USGBORAL.COM

SYSTEMS+

I

SPECIALTY SYSTEMS

INNOVATIVE SYSTEMS SOLUTIONS

INTRODUCTION

The following USG Boral Specialty Systems are outlined in this manual:

- Lift and Services Shafts
  - Shaftwall™
  - Ventshaft® (services shafts only)
- Column and Beam Protection
- Fire Tunnel™

LIFT AND SERVICES SHAFTS

BCA REQUIREMENTS

FIRE RATING

- Refer to Multi-Residential section for fire rating requirements for lift and services shafts in Class 2 and 3 buildings.
- Refer to BCA for fire ratings requirements for lift and services shafts in other Classes of buildings.

ACOUSTICS

- The BCA requirement for a wall between a lift shaft and a sole-occupancy unit in Class 2 and 3 buildings is R_w=50 and discontinuous construction.
- Refer Multi-residential section for BCA requirements for ducts, soil, waste and water supply pipes.

STRUCTURAL

Refer to BCA for structural requirements for lift and services shafts.

» INTRODUCTION

SHAFTWALL™

DESCRIPTION

Shaftwall systems utilise 25mm Shaftliner friction fit between Rondo CH-Studs, and Firestop plasterboard screw fixed on one or both sides of the wall.

Most Shaftwall systems outlined in this manual can be fully constructed from one side and can be used for enclosure of lift and services shafts.

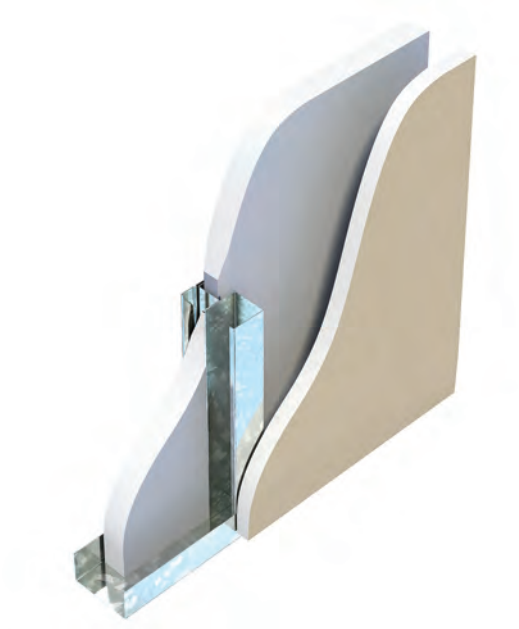


Figure I1: **Shaftwall**

DESIGN OPTIONS

Shaftwall systems are available with various configurations of Firestop linings achieving Fire Resistance Levels up to -/120/120 from both sides and acoustic ratings up to R_w=50 (R_w+C_{tr}=42).

A number of stud sizes and thicknesses are available allowing construction of some Shaftwall systems up to 4.8m (refer to Shaftwall Maximum Wall Heights table).

MATERIALS

Plasterboard Linings

- 25mm Shaftliner plasterboard
- 13mm Firestop plasterboard
- 16mm Firestop plasterboard.

Steel Sections

The following Rondo steel sections are utilised in Shaftwall systems:

TABLE I1: **RONDO SHAFTWALL COMPONENTS**

SECTION TYPE & SIZE	SECTION SIZE	BASE METAL THICKNESS
CH-stud	64mm and 102mm	0.55mm and 0.90mm
E-stud	64mm and 102mm	0.55mm and 0.90mm
J-track	64mm and 102mm	0.80mm
Deflection track	64mm and 102mm	0.80mm

Figure I2: **CH-Stud**

Insulation

- 50mm Pink® Partition 11kg/m^3 glasswool by Fletcher Insulation
- 50mm Polyester Insulation 14kg/m^3 density.

Screws

Refer to General Information — Materials section for plasterboard screw types.

Caulking

H.B. Fuller Firesound sealant.

DESIGN CONSIDERATIONS

- Refer to BCA for performance requirements for lift and services shafts.
- Refer to USG Boral Shaftwall brochure for Shaftwall design considerations.

