Frame Materials & Specifications:

Details in this section show minimum dimensions for frames for use with fire rated doorsets.

Frame materials for use with fire doors should comply with the recommendations to be found by reference to BS8214 : 2008.

Frame material for FD30 doorsets may be softwood or hardwood of not less than 510kgs/m^3 density @15% moisture content. OR, Min. 700kgs/m^3 MDF.
NOTE: MDF frames are not approved for storey height frames with transoms.

Frame material for FD60 doorsets must be hardwood of not less than 640kgs/m^3 @ 15% moisture content.

The minimum quality standard for frames for fire doorset applications defined by reference to BS EN942 : 2007 Class J30. *(Equating to BS 1186 Pt.1 Class 2).*
NOTE: All timber used for fire rated doorset including frames, lippings & beading, must meet or exceed Class J30 as specified in BS EN 942 : 2007, any defects should be repaired and, as far as possible, orientated away from areas of intumescent seal activation.

Frames must be installed plumb and square and assembled with mortice and tenon, mitred, butt or half lap joints with mechanical assembly fixings *(e.g. screwed)*. All joints must be of a tight fit.
NOTE: Joints may be glued and screwed.

Unless otherwise stated in project specifications: The moisture content of material used for frames should be 9 - 13% average. moisture content before the application of finishes, as required by reference to BS EN 942 : 2007 for internal joinery designed for use in heated buildings providing room temperatures of 12°C to 21°C.

NOTE: For 'Q' Mark fire rated doorsets refer to 'Section 2 - FLAMEBREAK Fire Door Applications'.

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Pacific Rim Wood Ltd., recommends the use of timber obtained from FSC approved sources.

Structures:

It is the Designers responsibility to ensure that structures to receive fire doorsets comply with National and Local Regulations and that they are suitable for the design performance.
NOTE: Refer to the various parts of BS9999 for further guidance.

The fire test / assessment data applicable to FLAMEBREAK© based doorsets anticipates that the doorsets will be fitted into blockwork, brickwork, concrete, (or similar). OR, timber stud partitioning.

Where doorsets are to be fitted into metal stud partitioning, the hollow metal stud at the doorset positions must be filled with softwood unless the partitioning manufacturer can provide for fire test / assessment data to demonstrate that this is not necessary.

The finished partition thickness shall not be less than the partition thickness described for the door frame.

The gap between the frame and the surrounding structure must be treated in accordance with the recommendations to be found by reference to BS 8214 : 2008 according to performance. OR, as recommended by reference to: *Section 14 - Fire Door Installation.*

Architrave:

The use of architrave is recommended for fire doors. These should be Min. 12mm thickness and conform with the material specifications applicable to frames for the relevant fire performance. The architrave must cover the gap between the frame and the surrounding structure. *(See Section 14 - Fire Door Installation).*

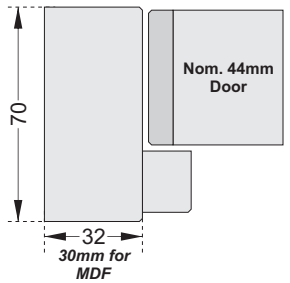
Where the doorset is fitted within the partition thickness, the architrave should be scribed on site to suit the wall conditions.

Intumescent mastics, ceramic cords and similar products may be used in lieu of architrave where these have a proven performance under fire test conditions with wood doorsets. These materials must be used strictly in accordance with the manufacturers handling and use instructions.

Minimum Recommended Frame Dimensions FD30 Doorsets.

ADVICE: MDF frames may be substituted for softwood or hardwood frames for FD30 door height doorset applications. (Not approved for storey height doorsets with transoms).
See Section 2 - Fire Door Applications and Section 4 - Intumescent Seals for further details.

Fig. 7.1

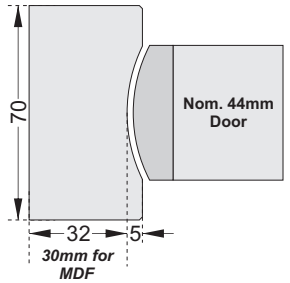


Recommended minimum frame dimensions for FD30 Single Action Doorsets.

- Frame material to be softwood or hardwood of minimum 510kg/m^3 density *(@15% moisture content),* complying with Class J30 BS EN 942 : 2007.
- 700kg/m^3 density MDF.

NOTE: The 32mm section dimension for the frame is reduced from 32mm to 30mm for use with MDF frames.

Fig. 7.2



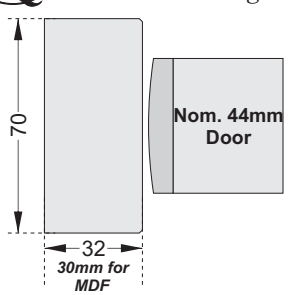
Recommended minimum frame dimensions for FD30 Double Action - Hanging Jambs

- Frame material to be softwood or hardwood of minimum 510kg/m^3 density *(@15% moisture content),* complying with Class J30 BS EN 942 : 2007.
- 700kg/m^3 density MDF.

NOTE 1: The 32mm section dimension for the frame is reduced from 32mm to 30mm for use with MDF frames.

NOTE 2: The radius at the hanging stile will usually be determined by the location of the double action pivot centre. A 50mm radius to the door edge will suit most popular brands of double action fittings, with a 52mm radius scallop in the frame.

Fig. 7.3



Recommended minimum frame dimensions for FD30 Double Action - Closing Jambs

- Frame material to be softwood or hardwood of minimum 510kg/m^3 density *(@15% moisture content),* complying with Class J30 BS EN 942 : 2007.
- 700kg/m^3 density MDF.

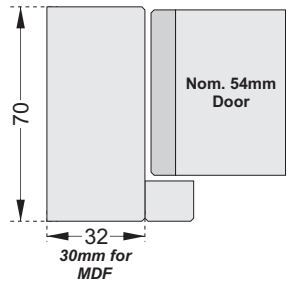
NOTE: The 32mm section dimension for the frame is reduced from 32mm to 30mm for use with MDF frames.

Minimum Recommended Frame Dimensions FD60 Doorsets.

Recommended minimum frame dimensions for FD60 Single Action Doorsets.

- Frame material to be hardwood of minimum 640kg/m^3 density *(@15% moisture content),* complying with Class J30 BS EN 942 : 2007.

