

Fire and Sound Rated Wall and Floor/Ceiling Systems Summary

Introduction

The following summary tables list the most common fire rated systems used in Multi Residential Timber Framed Construction (MRTFC). They include walls, floor/ceiling systems, incipient spread of fire ceilings and fire protection to beams and columns.

The purpose of this information bulletin is to aid in the selection of systems for inclusion in MRTFC projects and for that purpose only general information is contained within this bulletin. Full details on each system including fixings and limitations, is found in literature from the various lining manufacturers listed. Where systems have more than one lining manufacture, literature can be found from each.

Due to the ever-changing nature of MRTFC construction, new and improved systems frequently become available. Always check with lining manufacturers for the most up to date systems available and the requirements for its use.

Wall Summary Tables

The table gives the Fire Resistant Level (FRL), Weighted Sound Reduction Index (R_w) and Impact Sound Resistance for common wall systems used in MRTFC.

Information regarding method of construction, fixing, lining order and frame configurations is found in literature provided by the lining manufacturers. Some wall systems have restrictions, such as the order of linings to be fixed to the studs or minimum thickness of studs. Where this occurs, installations must be in accordance with these requirements.

Sound Insulation Performance

In some cases, a range of R_w values is given for internal walls listed. The range is due to the different insulation materials available and variations between opinions from opinion providers. Generally, the lowest R_w value refers to polyester batts while the highest is for Rockwool batts. Additionally, for the purpose of comparing various wall systems, an assumed stud size of 90 x 35mm has been made. Other R_w ratings may apply for smaller or larger stud sizes or plate widths. Information is also given to indicate whether the wall system is deemed to satisfy the Impact Sound Resistance requirements of the Building Code of Australia, Specification C1.8, Vol 1.

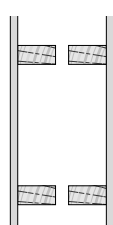
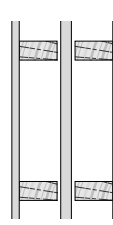
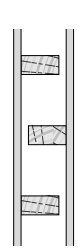
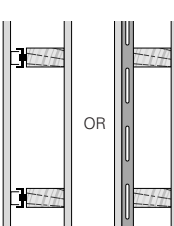
Sizing of Timber Members

Generally, the height and size of the studs are determined by the normal structural loads applied to the wall, not due to the fire load conditions. Refer to each lining manufacturers literature for information on maximum wall heights or limitations on stud sizes.

Additional Information

Each system listed in this bulletin references appropriate lining manufacturers, and where available, lining manufacturers' system identification. Further information on the systems detailed can be found from lining manufacturers' literature. Contact details are listed below.

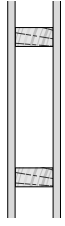
Product Suppliers	Company or Organisation	Phone Number	Publication	Web Site
Boral	Boral Plasterboard	1800 811 222	Plasterboard Building Systems - Construction Selector	www.plasterboard.boral.com.au
CSR	CSR Building Products	1800 621 117	The Red Book - CSR Gyprock Fire & Acoustic Design Guide	www.csr.com.au
James Hardie	James Hardie	1800 021 321	Fire & Acoustically Rated Timber Framed Fire Walls for Residential Buildings	www.jameshardie.com.au
Pioneer	Pioneer Plasterboard	1800 810 018	Fire & Acoustic System Guide	www.plastamasta.com.au
Timber Association	National Timber Development Council	See back page	MRTFC Design & Construction Manuals	www.timber.org.au

