Duty' applications. *(See page 2):*

Test Report Ref: Chilt/P10056/02 June 2010:

Test BS EN 947 - Severe Duty requirement = 1000N - tested to 1250N.

Test BS EN 948 - Severe Duty requirement = 350N - tested to 438N.

Test DD717 Test Ref: 4.3 - Severe Duty requirement = 150 Impacts - tested to 200 Impacts.

Test DD717 Test Ref: 4.9 - Severe Duty requirement = 200N. - tested to 300N.

Test DD717 Test Ref: 4.10 - Severe Duty requirement = 200 Impacts - tested to 300 Impacts.

PAS23:
For dwellings, specifications may call for PAS 23 related test data. PAS23 *'General performance requirements for door assemblies - Part 1: Single leaf, external door assemblies to dwellings'* requires mechanical testing similar to the DD171 tests but is extended to include Cyclic, Air Permeability, Watertightness and Wind Resistance testing.
NOTE: Cyclic testing may be specified separately by reference to BS EN 1191 with classifications defined by reference to BS EN 12400.

PAS24:
PAS24 *'Enhanced security performance requirements for door assemblies - Part 1: Single and double leaf, hinged external door assemblies to dwellings.* This is a security door standard that is supported by ACPO *(Association of Chief Police Officers)* under the 'Secure by Design' initiative.

LPS (Loss Prevention Standard):
Specifications may require door assembly designs to satisfy LPS ratings with the tested door assemblies approved by the Loss Prevention Certification Board.
(See page 11.5).

BS EN 1627 ~ 1630:
European test and classification standards similar to LPS requirements.

NOTE: Test standards for security door assemblies e.g. PAS24, LPS 1175 & EN 1627 ~ 1630 tests are essentially reactive standards. i.e. The test methods include manual attack elements that are constantly being amended as villains discover new and more sophisticated ways to overcome security design elements. Specifications for door assemblies of this type should include required test standard revision references.

DD171 & BS EN 1192 Mechanical Testing:

Strength and durability testing for door assemblies is defined by reference to DD171 - '*Guide to specifying performance requirements for hinged or pivoted doors (including test methods)'.*

British Standard Draft for Development DD171 : 1987 provides a means for the testing of complete door assemblies that are subjected to various levels of abuse to allow for the evaluation of mechanical performances.

More recently, European tests have been adopted that replace some of the mechanical tests described by reference to DD171. Where this has occurred, the EN tests are used but the DD171 tests have been retained in the United Kingdom where these have not been substituted by the European standards.

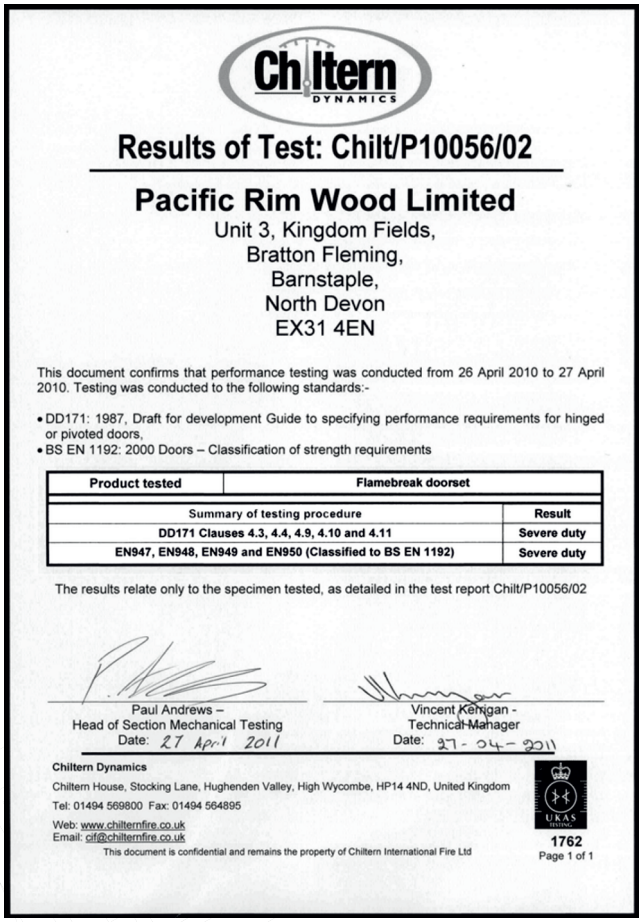
The following guidance is given to explain the grading system used by reference to DD171 for determining mechanical performance properties:

LD = Light Duty : Low frequency use by those with a high incentive to exercise care. e.g. by private house owners - small risk of accident occurring or abusive use.