» INTRODUCTION

NOTES TO SHAFTWALL HEIGHT TABLES:

- Symbols:

  d = deflection limits

  h = head track capacity limits

  f = fire height limits.
- Minimum yield stress of steel sections to be 270MPa.
- Deflection limit is height/240 to a maximum of 20mm for CH-studs.
- Wall heights tabled are for single length studs at maximum centres shown.
- The tabulated heights need to be checked against head track reaction capacity as listed below.
- Wall heights tabled are not for axial loads but include self-weight and lateral pressures stated.
- Wall heights tabled are not applicable to steel lipped C-studs.
- Shelf loading is not permitted for tabulated maximum wall heights. Refer USG Boral for maximum heights with shelf loadings.
- Tabulated heights are for internal walls only. Refer to USG Boral if walls are subjected to external loadings.
- All plasterboard is to be manufactured by USG Boral.
- Walls are to be constructed with Firestop plasterboard to USG Boral standard Shaftwall fire rated wall details as appropriate.
- For fire service 50Pa pressure assumed. Where pressures are >50Pa and fire loadings are likely to be coincident, USG Boral should be consulted.
- Detailed seismic analysis requires site/building specific parameters and has not been performed, however tabulated wall heights comply with AS 1170.4 clause 5.2.1, category 3, provided that:
  - the walls have been designed for 0.25kPa pressure (minimum)
  - the walls, including attachments, have a total mass (Gc) not exceeding 100kg/m^2
  - acceleration a ≤ 0.08
  - Site Factor S ≤ 2.0
  - ax ≤ 2.0
  - ac ≤ 1.0
  - Cc1 ≤ 0.9
  - I = 1.0

HEAD TRACK REACTION CAPACITIES

Tabulated maximum heights for Shaftwall systems are based on the following head track reaction capacities for 50mm x 0.80mm BMT head runner flange and 20mm max clearance at top of stud:

TABLE I2: **HEAD TRACK REACTION CAPACITIES**

STUD	HEAD TRACK REACTION CAPACITY kN
64CH55, 102CH55	0.28
64CH90, 102CH90	0.44

Refer to USG Boral where reactions and/or required clearance at top of stud exceed the above.

The following head track reaction capacities can be used for 0.80mm BMT standard J runner at head and base and 10mm max clearance at top of stud:

TABLE I3: **HEAD TRACK REACTION CAPACITIES**

STUD	HEAD TRACK REACTION CAPACITY kN
64CH55, 102CH55	0.40
64CH90, 102CH90	0.75

The head track reaction capacities listed above rely on the plasterboard for restraint.

Head track installation must be strictly in accordance with USG Boral and Rondo details. Contact USG Boral or Rondo for alternative head track installations.

INSTALLATION

Refer to USG Boral Shaftwall brochure for system installation instructions and details.

» INTRODUCTION

VENTSHAFT™

DESCRIPTION

Ventshaft is a family of laminated wall systems utilising 25mm Shaftliner and Firestop plasterboard. Some Ventshaft systems outlined in this manual incorporate free-standing steel or timber stud wall with 10mm Regular plasterboard lining.

Ventshaft systems can be fully constructed from one side and are suitable for enclosure of services shafts.

NOTE:

Ventshaft systems are not suitable for enclosure of lift shafts.

Figure I3: **Ventshaft**

DESIGN OPTIONS

Ventshaft systems are available in Fire Resistance Levels up to –/120/120 from both sides and acoustic ratings up to R_w=54.

MATERIALS

Plasterboard Linings

- 25mm Shaftliner plasterboard
- 13mm Firestop plasterboard
- 16mm Firestop plasterboard.

Steel Sections

- 20mm x 38mm galv angle 0.75mm BMT
- 35mm x 35mm galv angle 0.75mm BMT.

Screws

- Plasterboard laminating screws (Type L)
- Plasterboard to steel frame screws (Type S).

Refer to USG Boral Ventshaft brochure for plasterboard screw type specification.

Sealants and Packers

- H.B. Fuller Firesound sealant
- IBS intumescent rod.

INSULATION (Systems VST120.1A & VSS120.1A)

- 50mm polyester insulation 7kg/m^3 density.