System Configuration	FRL	R _w	Insulation	Impact Sound Resistance	Wall Linings (each side of wall unless otherwise stated)	Wall Thickness (mm)	System N ^o or Test/Opinion Sponsor
DOUBLE STUD WALL SYSTEMS							
	30/30/30 or - /60/60	45	Nil	✓	1 x 13mm Fire Grade Plasterboard	226	CSR550
		51 to 53	Yes				
	60/60/60 or - /60/60	45 to 47	Nil	✓	1 x 16mm Fire Grade Plasterboard	232	Boral TS20 CSR555 Pioneer PS180
		53 to 55	Yes				
		53	Nil	✓	1 x 13mm Fire Grade Plasterboard 1 x 6mm Fibre Cement sheet (Linings fixed in any order)	238	CSR680 & 681 Refer to James Hardie
			58 to 61				
	90/90/90 or - /90/90	53 to 54	Nil	✓	2 x 13mm Fire Grade Plasterboard	252	Boral TS18 CSR575
		58 to 61	Yes				
		54	Nil	✓	1 x 16mm Fire Grade Plasterboard 1 x 6mm Fibre Cement sheet (Fibre Cement sheet must be against studs)	244	CSR681 Refer to James Hardie
			58 to 62				
	60/60/60 or - /60/60	43	Nil	✓	1 x 10mm Plasterboard (each side of wall) + 1 x 25mm Fire Grade Plasterboard (600mm wide vertical panels supported by H section studs centre of wall frame)	265	Boral TS17
		48 to 51	Yes				
STAGGERED STUD WALL SYSTEMS							
	30/30/30 or - /60/60	41	Nil	✓	1 x 13mm Fire Grade Plasterboard	146	CSR450 Pioneer PS191
		47 to 50	Yes				
	60/60/60 or - /60/60	42 to 43	Nil	✓	1 x 16mm Fire Grade Plasterboard	152	Boral STS5 CSR455 Pioneer PS193
		47 to 51	Yes				
		49 to 50	Nil	✓	1 x 13mm Fire Grade Plasterboard 1 x 6mm Fibre Cement sheet (Linings fixed in any order)	158	CSR670 Refer to James Hardie
			55 to 56				
	90/90/90 or - /90/90	49 to 51	Nil	✓	2 x 13mm Fire Grade Plasterboard	172	Boral STS6 CSR475 Pioneer PS195
		53 to 59	Yes				
		50	Nil	✓	1 x 16mm Fire Grade Plasterboard 1 x 6mm Fibre Cement sheet (Fibre Cement sheet must be against studs)	164	CSR671 Refer to James Hardie
			56 to 58				
SINGLE STUD RESILIENT FURRING OR RESILIENT MOUNT WALL SYSTEMS							
	30/30/30 or - /60/60	40 to 41	Nil	✓	1 x 13mm Fire Grade Plasterboard	128 to 136	CSR405 & 407
		44 to 48	Yes				
	60/60/60 or - /60/60	39 to 49	Nil	✓	1 x 16mm Fire Grade Plasterboard	134 to 142	Boral TS4 CSR409 & 411 Pioneer RM1 & MRT140
		45 to 51	Yes				
	90/90/90 or - /90/90	48 to 49	Nil	✓	2 x 13mm Fire Grade Plasterboard	154 to 162	Boral TS12 CSR413 & 415
		52 to 56	Yes				

NOTE: FRL ratings of - /60/60 and - /90/90 refer to NON-LOADBEARING walls.


System Configuration	FRL	R _w	Insulation	Impact Sound Resistance	Wall Linings (each side of wall unless otherwise stated)	Wall Thickness (mm)	System N° or Test/Opinion Sponsor
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SINGLE STUD WALL SYSTEMS

	30/30/30 or - /60/60	38	Nil	No	1 x 13mm Fire Grade Plasterboard	116	CSR350
		40 to 42	Yes				
	60/60/60 or - /60/60	34 to 40	Nil	No	1 x 16mm Fire Grade Plasterboard	122	Boral TS3 CSR355 Pioneer MRT90 & PS130
		38 to 47	Yes				
		47 to 49	Nil	No	1 x 13mm Fire Grade Plasterboard 1 x 6mm Fibre Cement sheet (Linings fixed in any order)	128	CSR660 Refer to James Hardie
		48 to 50	Yes				
	90/90/90 or - /90/90	41 to 47	Nil	No	2 x 13mm Fire Grade Plasterboard	142	Boral TS15 CSR375 Pioneer MRT100 & PS150
		46 to 51	Yes				
		47	Nil	No	1 x 16mm Fire Grade Plasterboard 1 x 6mm Fibre Cement sheet (Fibre Cement sheet must be against studs)	134	CSR665 Refer to James Hardie
		49 to 51	Yes				