MD = Medium Duty : medium frequency use primarily by those with some incentive to exercise care - some chance of accident occurring or mild abuse.

HD = Heavy Duty : High frequency use by public and others with little incentive to exercise care. Risk of accident with probability of some abuse. e.g. offices, particularly offices open to the public.

SD = Severe Duty : High frequency use with risk of accidental damage and possibility of violent abusive usage. e.g. Hospitals, Educational Establishments.



Chiltern DYNAMICS

Results of Test: Chilt/P10056/02

Pacific Rim Wood Limited

Unit 3, Kingdom Fields,
Bratton Fleming,
Barnstaple,
North Devon
EX31 4EN

This document confirms that performance testing was conducted from 26 April 2010 to 27 April 2010. Testing was conducted to the following standards:-

- DD171: 1987, Draft for development Guide to specifying performance requirements for hinged or pivoted doors,
- BS EN 1192: 2000 Doors – Classification of strength requirements

Product tested	Flamebreak doorset
Summary of testing procedure	Result
DD171 Clauses 4.3, 4.4, 4.9, 4.10 and 4.11	Severe duty
EN947, EN948, EN949 and EN950 (Classified to BS EN 1192)	Severe duty

The results relate only to the specimen tested, as detailed in the test report Chilt/P10056/02

Paul Andrews –
Head of Section Mechanical Testing
Date: 27 April 2011

Vincent Kerrigan -
Technical Manager
Date: 27-04-2011

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UKAS TESTING 1762

Page 1 of 1

Door assemblies based upon the use of FLAMEBREAK™ door cores have been successfully tested with testing extended to exceed the minimum requirements of D171 and BS EN 1192 for 'Severe Duty' performances.

Comparisons of DD171 & BS EN 1192 Mechanical Tests.

DD171						European Standards					
		Classification									Classification Document
TEST	Test Ref.	LD	MD	HD	SD	TEST					
Slam shut test	*4.3*	10 times	20 times	100 times	200 times	*No test*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*
Slam open test	*4.4*	5J	25J	50J	50J	*No test*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*
Heavy body impact	*4.5*	20J	40J	100J	150J	EN949	30J	60J	120J	180J	EN 1192
Hard body impact	*4.6*	2J	3J	5J	8J	EN950	1.5J	3J	5J	8J	EN 1192
Torsion	*4.7*	400N	400N	400N	400N	EN948	200N	250N	300N	350N	EN 1192
Downward Deflection	*4.8*	500N	500N	500N	500N	EN947	400N	600N	800N	1000N	EN 1192
Closure against obstruction	*4.9*	200N	200N	200N	200N	*No test*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*
Resistance to jarring	*4.10*	50 Impacts	100 Impacts	150 Impacts	200 Impacts	*No test*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*
Abusive force to handle	*4.11*	750N	750N	750N	750N	*No test*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*

PAS23 & PAS24:

Door assemblies manufactured using FLAMEBREAK™ cores have been successfully tested to meet PAS 23 and PAS 24 performances requirements, thus demonstrating the potential of FLAMEBREAK™ door cores to provide for the general performance requirements and enhanced security performances for external door assemblies to dwellings.

PAS 23 (*Product Assessment Specification - General Performance Requirements*) provides for a number of durability and mechanical tests, similar in many respects to DD171 including tests for:

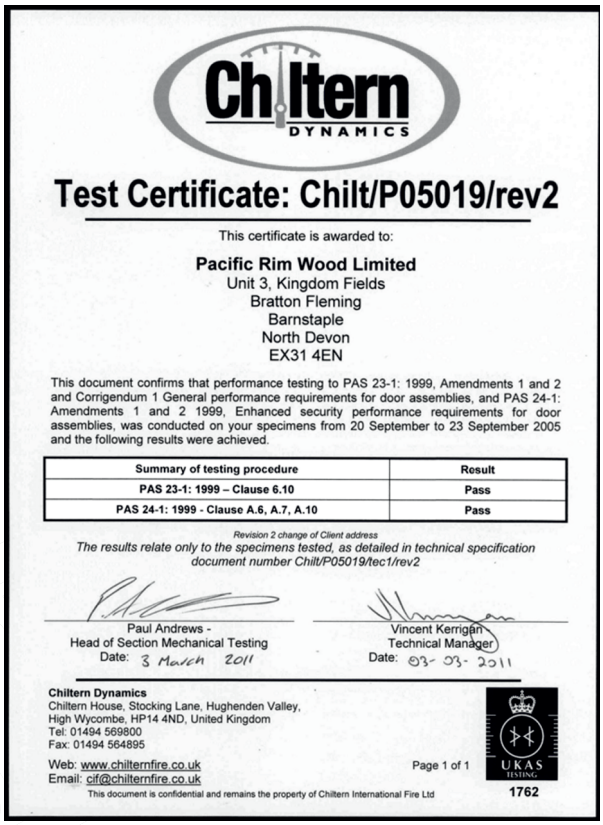
- Resistance to static torsion.
- Operating forces.
- Resistance to vertical loads.
- Slamming resistance.
- Closure against obstructions.
- Abusive forces on handles.
- Resistance to soft & heavy body impact.
- Resistance to hard body impact.
- Resistance to thermal variation.
- Resistance to humidity.