DESIGN CONSIDERATIONS

- Refer to BCA for performance requirements for services shafts.
- Static pressure testing of Ventshaft™ VS120.1A and resistance to impact testing to BCA C1.8 was carried out at USG Boral NATA accredited laboratory. Consulting Engineers Taylor Thomson Whitting observed the static testing, and maximum Ventshaft™ VS120.1A panel sizes were subsequently computed as listed in the Max Ventshaft Panel Size table.
- Impact resistance testing on 3000 x 3000mm Ventshaft™ VS120.1A panel show the panel to meet BCA criteria for bag drop heights of 100mm and 150mm.

INSTALLATION

Refer to USG Boral Laminated Wall Systems brochure for system installation instructions and details.

» INTRODUCTION

COLUMN & BEAM PROTECTION

DESCRIPTION

USG Boral Column & Beam Protection systems utilise fire resistant plasterboard for fire protection of various types of columns and beams.

Fire protection systems are available for the following types of columns and beams:

- Free standing concrete columns
- Free standing I-section, CHS and SHS steel columns
- Steel columns within a fire rated wall
- Free standing timber columns
- Steel beams under concrete floor
- Timber beams under fire rated floor.

Figure I4: **Beam Protection System PSB120.1D**

DESIGN OPTIONS

Steel column protection systems are available with Fire Resistance Levels up to 180/–/–

Concrete and timber column protection systems are available with Fire Resistance Levels up to 120/–/–

Steel and timber beam protection systems are available with Fire Resistance Levels up to 120/–/–

MATERIALS

Plasterboard Linings

- 25mm Shaftliner plasterboard
- 13mm Firestop plasterboard
- 16mm Firestop plasterboard.

Steel Sections

Refer systems tables and USG Boral Column & Beam Protection brochure.

Screws

Refer to General Information — Materials for plasterboard screw types.

Sealants and Packers

H.B. Fuller Firesound® sealant

DESIGN CONSIDERATIONS

- Refer to BCA for fire rating requirements for load bearing columns and beams.
- Load bearing columns and beams are to be designed in accordance with BCA and relevant Australian Standards.

INSTALLATION

- Refer to USG Boral Column & Beam Protection brochure for system installation instructions and details.
- Refer to Junctions and Penetrations for beam protection details under fire rated timber floor.

» INTRODUCTION

FIRE TUNNEL™

DESCRIPTION

USG Boral Fire Tunnel provides a lightweight solution for fire isolated passageways as outlined in the BCA.

Fire Tunnel is a self-supported steel framed system constructed using Rondo 150mm stud and track and lined with USG Boral Firestop plasterboard inside and outside.

Figure I5: **Fire Tunnel**

DESIGN OPTIONS

USG Boral Fire Tunnels are available with Fire Resistance Levels up to –/120/120 from both sides or –/180/180 from outside only.

Fire Tunnels can be constructed without structural design calculations to an internal width of 2000mm, and an internal height of 2200mm. Refer to USG Boral if larger size Fire Tunnel is required.

MATERIALS

Plasterboard

- 25mm Shaftliner plasterboard
- 13mm Firestop plasterboard
- 16mm Firestop plasterboard
- 10mm Regular plasterboard.

Rondo Steel Sections

- 150mm C-stud 0.75mm BMT
- 150mm track 0.75mm BMT
- 75mm x 75mm steel angle 0.75mm BMT.

Fasteners

- 10 x 16 Drill Point Wafer Head screws
- 6 x 3 dia all steel pop rivets
- 6 x 32, 8 x 60 Needle Point screws.

DESIGN CONSIDERATIONS

- Refer to BCA for fire rating requirements for Fire Isolated Passageways.
- Refer to USG Boral Fire Tunnel brochure for Fire Tunnel design considerations.
- Fire Tunnel systems are designed to support their own weight only. Fire Tunnel roof is not trafficable and must not be used for storage of materials or equipment.

INSTALLATION

- Refer to Steel Stud Wall section for general installation instructions for fire rated steel stud walls.
- Refer to Junctions and Penetrations for fire rated steel stud wall construction details.
- Refer to USG Boral Fire Tunnel brochure for Fire Tunnel frame construction details.