Fig. 7.4

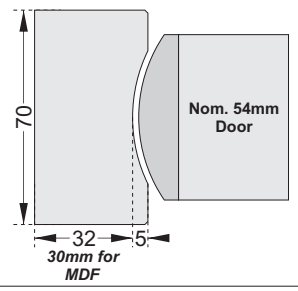


Recommended minimum frame dimensions for FD60 Double Action - Hanging Jambs

- Frame material to be hardwood of minimum 640kg/m^3 density *(@15% moisture content),* complying with Class J30 BS EN 942 : 2007.

NOTE: The radius at the hanging stile will usually be determined by the location of the double action pivot centre. A 50mm radius to the door edge will suit most popular brands of double action fittings, with a 52mm radius scallop in the frame.

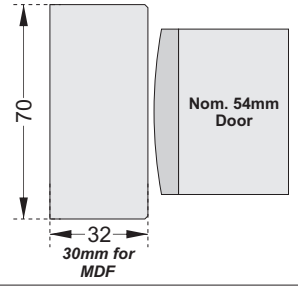
Fig. 7.5



Recommended minimum frame dimensions for FD60 Double Action - Closing Jambs

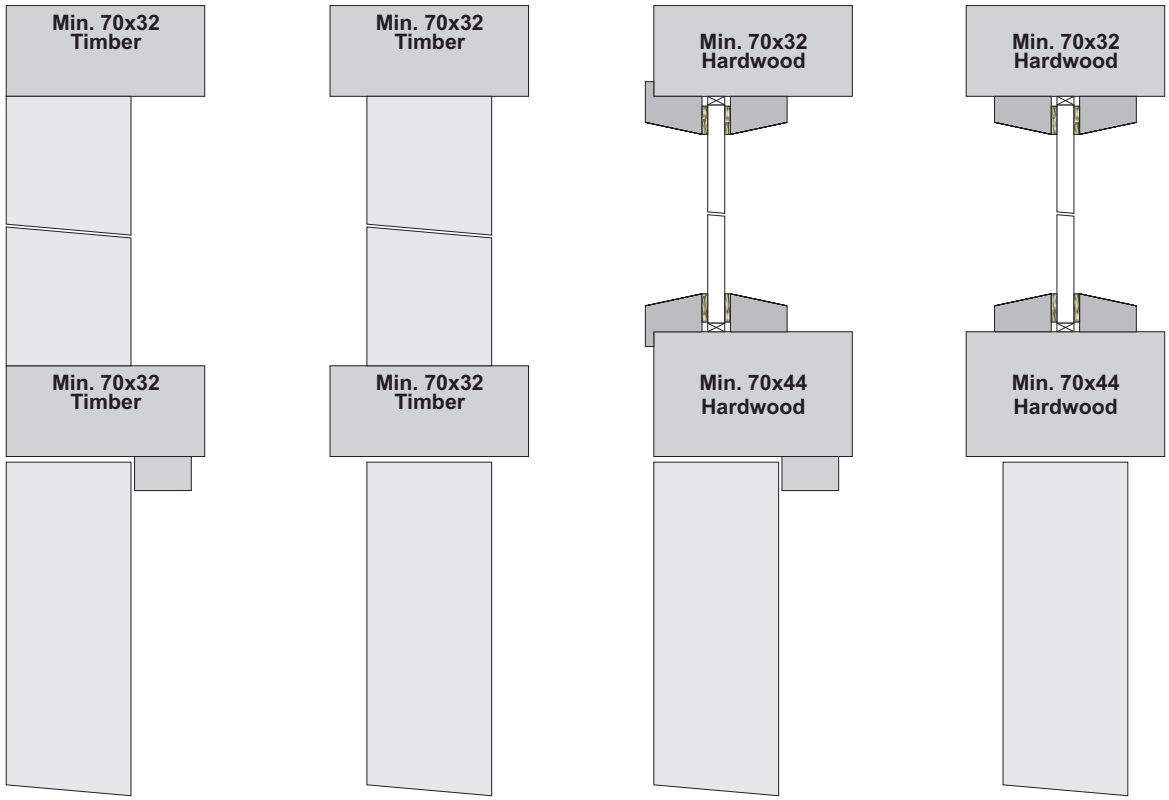
- Frame material to be hardwood of minimum 640kg/m^3 density *(@15% moisture content),* complying with Class J30 BS EN 942 : 2007.

Fig. 7.6



Doorsets with Transoms FD30 & FD60.

Fig. 7.7



NOTE: A 44mm transom section recommended for double action doorsets to receive double action pivot fixings.

Transomed Overpanels:

For doorsets with transomed overpanels, the transom rail must be softwood or hardwood *(to suit fire rating)* with minimum section of 70x32mm.

The overpanel must located to align with the centre thickness of the door leaf and secured using steel screw fixings passing through the rear of the frame to align centre thickness of the panel to a minimum depth of 30mm into the panel. Fixings should be located not more than 100mm from each corner and at not more than 250mm centres. Overpanels must be fitted tight to the frame with no gaps.

Glazed Fanlights:

Transom rails for doorset designs using glazed fanlights for either FD30 or FD60 applications are to be of a minimum 70x44mm section and manufactured using hardwood with a minimum density of 640kg/m3 *(@15% moisture content)*.

The glass and glazing system used for the fanlight must be able to demonstrate a fire performance that is at least equal to the required doorset performance when tested as a window or screen in accordance with BS476 Pt.22 : 1987 or BS EN 1634-1 : 2000.

NOTE 1: For 'Q' mark applications the clear glass fanlight height for fire rated doorsets must not exceed 600mm.

NOTE 2: Storey height doorsets with transoms are not approved for use with MDF frames.

Frame Designs for Fire Door Applications:

The design of frames for doorsets is beyond the scope of this manual. However, certain indicative parameters can be advised to illustrate frame designs that can be 'Q' Marked as being suitable for fire door applications up to FD60 *(BS476 Pt.22).*

Materials approved for the manufacture of frames for fire door applications are given by reference to *Section 2 - Fire Door Applications* with further advice concerning the minimum approved sectional dimensions advised by reference to *Pages 7.2 & 7.3.*

Generally frames will fall into two basic categories:
1/ 1st. Fix Frames: Frames that are installed into *(and becoming part of)* the structure in advanced of the application of final finishes to walls or partitions.
NOTE: 1st. Fix frame designs are generally installed while 'wet trades' are still active on site. This can influence the moisture content of timber and induce raised grain. Whereas this might be a suitable option for painted frames the use of 1st. Fix frame designs is not recommended where frame are in polished hardwoods.