In addition to the above, PAS 23 requires testing for weather tightness and a cycling test (50,000 cycles) that must be achieved without detriment to the operation of the door assembly.

PAS 24 (*Product Assessment Specification -Enhanced Security Performance*) provides for testing of door assemblies in respect of resistance to opportunists attacks. This standard is supported by the Association of Chief Police Officers and forms a core element of the 'Secure by Design' initiative that is promoted by many Local Authorities.

It is important to recognise that PAS 23 and PAS 24 testing is related to a prescribed door assembly complete with all glazing, seals and hardware. Any variation to size, detail or fittings will generally require re-testing. However, the specimens that achieved satisfactory PAS 23, PAS 24 performances were based upon the use of the FLAMEBREAK™ 430 core, it has therefore been possible to assess other FLAMEBREAK™ door core types as providing for suitable alternative core constructions, without adversely affecting the performance of a door that otherwise conforms with the tested details. ***See Chiltern Dynamics Assessment Ref: Chilt/P06015 February 2006***

NOTE: PAS23 Clause 6.2 Weathertightness test data applies to plywood faced FLAMEBREAK™ products only. i.e. Types 430, 630 & 660. MDF versions FLAMEBREAK™ FF630 & FF660 should not be used in external locations.



Chiltern DYNAMICS

Test Certificate: Chilt/P05019/rev2

This certificate is awarded to:

Pacific Rim Wood Limited
Unit 3, Kingdom Fields
Bratton Fleming
Barnstaple
North Devon
EX31 4EN

This document confirms that performance testing to PAS 23-1: 1999, Amendments 1 and 2 and Corrigendum 1 General performance requirements for door assemblies, and PAS 24-1: Amendments 1 and 2 1999, Enhanced security performance requirements for door assemblies, was conducted on your specimens from 20 September to 23 September 2005 and the following results were achieved.

Summary of testing procedure	Result
PAS 23-1: 1999 – Clause 6.10	Pass
PAS 24-1: 1999 - Clause A.6, A.7, A.10	Pass

Revision 2 change of Client address
The results relate only to the specimens tested, as detailed in technical specification document number Chilt/P05019/tec1/rev2

Paul Andrews - Head of Section Mechanical Testing
Date: 3 March 2011

Vincent Kerrigan Technical Manager
Date: 03-03-2011

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Page 1 of 1

UKAS TESTING 1762

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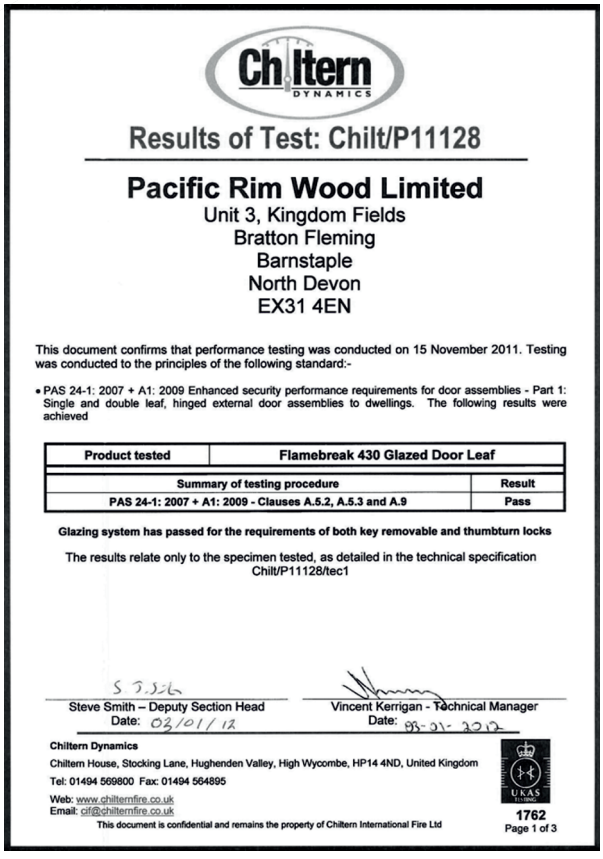