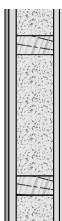
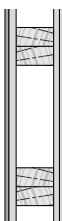
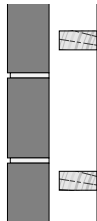
Frame Configuration	FRL	R _w	Wall Linings (External Side of Wall)	Wall Linings (Internal Side of Wall)	System N° or Test/Opinion Sponsor
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EXTERNAL LIGHTWEIGHT CLAD WALL SYSTEMS

	60/60/60 or - /60/60 (from outside only)	N/A	Any external cladding on battens (self ignition temperature above 200°C) ① + 1 x 16mm Fire Grade Moisture Resistant Plasterboard against studs	1 x 10mm Standard Plasterboard	Boral TS24 Refer to CSR
	- /60/60	N/A	Any external cladding on battens (self ignition temperature above 200°C) ① + 1 x 13mm Fire Grade Moisture Resistant Plasterboard against studs	1 x 13mm Fire Grade Plasterboard	CSR350 Pioneer PS120
	60/60/60 or - /60/60	N/A	Any external cladding on battens (self ignition temperature above 200°C) ① + 1 x 16mm Fire Grade Moisture Resistant Plasterboard against studs	1 x 16mm Fire Grade Plasterboard	Boral TS3 CSR355
		N/A	1 x 7.5mm Fibre Cement sheet + 1 x 13mm Fire Grade Moisture Resistant Plasterboard against studs	1 x 13mm Fire Grade Plasterboard 1 x 6mm Fibre Cement sheet (Linings fixed in any order)	CSR660 Refer to James Hardie
	90/90/90 or - /90/90	N/A	1 x 7.5mm Fibre Cement sheet + 1 x 16mm Fire Grade Plasterboard + 1 x 6mm Fibre Cement (Fibre Cement sheet must be against studs)	1 x 16mm Fire Grade Plasterboard 1 x 6mm Fibre Cement sheet (Fibre Cement sheet must be against studs)	CSR665 Refer to James Hardie

NOTES:

- ① Timber cladding has a self ignition temperature greater than 200°C.
- FRL ratings of - /60/60 and - /90/90 refer to NON-LOADBEARING walls.

System Configuration	FRL	R _w	Wall Linings (External Side of Wall)	Wall Linings (Internal Side of Wall)	System N ^o or Test/Opinion Sponsor
EXTERNAL LIGHTWEIGHT CLAD + ROCKWOOL WALL SYSTEMS					
	90/90/90 or - /90/90	N/A	1 x 7.5mm Fibre Cement sheet + 1 x 16mm Fire grade & moisture resistant plasterboard (against studs) + 100mm Rockwool insulation	2 x 13mm Fire Grade Plasterboard	Timber Associations
		N/A	1 x 12mm Plywood sheet + 1 x 16mm Fire grade & moisture resistant plasterboard (against studs) + 100mm Rockwool insulation	2 x 13mm Fire Grade Plasterboard	Timber Associations
EXTERNAL LIGHTWEIGHT CLAD WALL SYSTEMS (NAIL LAMINATED POST)					
	90/90/90 or - /90/90	N/A	1 x 7.5mm Fibre Cement sheet + 1 x 16mm Fire grade & moisture resistant plasterboard (against studs) + Nail Laminated posts (studs back- to-back to provide double thickness)	2 x 13mm Fire Grade Plasterboard	Timber Associations
BRICK VENEER WALL SYSTEMS					
	60/60/60 or - /60/60 (from outside only)	54	90mm Masonry wall	1 x 10mm Standard Plasterboard	BCA DTS Boral TS11 Refer to CSR Pioneer MRT160
	- /60/60	55	110mm Masonry wall	1 x 13mm Fire Grade Plasterboard	Refer to Boral Refer to CSR
	60/60/60	55	110mm Masonry wall	1 x 16mm Fire Grade Plasterboard	Boral TS10 Refer to CSR Pioneer MRT170
	90/90/90 or - /90/90	N/A	110mm Masonry wall	2 x 13mm Fire Grade Plasterboard	Boral TS16 Refer to CSR Pioneer MRT180

NOTES:

1. BCA DTS refers to a 'deemed-to-satisfy' system in accordance with the Building Code of Australia.
2. FRL ratings of – /60/60 and – /90/90 refer to NON-LOADBEARING walls.