2/ 2nd. Fix Frames: Frames that are installed into pre formed *(prepared openings)* in the structure. A 'fitting in' installation gap is required between the frame and the surrounding structure. 2nd. Fix frames can be installed into walls or partitions that are completely finished including the application of decoration.
NOTE: 2nd. Fix frame designs can generally be fitted into completely finished areas of the building allowing for joinery to be delivered at a late stage in the construction programme with a consequent reduction of the risk of damage due to construction activities. The use of 2nd. Fix frame designs is recommended where polished hardwood frames are used.

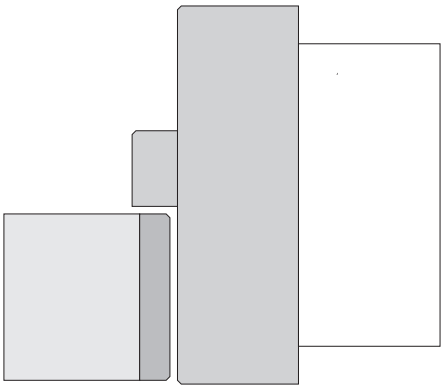
Proposed frame designs for any particular project can be independently assessed by Chiltern International Fire where required.

Method of Jointing:
The following methods of jointing can be used for the construction of frames for fire door applications up to FD60:
Mortise & Tenon Joints.
Butt Joints*.
Half Lapped Joints.
Mitred joints.
Frames may be assembled using dry joints with mechanical *(screw)* fixings or glued and screw fixed.
NOTE: * Butt joints must be bonded using urea formaldehyde adhesives.

The following details are **not** approved for 'Q' Mark applications:

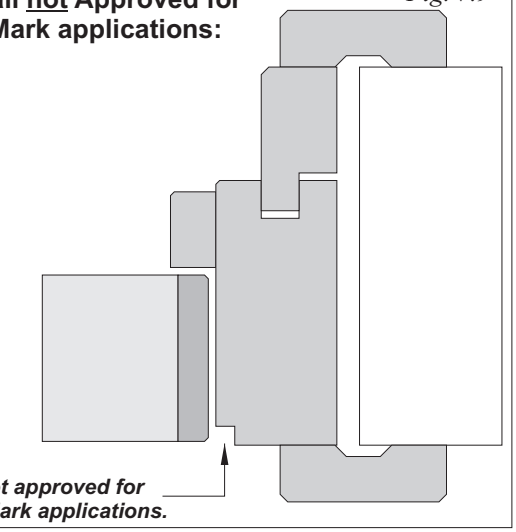
Frames projecting beyond the face of the wall / partition:

Detail not Approved for 'Q' Mark applications: *Fig. 7.8*



Frames with feature rebates to the door leaf or the frame at the operating gap positions between the door leaf and the frame:

Detail not Approved for 'Q' Mark applications: *Fig. 7.9*

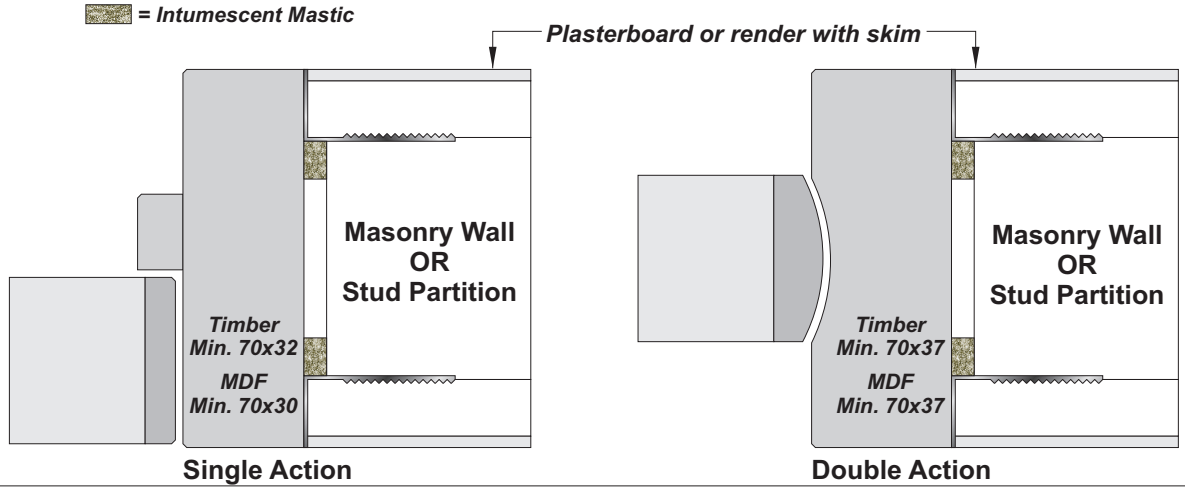


The following illustrates guidance details for frame designs that have been 'Q' Mark assessed as being suitable for fire door applications for performances up to FD60 *(BS476 Pt.22)* subject to the use of materials that are approved for the particular performance by reference to *Section 2 - Fire Door Applications* of this manual.

Flush Frame - No Architrave - (1st. Fix).