Chiltern DYNAMICS

Results of Test: Chilt/P11128

Pacific Rim Wood Limited
Unit 3, Kingdom Fields
Bratton Fleming
Barnstaple
North Devon
EX31 4EN

This document confirms that performance testing was conducted on 15 November 2011. Testing was conducted to the principles of the following standard:-

- PAS 24-1: 2007 + A1: 2009 Enhanced security performance requirements for door assemblies - Part 1: Single and double leaf, hinged external door assemblies to dwellings. The following results were achieved

Product tested	Flamebreak 430 Glazed Door Leaf
Summary of testing procedure	Result
PAS 24-1: 2007 + A1: 2009 - Clauses A.5.2, A.5.3 and A.9	Pass

Glazing system has passed for the requirements of both key removable and thumbturn locks

The results relate only to the specimen tested, as detailed in the technical specification Chilt/P11128/tec1

Steve Smith – Deputy Section Head
Date: 03/01/12

Vincent Kerrigan - Technical Manager
Date: 05-01-2012

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Page 1 of 3

LPS Security ratings:

Some specifications may call for security door performances to meet LPS rating requirements.

Otherwise, private specifications may use the LPCB approved methods as a basis for determining test methods with modifications to meet specific risks identified by the Client and related to particular project considerations.

Guide to Security Standards for Doors & Windows

This leaflet is an aid to help you determine whether a product has the appropriate level of security for its application and risk factor. It is a clear comparison between established security standards appropriate for the protection of windows and doors against burglary. For more details please refer to the actual standards or see the websites listed below.

To ensure that a product conforms to these standards, it is important that products be certified by a UKAS accredited certification body rather than be type tested. Certification ensures that the manufacturer continues to produce products to this high standard, particularly relevant for higher risk situations.

To verify certification, ask to see a valid certificate or check with the relevant certification body.

The selection of the appropriate physical protection for windows and doors will depend on a number of issues including the following:

- The location of the door/window.
- The location of the property.
- The value of the property.
- The value or desirability of the goods or information within the premises.
- The risks relating to the loss of, or interruption to business.
- The use of additional security products and technology, including CCTV, intruder detection equipment and asset market systems.

The standards of product performance specified in this chart should therefore be

Application	Minimum Performance Required	Notes
HIGH RISK **Very high security Doorsets.** LPS1175 SR 5 certification is a minimum standard for high risk situations.	**LPS1175 Security Rating (SR) 6** **LPS1175 SR 5**	Products certified to these security standards have resisted a series of professional attack tests each lasting up to 30 minutes using a wide variety of powerful mains operated tools.
MEDIUM RISK **Doorsets or Rolling Shutters for door and window openings.** LPS1175 SR 3 certification is a minimum standard for medium risk situations.	**LPS1175 SR 4** **LPS1175 SR 3**	Products certified to these security standards have resisted a series of professional attacks, each lasting up to 30 minutes (SR 4) or 20 minutes (SR 3), using a wide variety of battery operated power tools.
LOW RISK **Doorsets, Rolling Shutters, Security Grilles or Windows for door and window openings.** BS.PAS 24 or LPS1175 SR 1 certification is a minimum standard for low risk situations.	**LPS1175 SR 2** **BS.PAS24**[1] **LPS1175 SR 1 and BS7950**[2]	Products certified to these security standards have resisted a series of professional attacks, each lasting up to 15 minutes (SR 2 & PAS 24) or 10 minutes (SR 1) using a variety of hand tools such as hammers, crowbars, chisels and hacksaws.
MINIMUM **Locking devices for doors & windows.** Locks should be independently certified to BS3621 or incorporate cylinders that have been independently certified to EN1303, as a minimum protection.	**BS3621 and EN1303 Grades 4-6**	These standards cover the mechanical performance of the lock-set or cylinder for doors. They do not guarantee the resistance of the door to which they are fitted, although they can enhance the resistance to certain forms of attack.

www.brecertification.co.uk www.securedbydesign.com www.bsia.co.uk

This leaflet has been prepared with the support of the above organisations. It should not be inferred that these organisations endorse specific products that meet these security standards, as each organisation has criteria for accrediting a particular company or product. No commercial reference to these organisations or their logos may be made without written agreement of the organisations concerned.