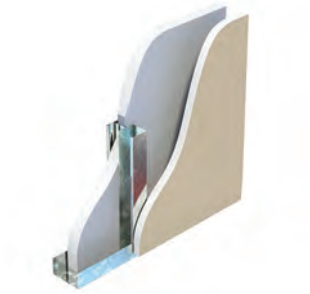
LIFT & SERVICES SHAFTS – SHAFTWALL

R_w 40-44 45-49 50-54
R_w+C_{tr}

SH

FIRE RESISTANCE LEVEL (refer to table)

FRL Basis: FCO–1556, FCO–1828, FCO–1503, SI 1017, FCO–1659, FR 1429



SYSTEM DESCRIPTION

If side 1 specified:
1x25mm Shaftliner pbd (+ 1x16mm Firestop pbd if specified)

Framing: Steel CH-studs (refer to table)

Insulation: Refer to table

Side 2: One or more layers of fire resistant pbd.

ACOUSTIC RATINGS BASIS: RT&A TE405-05F23

SYSTEM	FRL	LINING SIDE 1	LINING SIDE 2	NOM WALL WIDTH mm	INSULATION* STUD SIZE mm	NIL R_w	NIL R_w+C_{tr}	50G11, 50P14 R_w	50G11, 50P14 R_w+C_{tr}
SH60.1A	–/60/60 from both sides	1x25mm SHAFTLINER	1x16mm FIRESTOP	80	64CH55	39	30	47	35
					64CH90	36	27	44	32
				118	102CH55	41	32	48	39
					102CH90	38	29	45	36
SH120.1A	–/120/90 from occupancy –/120/120 from shaft	1x25mm SHAFTLINER	2x13mm FIRESTOP	90	64CH55	42	32	50	40
					64CH90	39	29	47	37
				128	102CH55	44	35	50	41
					102CH90	41	32	47	38
SH120.2A	–/120/120 from both sides	1x25mm SHAFTLINER	1x16mm FIRESTOP + 1x13mm FIRESTOP	93	64CH55	42	33	50	40
					64CH90	39	30	47	37
				131	102CH55	44	35	51	42
					102CH90	41	32	48	39
SH120.3A	–/120/120 from both sides	1x25mm SHAFTLINER	2x16mm FIRESTOP	96	64CH55	43	34	50	40
					64CH90	40	31	47	37
				134	102CH55	45	36	51	42
					102CH90	42	33	48	39
SH120.4A	–/120/120 from both sides	1x25mm SHAFTLINER + 1x16mm FIRESTOP	1x16mm FIRESTOP	96	64CH55	42	33	51	40
					64CH90	39	30	48	37
				134	102CH55	45	36	52	42
					102CH90	42	33	49	39

* **50G11** – 50mm Pink® Partition 11kg/m³ glasswool by Fletcher Insulation, **50P14** – 50mm Polyester Insulation 14kg/m³

MAX WALL HEIGHTS mm

SYSTEM	STUD SIZE mm	BASE METAL THICKNESS mm	PRESSURE kPa 0.25	PRESSURE kPa 0.35
SH60.1A SH120.1A SH120.2A SH120.4A	64	0.55	2950d	2640 d
		0.90	3460 d	3090 d
	102	0.55	3730h	2660 h
		0.90	4980 d	4190 h
SH120.3A	64	0.55	3730 h	2660 h
		0.90	4380 d	3890 d
	102	0.55	3730 h	2660 h
		0.90	5510 d	4190 h

Height Limiting Factor: **d** - deflection (L/240 ≤ 20mm), **h** – head track capacity

SERVICES SHAFTS – VENTSHAFT

R_w 40-44 45-49 50-54
R_w+C_{tr}

VS

FIRE RESISTANCE LEVEL
(refer to table)

FRL Basis: FCO-2423, FSV-0538, FCO-1665, FCO-1480, FSV-0169

SYSTEM DESCRIPTION

Side 1:
Multiple layers of fire resistant plasterboard screw laminated together

Side 2 (if specified):
- 10mm Regular pbd
- timber or steel framing
- 20mm gap between framing and laminated panel
- Cavity insulation (refer to table).