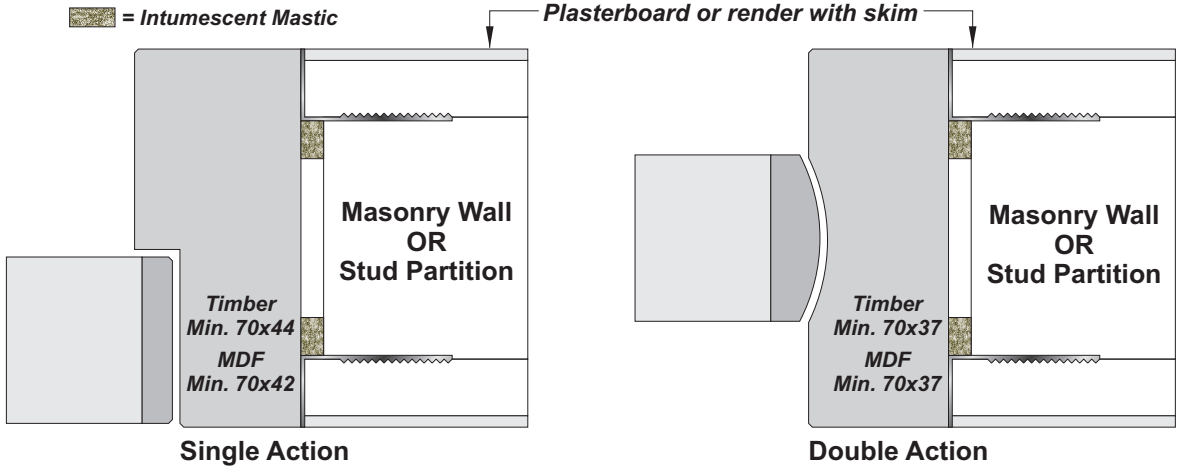
One piece lining with planted doorstop

Fig. 7.10



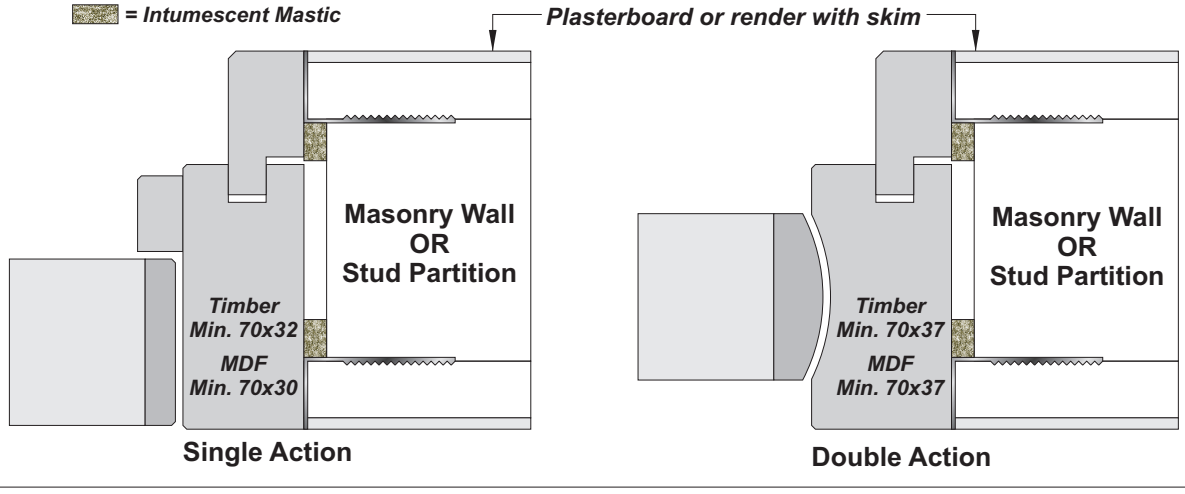
One piece lining with moulded doorstop

Fig. 7.11



Frame with extension lining.

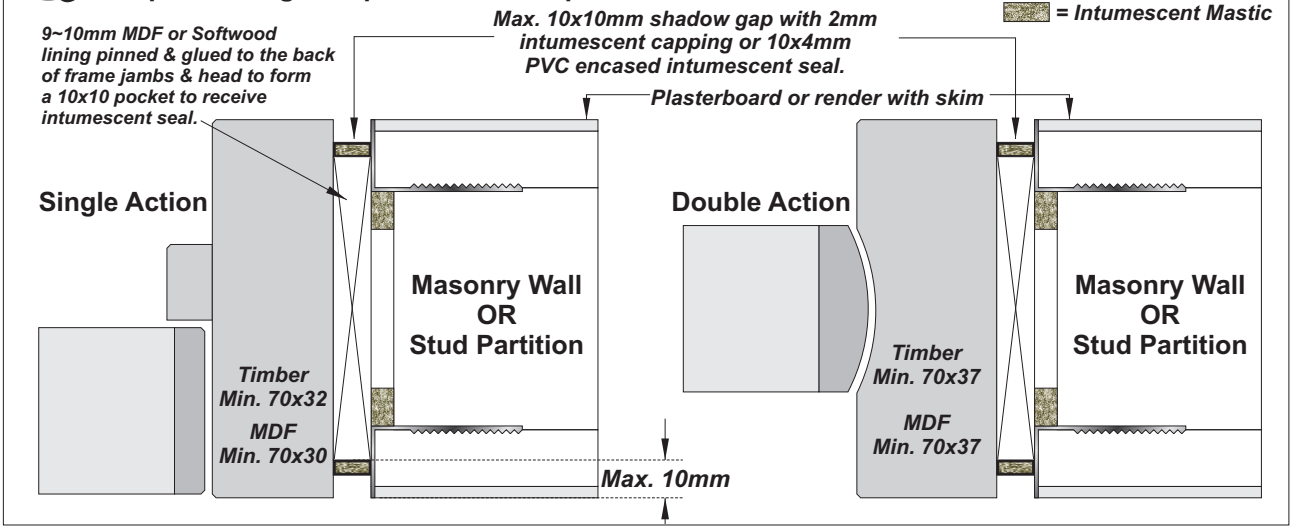
Fig. 7.12



Shadow Gap Frame - (1st. Fix).