Each manufacturer will have their own preferences with regard to the construction of door assemblies intended for DD171 'severe duty' or security door applications.

Notwithstanding the performance achieved by testing, the following is provided by way of guidance for consideration where additional reinforcement might be required to suit door assemblies for use in locations that might be vulnerable to heavy impact attack.

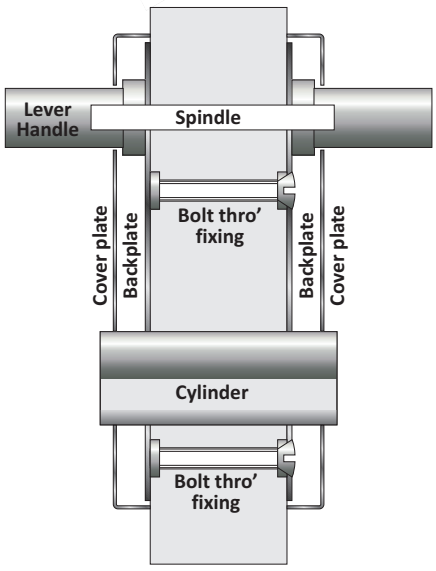
Hardware Enhanced fixing:

Hinges & Hanging Devices: Whereas successful testing has been carried out using wood screws, the use of minimum1 1/2in. No. 10 fully threaded 'twinfast' or chipboard screws is recommended for the fixing of load bearing items of hardware to FLAMEBREAK™ door constructions. In any event, pilot holes should be drilled to receive screw fixings in both the door leaf and the frame.

Locks / Latches: Under heavy and abusive impact all wood door constructions may split at the lock / latch positions. The use of backplates with bolt through fixings is recommended to strengthen doors at these positions.

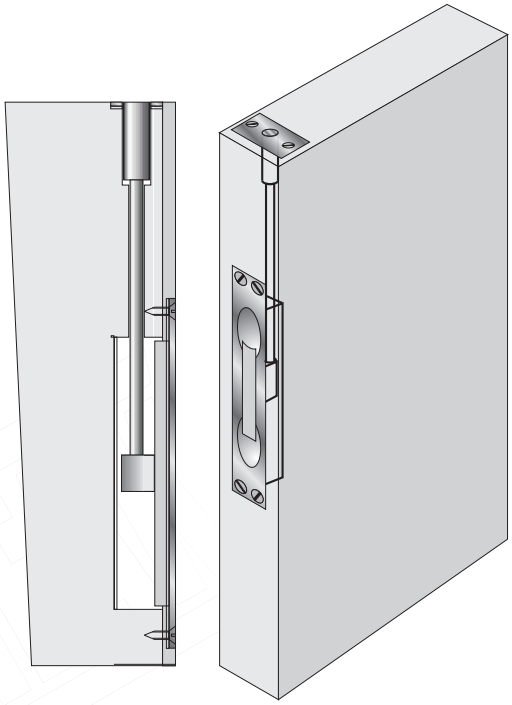
Recommended Lock / Latch fitting. *Fig. 11.1*

The use of backplates with bolt through fixings provide a means for clamping the door at lock / latch positions to improve resistance to splitting.



Concealed rod type Flush bolt. *Fig. 11.2*

The use of concealed rod type flush bolts provides for improved resistance to splitting when doors are subjected to impact forces.



Other Hardware:

- Surface mounted hardware such as kick & buffer plates can generally be used without detriment to mechanical performance.

NOTE: The use of PVC protection plates is recommended in preference to metal plates. Sharp edges can be created when using metal plates, (particularly aluminium) resulting from impact damage with a consequent risk to users of a building.

- It is recommended that pull handles should be of the 'bolt-through' type used in conjunction with load spreading washers on the bolted face with pull handle fixings covered by a finger plate.

- Surface mounted Emergency Exit & Panic devices and surface mounted barrel bolts can generally be used without weakening the door construction.

- Edge fixed flush bolts can weaken the door construction in a similar manner to locks and latches. Use of 'concealed rod' type edge fixed flush bolts is recommended as a preferred alternative to edge fixed flush bolts for mechanical strength purposes.