Floor/Ceiling Systems

The following table contains general information to assist in the selection of a floor/ceiling systems. Fire Resistance Level (FRL), Weighted Sound Reduction Index (R_w), Impact Isolation Class (IIC) and appropriate ceiling lining materials are provided for each system listed.

Information regarding method of construction, fixing and lining configuration are found in literature provided by the lining manufacturers.

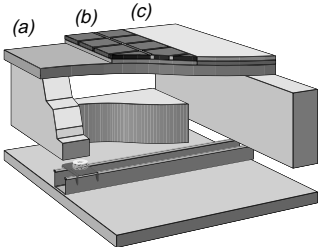
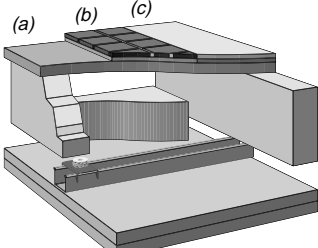
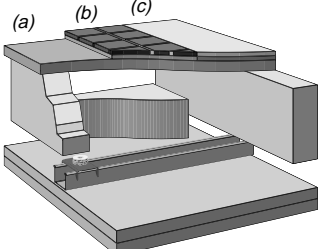
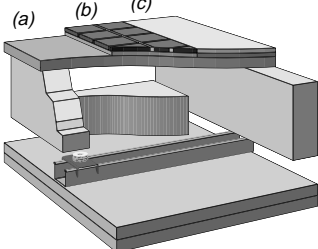
Sound Insulation Performance

A range of R_w values is given for each floor/ceiling system due to the variation in floor covering and the differences between opinions from opinion providers.

R_w ratings for floor/ceiling systems contained in the table are much better than the BCA minimum requirement of R_w 45. For adequate sound performance of floor/ceiling systems, the selection should be based on the Impact Isolation Class (IIC). The Impact Isolation Class is not regulated by the Building Code of Australia, but it is recommended that it is used to select floor/ceiling systems. Refer to MRTFC Information Bulletin N°3 for a discussion on Impact Isolation Class.

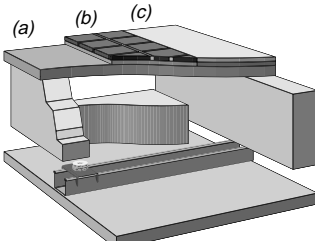
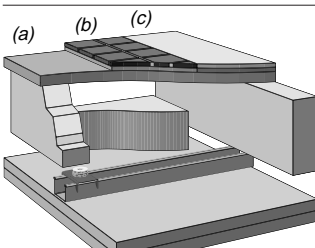
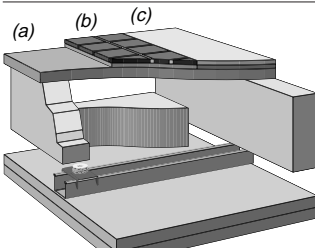
Sizing of Member

Generally, the span and size of the joist are determined by the structural load applied. Any joists, being either solid, nail plated, floor truss or I-beam can be used. Refer to each lining manufacturer's literature for further information on determining joist size or limitations.