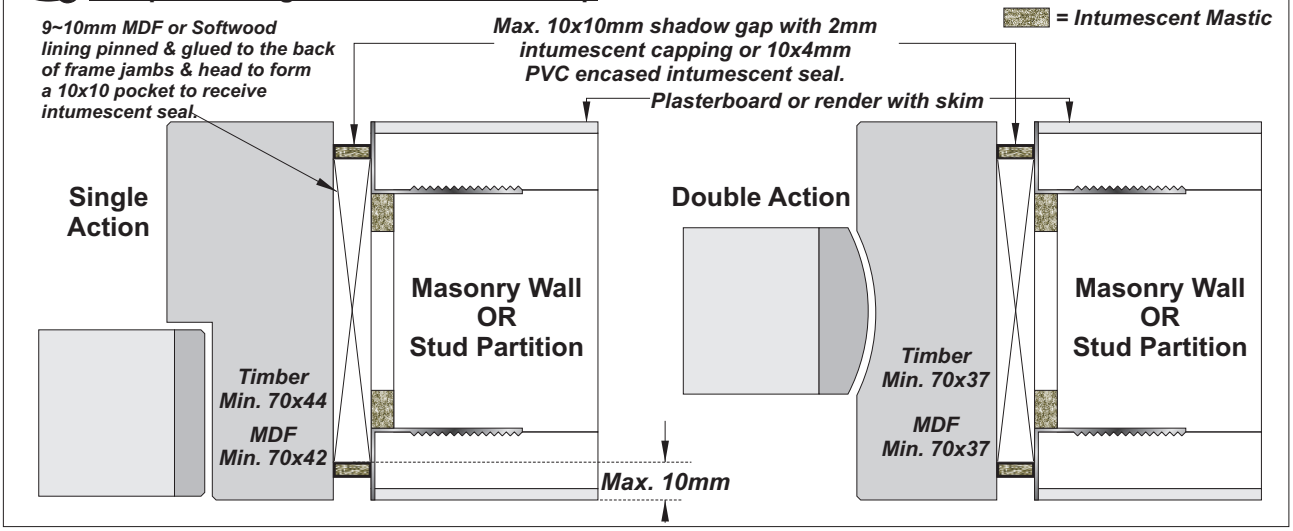
One piece lining with planted doorstop

Fig. 7.13



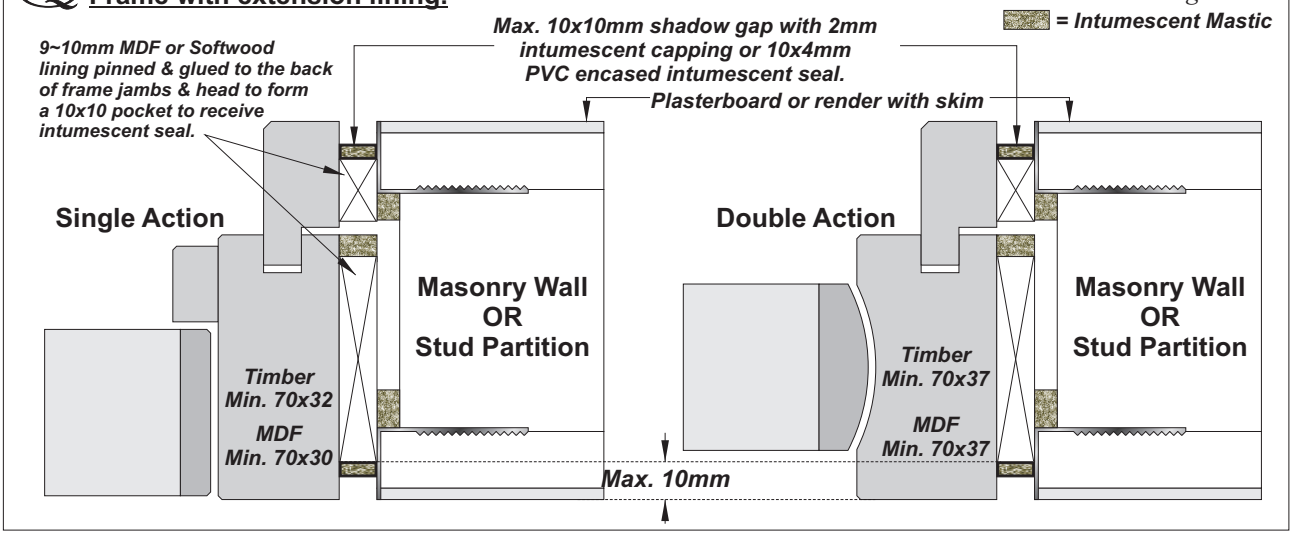
One piece lining with moulded doorstop

Fig. 7.14



Frame with extension lining.

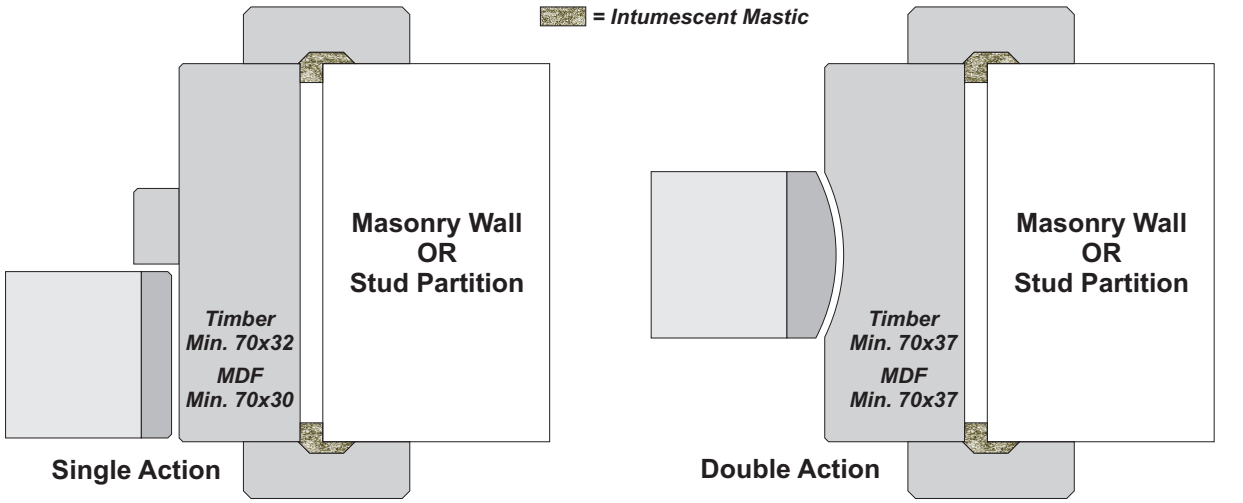
Fig. 7.15



Traditional Frame - With Architrave - (2nd. Fix)

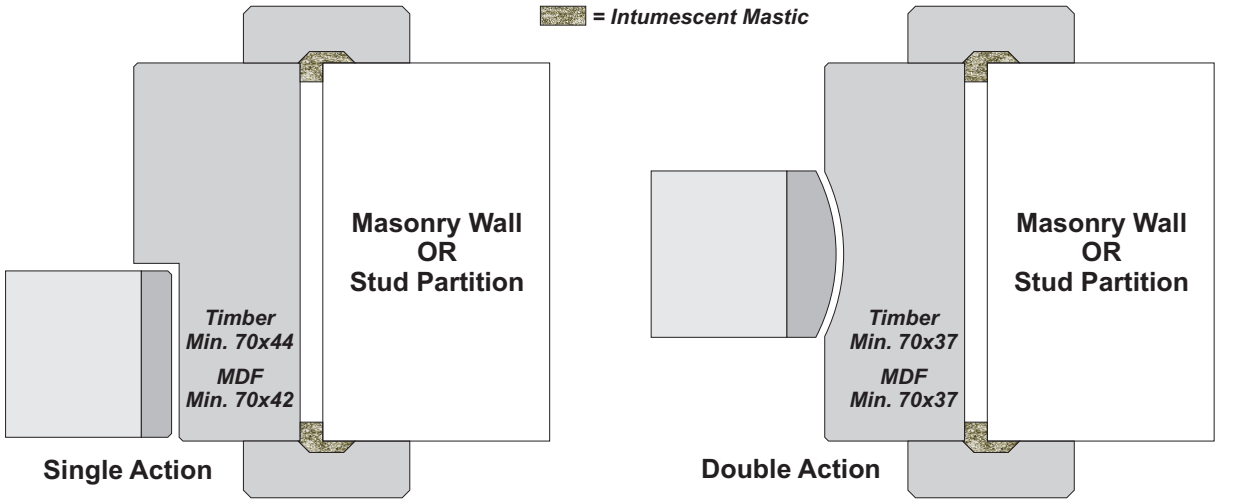
One piece lining with planted doorstop

Fig. 7.16



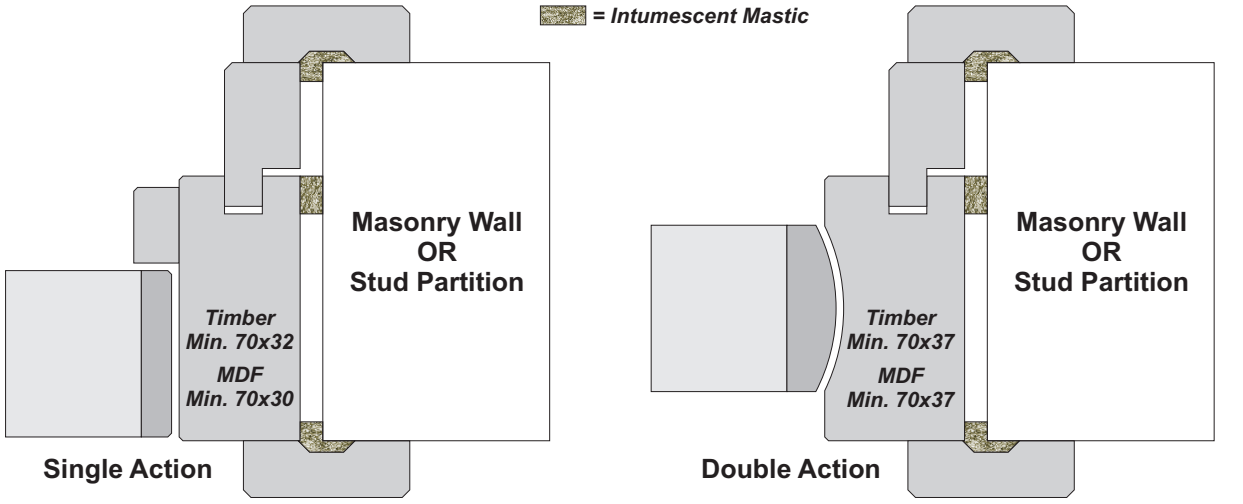
One piece lining with moulded doorstop

Fig. 7.17



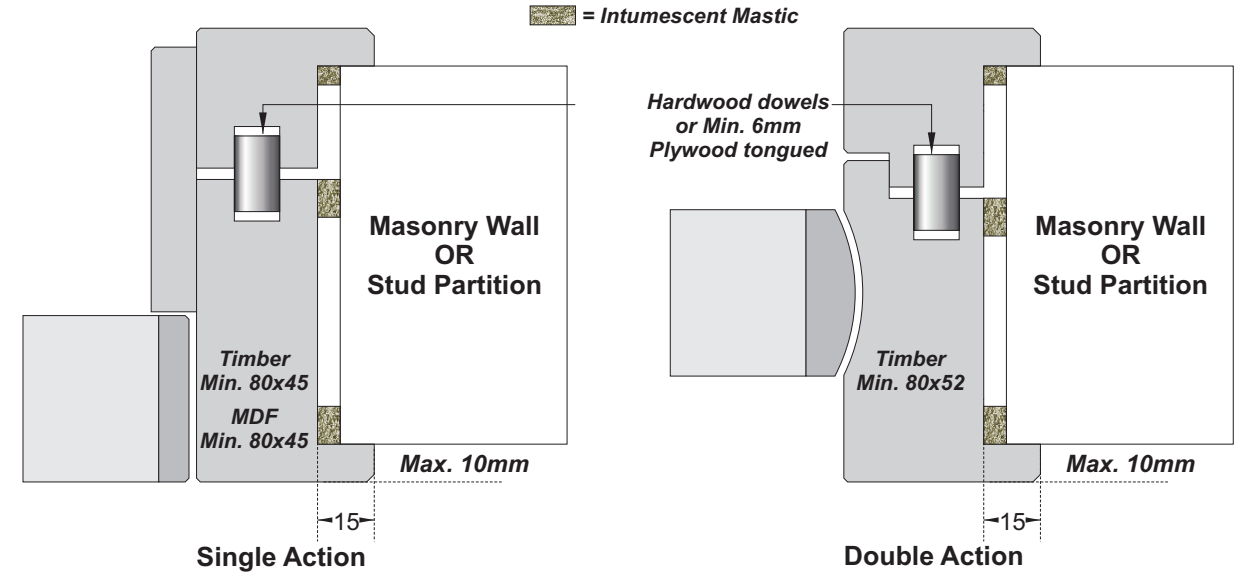
Frame with extension lining.

Fig. 7.18



Split Frame - With Intregal Architrave - (2nd. Fix).

Two piece frame with integral architrave. *Fig. 7.19*



Alternative Frame Intumescent Sealing:

The back of frame components can be grooved to receive low pressure intumescent seals that can be fitted to the frames before installation to provide for an alternative to the use of intumescent mastics.

This option is a preferred method for use with 2nd. Fix frame designs, particularly where used in conjunction with high quality polished hardwoods.

An additional benefit resulting from this method of sealing is that the frame components are more resistant to distortion if subjected to environmental conditions that result in variations to moisture content.

Fig. 7.20

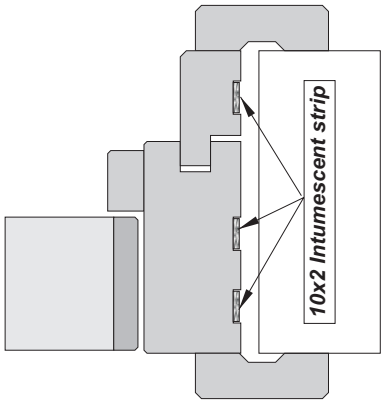
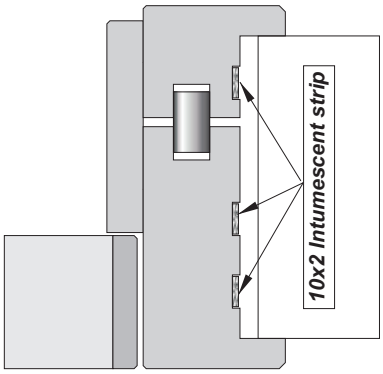


Fig. 7.21



Approved Intumescent material suitable for this application:

2mm Interdens - Dufalite Developments Ltd.
2mm MAP paper - Lorient Polyproducts Ltd.
2mm Therm-A-Strip - Intumencent Seals Ltd.
2mm Pyrostrip 300 - Mann McGowan Fabrications Ltd.