System Configuration	FRL	R_w			Impact Isolation Class			Insulation	Ceiling Linings	System N° or Test/Opinion Sponsor
		(a)	(b)	(c)	(a)	(b)	(c)			
		Bare Floor	Tiles on Fibre Cement	Carpet & Underlay	Bare Floor	Tiles on Fibre Cement	Carpet & Underlay			
FLOOR/CEILING SYSTEMS										
	Fire Protective Covering or 30/30/30	53	56	54	48	52	67	Yes	1 x 13 mm Fire Grade Plasterboard supported on resilient channels or resilient mounted channels	BCA DTS Clause A1 Boral CS19 CSR825 Pioneer PS610
	60/60/60	55	58	56	49	53	68	Yes	2 x 13 mm Fire Grade Plasterboard supported on resilient channels or resilient mounted channels	Refer to Boral
	60/60/60	–	–	56	–	–	–	Yes	1 x 13 + 1 x 16mm Fire Grade Plasterboard supported on resilient channels or resilient mounted channels	Refer to Boral Refer to CSR Pioneer PS620
	90/90/90	57	57	57	51	55	70	Yes	2 x 16 mm Fire Grade Plasterboard supported on resilient channels or resilient mounted channels	Refer to Boral CSR827

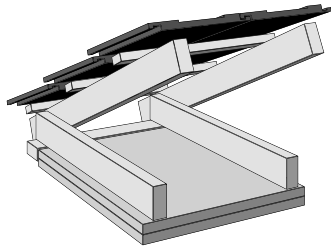
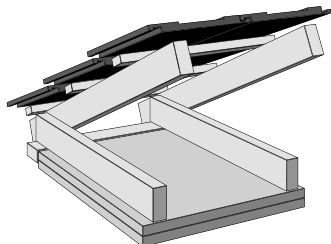
NOTES:

- Fire protective covering is defined in Clause A1-1 of the Building Code of Australia.
- BCA DTS refers to a 'deemed-to-satisfy' system in accordance with the Building Code of Australia.

System Configuration	FRL	R _w			Impact Isolation Class			Insulation	Ceiling Linings	System N ^o or Test/Opinion Sponsor
		(a)	(b)	(c)	(a)	(b)	(c)			
		Bare Floor	Tiles on Fibre Cement	Carpet & Underlay	Bare Floor	Tiles on Fibre Cement	Carpet & Underlay			
FLOATING FLOOR/CEILING SYSTEMS (Caneite™ and 12mm Plywood on Structural Floor)										
	Fire Protective Covering or 30/30/30	55	58	56	49	53	68	Yes	1 x 13 mm Fire Grade Plasterboard supported on resilient channels or resilient mounted channels	Refer to Timber Associations
	60/60/60	57	60	58	50	54	69	Yes	2 x 13 mm Fire Grade Plasterboard supported on resilient channels or resilient mounted channels	Refer to Timber Associations
	90/90/90	57	60	58	51	55	70	Yes	2 x 16mm Fire Grade Plasterboard supported on resilient channels or resilient mounted channels	Refer to Timber Associations

NOTE: 1. Fire protective covering is defined in Clause A1-1 of the Building Code of Australia.

Ceilings with Resistance to the Incipient Spread of Fire

System Configuration	Resistance to the Incipient Spread of Fire (minutes)	R _w			Impact Isolation Class			Insulation	Ceiling Linings	System N ^o or Test/Opinion Sponsor
ROOF/CEILING SYSTEMS WITH RESISTANCE TO THE INCIPIENT SPREAD OF FIRE										
	60	—	—	—	—	—	—	No	1 x 13 + 1 x 16mm Fire Grade Plasterboard direct fixed to ceiling joists or supported on resilient channels or resilient mounted channels	Refer to Boral CSR 870 & 875 Pioneer PS620
	60	—	—	—	—	—	—	No	2x 16mm Fire Grade Plasterboard direct fixed to ceiling joists or supported on resilient channels or resilient mounted channels	Boral CS15 CSR 871 & 876 Pioneer PS630, PS631 & PS632