Further guidance relating to the installation of fire rated doorsets with wood frames is given by reference to *Section 14- Fire Door Installation* of this manual.

Softwood and Hardwoods for use with frames for FLAMEBREAK based doors.

1/ The following lists of Softwoods & Hardwoods is culled from BS EN 942 : 2007.
2/ These lists show the nominal density for the species @ 15% moisture content.
3/ The lists identify suitability for fire door applications based upon BS8214 : 2008 recommendations and current fire test / assessment data.
4/ The lists are provided as a guide to users and may not describe all available softwoods or hardwoods.

Frame Materials - Softwoods

Item	Species	*Latin Name*	Characteristics	Avg. Density	Fire Door FD30	FD60
1	**Douglas Fir**	*Pseudotsuga menziesii*	Pale reddish brown heartwood, paler sapwood. Growth rings clearly defined and inclined to show through paint. Discolours in contact with ferrous metal. Non-ferrous fittings and fastenings are recommended. Long clear lengths available.	530Kg/m3	OK	NR
2	**Hemlock, western**	*Tsuga heterphylla*	Pale brown in colour. Growth rings distinguishable. Straight grain, fine even texture. Shipments include amabilis fir (less dense, less strong). Good paint performance in service. Long clear lengths available.	470Kg/m3 to 500Kg/m3	OK	NR
3	**Parana Pine**	*Araucaria angustifolia*	Golden brown, sometimes with red streaks. Straight grain, fine uniform texture, generally available knot free. Liable to distort on machining. Good paint performance in service.	550Kg/m3	OK	NR
4	**Pine, lodgpole**	*Pinus contorta*	Heartwood yellow to pale brown tinged with red, paler sapwood. Where present, knots are small and tight. Resinous smell. Fine even texture, straight grained. Paints well.	470Kg/m3	NR	NR
5	**Pine, ponderosa**	*Pinus ponderosa*	Very wide pale yellow sapwood. Dark yellow to reddish brown heartwood, with fine prominent resin ducts. Paints well, but resin exudation can be troublesome.	480Kg/m3	OK	NR
6	**Pine, southern**	*Pinus echinata, Pinus taeda & others*	Yellow / reddish brown resinous heartwood, paler sapwood. Growth rings distinct, course appearance. Paints fairly satisfactorily	590Kg/m3	OK	NR
7	**Pine, sugar**	*Pinus lambertiana*	Pale straw to reddish brown heartwood, white sapwood. Soft even texture. Paints well.	430Kg/m3	NR	NR
8	**Redwood: Scots pine**	*Pinus sylvestris*	Pale yellowish brown to red brown heartwood, paler sapwood. Medium texture. Growth rings clearly marked. Good paint performance in service.	510Kg/m3	OK	NR
9	**Western Red Cedar**	*Thuja plicata*	Variable reddish brown heartwood, distinct white sapwood. Straight grain, course texture. Discolours in contact with ferrous metal if damp. Non-ferrous fittings and fastenings are recommended. Good paint performance in service. Particularly suited for exterior use.	390Kg/m3	NR	NR
10	**Whitewood**	*Picea abies and Abies alba*	White to pale yellowish brown. Straight grain, rather fine texture. Good paint performance in service.	470Kg/m3	NR	NR

Avg. Density = Average density @ 15% moisture content.

NOTE:
The densities for Softwoods and Hardwoods described in BS EN 942 are the <u>average</u> densities for the particular species at 15% moisture content.
Some species listed as 'NR' may be used for FD30 and FD60 applications where the frame material is selected from available stocks to suit the fire performance density requirement. e.g. American Cherry selected to provide for a minimum density of 640kg/m^3 may be used for FD60 applications.
Similarly, materials listed as 'OK' for fire door applications must provide for the minimum density requirement to suit the fire performance.

Frame Materials - Hardwoods

Item	Species	*Latin Name*	Characteristics	Avg. Density	Fire Door FD30	Fire Door FD60
1	**Abura**	*Hallan ciliata*	Pale brownish coloured heartwood and sapwood, plain appearance. Medium / fine texture. Tendency to split on nailing. Stains well	580Kg/m3	OK	NR
2	**Afromosia**	*Pericopsis elata*	Deep brown heartwood, pale brown sapwood. Medium / fine texture. Discolours in contact with ferrous metal if damp. Pre-bore before nailing.	710Kg/m3	OK	OK
3	**Afzelia**	*Afzelia spp.*	Reddish brown timber, straw coloured spwood. Grain often interlocked, texture course. Pre-bore before nailing. Can stain masonry and textiles if damp.	830Kg/m3	OK	OK
4	**Agba**	*Gossweilerodendron balsamiferum*	Pale pinkish brown heartwood of uniform appearance, sapwood slightly paler (border sometimes indistinct). Medium texture. Resin, resinous odour frequent.	510Kg/m3	OK	NR
5	**Ash, American**	*Fraxinus americana, F. nigra & others.*	Coarse texture. Sapwood nearly white, White ash heartwood greyish brown, tough. Black ash darker, lower density, less tough.	660Kg/m3	OK	OK
6	**Ash, European**	*Fraxinus excelsior*	Generally white to pale brown. Medium / course texture. Very good bending timber, very tough.	710Kg/m3	OK	OK
7	**Beech, European**	*Fagus sylvatica*	Pale reddish brown; if steamed, pink. Fine even texture. Good bending. Stains, polishes well.	720Kg/m3	OK	OK
8	**Birch, yellow**	*Betula alleghaniensis*	Wide variation in colour from cream to reddish brown, can include sweet birch (denser, darker). Fine even texture. Stains and polishes well.	700Kg/m3	OK	OK
9	**Cedar, Central & South American**	*Cedrela odorata, C. fissilis*	Colour pale to dark reddish brown and properties highly variable. Very low density. Occasional interlocked grain, coarse texture. Fragrant odour. Resin exudation, resin pockets may occur.	480Kg/m3	OK	NR
10	**Cherry, American**	*Prunus serotina*	Colour varies from pale straw to reddish brown. Straight fine grain, fine texture. Pith flecks and small gum pockets are common. Stains, polishes well.	590Kg/m3	OK	NR
11	**Chestnut, sweet**	*Castanea sativa*	Yellowish brown heartwood, similar to oak. Sapwood distinct. Course texture, tendancy to spiral grain. Discolours in contact with ferrous metal if damp. Non-ferrous fittings or fastenings are recommended.	560Kg/m3	OK	NR
12	**Elm**	*Ulmus spp.*	Pale greyish brown. Straight but sometimes interlocked grain, course texture. Good bending properties.	580Kg/m3	OK	NR
13	**Guarea**	*a/ Guarea cedrata b/Guarea thompsonii*	Can be brought separately. Pinkish brown colour, sapwood pale. Fine texture, often interlocked grain. a/ occasionally exudes resin.	590Kg/m3 640Kg/m3	OK	NR OK
14	**Idigbo**	*Terminalia ivorensis*	Yellowish to pale yellowish brown colour heartwood, sapwood somewhat paler. Coarse texture. Discolours in contact with ferrous metal, can stain masonry if damp. Non-ferrous fittings or fastenings are recommended.	560Kg/m3	OK	NR
15	**Iroko**	*Milicia excelsa and m. regia*	Colour varies from yellowish brown to dark brown, with pale yellow sapwood. Interlocked grain, coarse texture. Very hard, strong.	660Kg/m3	OK	OK
16	**Keruing**	*Dipterocarpus spp.*	Numerous species of similar characteristics. Pinkish brown to dark brown heartwood, plain appearance. Sapwood grey. Straight grain, occasionally interlocked. Exudes resin, sometimes making finishing troublesome. Prone to severe distortion during drying.	740Kg/m3	OK	OK

Rev.D

Frame Materials - Hardwoods

Item	Species	*Latin Name*	Characteristics	Avg. Density	Fire Door FD30	Fire Door FD60
17	**Lauan, Meranti, Seraya**	*Shorea spp.* *Parashorea spp.*	Name depends on origin: Philippines, Malaysia/Indonesia Sabah respectively. Produced from numerous species, the timber is sold in a wide variety of colour (dark red, red, light red, yellow, white) with widly varying characteristics. Those with higher density are generally stronger, stiffer and more durable than those with lower density. Interlocked grain, coarse texture.	Dark Red 710Kg/m3 Light Red 550Kg/m3	OK	OK NR
18	**Mahogany, African**	*Khaya spp.*	Reddish brown heartwood, yellowish brown sapwood. Interlocked grain, moderately coarse texture.	530Kg/m3	OK	NR
19	**Mahogany, American**	*Swietenia spp.*	Pale to dark reddish brown. Some interlocked grain, texture slightly coarse: gives excellent finish.	560Kg/m3	OK	NR
20	**Makore**	*Teieghemella heckelii*	Lustrous, pinkish brown to dark red heartwood, paler sapwood. Straight grain, fine texture. Discolours in contact with ferrous metal. Tends to split on nailing.	640Kg/m3	OK	OK
21	**Maple, rock**	*Acer saccharum*	Pale brown heartwood, white sapwood. Straight grain, fine texture. A strong, taut timber, bends well. Stains, polishes well.	740Kg/m3	OK	OK
22	**Maple, soft**	*Acer rubrum, A. saccharinum*	Creamy white heartwood, sapwood indistinct. Similar to rock maple but softer, less strong.	610Kg/m3	OK	NR
23	**Niangon**	*Heritiera utilis, H. densiflora*	Pale sapwood, pink to reddish-brown heartwood. Interlocked grain gives stripey appearance, affects machining.	640Kg/m3	OK	OK
24	**Oak American, red**	*Quercus spp*	Colour varies, depending on species, from pale yellow brown to reddish mid brown. Sapwood distinct, paler. Straight grain, all species medium texture except European, which may be coarse. Discolours in contact with ferrous metals. Non-ferrous fittings and fastenings are required. Nailing difficult, pre-bore. Difficult to dry, tendency to check, split and honeycomb.	Am.Red 790Kg/m3	OK	OK
25	**Oak American, white**	*Quercus spp*		Am.White 770Kg/m3	OK	OK
26	**Oak European**	*Quercus spp*		European 720Kg/m3	OK	OK
27	**Oak Japanese**	*Quercus spp*		Japanese 670Kg/m3	OK	OK
28	**Obeche**	*Triplochiton scleroxylon*	Pale straw coloured. Interlocked grain, moderately coarse even texture. A stable, lightweight, easy to work timber. Stains well. Not suitable for stairs.	390Kg/m3	NR	NR
29	**Poplar American - yellow**	*Liriodendron tuplipifera*	Yellowish to olive brown heartwood with some dark streaks, whitish sapwood. Straight grain, fine even texture. Smooth finish, good nailing and staining.	510Kg/m3	OK	NR
30	**Ramin**	*Gonystylus spp.*	White to pale straw colour. Straight grain, fine texture. Splits on nailing. Stains well. Not suitable for stairs.	670Kg/m3	OK	OK
31	**Sapele**	*Entandrophragma cylindricum*	Medium to dark reddish brown heartwood with a pronounced stripe. Sapwood whitish. Interlocked grain, fine texture.	640Kg/m3	OK	OK
32	**Sycamore**	*Acer pseudoplantanus*	White to yellowish, lustrous. Generally straight grain, fine even texture.	630Kg/m3	OK	NR
33	**Teak (Burma)**	*Tectona grandis*	Golden brown heartwood sometimes with dark markings, pale yellowish brown sapwood. Straight or wavy grain, course texture. Very stable. Pre-boring recommended for nailing.	660Kg/m3	OK	OK
34	**Utile**	*Entandrophragma utile*	Reddish or purplish brown heartwood, pale sapwood. Interlocked grain, open texture.	660Kg/m3	OK	OK
35	**Walnut (African)**	*Lovoa trichilioides*	Bronze brown heartwood, with occasional black streaks, distinct buff coloured spwood. Interlocked grain, fine texture.	560Kg/m3	OK	NR
36	**Walnut (American)**	*Juglans nigra*	Rich dark brown heartwood, pale sapwood. Grain varies from straight to curly, texture course.	660Kg/m3	OK	OK
37	**Wenge**	*Millettia laurentii*	Sapwood whitish, heartwood dark brown with fine blackish veining. Straight grained, coarse texture. Difficult to polish.	880Kg/m3	OK	OK

Avg. Density = Average density @ 15% moisture content.