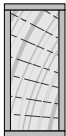
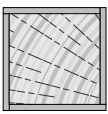
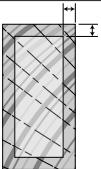
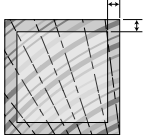
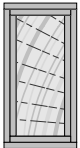
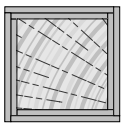
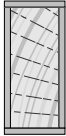
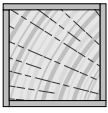
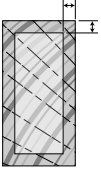
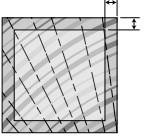
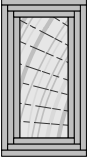
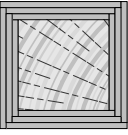
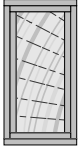
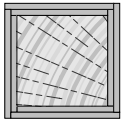
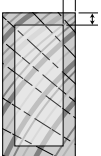
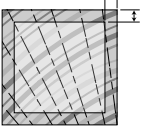
Beam and Column Protection Systems

Where beams and columns are required to be fire resistant, they can be protected either by applying fire grade plasterboard or by including sufficient sacrificial timber. The number of layers of plasterboard or thickness of sacrificial timber is dependent on the fire resistance required. Sacrificial timber depth is additional to the structural requirements of the beam or column.

The protection is only required to the exposed faces of

the beam or column. For example, the top edge of a beam supporting a fire rated floor would require no protection.

Sacrificial timber solutions detailed here are based on an average dry timber density of 550kg/m³ for softwood or 850kg/m³ for hardwood. Where the actual timber density is known, alternative sacrificial char depths can be determined from AS1720.4 'Fire Resistance of Structural Timber Members'.

System Configuration		FRL	Fire Grade Linings	Sacrificial Timber (additional to structural requirements) (mm)		System N° or Test/Opinion Sponsor
Beam	Column			Softwood	Hardwood	
		30 / - / -	1 x 13mm Fire Grade Plasterboard	Nil	Nil	CSR Boral CP8 & BP12
			Nil	28	23	AS1720.4
		60 / - / -	2 x 13mm Fire Grade Plasterboard	Nil	Nil	CSR Table G8 Boral CP6 & BP10
			1 x 25mm Fire Grade Plasterboard	Nil	Nil	CSR Table G8
			Nil	47	38	AS1720.4
		90 / - / -	3 x 13mm Fire Grade Plasterboard	Nil	Nil	CSR Table G8 Boral CP5 & BP8
			1 x 13 + 1 x 25mm Fire Grade Plasterboard	Nil	Nil	CSR Table G8
			Nil	67	54	AS1720.4

Reference Material

1. Building Code of Australia – Australian Building Codes Board.
2. Construction Selector – Plasterboard Building Systems – Boral Plasterboard.
3. Fire & Acoustically Rated Timber Framed Fire Walls for Residential Buildings – James Hardie.
4. Fire & Acoustic System Guide – Pioneer Building Products.
5. MRTFC Design and Construction Manual Class 1 Buildings – National Timber Development Council.
6. MRTFC Design and Construction Manual – Class 2 & 3 Buildings – National Timber Development Council.
7. The Red Book – CSR Gyprock® Fire & Acoustic Design Guide – CSR Gyprock®.
8. AS1720.4 Fire Resistance of Structural Timber Members – Standards Australia.

Technical Advice

Further technical information and assistance is available from the following Timber Advisory Services.

NEW SOUTH WALES

Timber Development Association NSW Ltd.
13 - 29 Nichols Street, Surry Hills NSW 2010.
Tel: (02) 9360 3088. Fax: (02) 9360 3464.

QUEENSLAND

Timber Research and Development Advisory Council of Queensland.
500 Brunswick Street, Fortitude Valley Qld 4006.
Tel (07) 3358 1400. Fax: (07) 3358 1411.

VICTORIA

Timber Advisory Centre.
180 Whitehorse Road Blackburn VIC 3130.
Tel: (03) 9877 2011. Fax: (03) 9877 6663.

SOUTH AUSTRALIA

Timber Development Association of SA Inc.
113 Anzac Highway, Ashford, SA 5035.
Tel: (08) 8297 0044. Fax: (08) 8297 2772.

WESTERN AUSTRALIA

Timber Advisory Centre.
Cnr Salvado Road & Harborne Street,
Wembly WA 6014.
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