ACOUSTIC RATINGS BASIS: RT&A TE405-05F24

SYSTEM	FRL	SIDE 1	SIDE 2	CAVITY mm	STUD SIZE (Gap) mm	NOM WALL WIDTH mm	INSULATION*	R_w	R_w+C_{tr}
VS90.1A	–/90/90 from both sides	3x13mm FIRESTOP screw laminated together	NA	NA	NA	39	NA	38	37
VS120.1A	–/120/120 from both sides	3x16mm FIRESTOP screw laminated together	NA	NA	NA	48	NA	39	38
VS120.2A	–/120/120 from both sides	16mm FIRESTOP adhesive + screw laminated to each side of 1x25mm SHAFTLINER	NA	NA	NA	57	NA	39	38
VST120.1A	–/120/120 from both sides	3x16mm FIRESTOP screw laminated together	1x10mm REGULAR on free-standing 70mm timber stud	90	70 (20)	148	Nil	47	41
							50P7	53	45
VSS120.1A	–/120/120 from both sides	3x16mm FIRESTOP screw laminated together	1x10mm REGULAR on free-standing 64mm steel stud	85	64 (20)	142	Nil	48	42
							50P7	54	46

* **50P7** – 50mm Polyester Insulation 7kg/m^3

MAX SIZES OF NON LOAD BEARING VENTSHAFT (VS120.1A, VS120.2A. VST120.1A & VSS120.1A)

WALL PRESSURE			
0.25kPa		0.35kPa	
WIDTH mm	HEIGHT mm	WIDTH mm	HEIGHT mm
1200	6000	1200	6000
1800	4800	1800	2800
2400	3300	2400	2100
3000	2700	3000	1700

Height Limiting Factor: L/240 ≤ 20mm

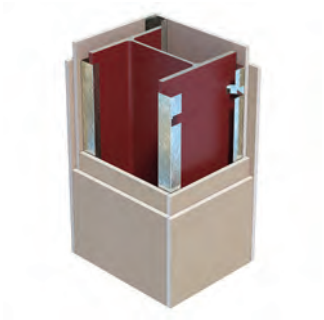
Notes:
- All four edges of the panel must be supported
- Plasterboard layers 1 and 3 to be aligned along long direction of panel, layer 2 across
- Wall heights tabled are not for axial loads but include self weight and lateral pressures stated
- The maximum panel sizes are based on testing performed using USG Boral Firestop plasterboard
- Deflection heads to be designed and used as required
- Panel size of up to 3000mm x 3000mm have been fire tested at pressures of 50Pa. However, the panel size will in most cases be limited by cold structural considerations.

COLUMN PROTECTION

PSC.1

FIRE RESISTANCE LEVEL
(refer to table)

FRL Basis: FCO–1972



SYSTEM DESCRIPTION

One or more layers of fire resistant pbd around periphery on encasement channel forming gap around column

COLUMN PROTECTION – STEEL I–SECTIONS

SYSTEM	FRL	LINING (All Sides)	FIXING
PSC30.1A	30/–/–	1x13mm FIRESTOP	Around periphery, spaced from column
PSC60.1A	60/–/–	2x13mm FIRESTOP or 1x25mm SHAFTLINER	Around periphery, spaced from column
PSC90.1A	90/–/–	2x16mm FIRESTOP	Around periphery, spaced from column
PSC120.1A	120/–/–	3x13mm FIRESTOP or 1x13mm FIRESTOP + 1x25mm SHAFTLINER	Around periphery, spaced from column

PSC.2

FIRE RESISTANCE LEVEL
(refer to table)

FRL Basis: FCO–1972

SYSTEM DESCRIPTION

One or more layers of fire resistant pbd around periphery on Rondo 142 track forming min 18mm gap around column

COLUMN PROTECTION – STEEL SHS/RHS SECTIONS

SYSTEM	FRL	LINING (All Sides)	FIXING
PSC30.2A	30/–/–	1x13mm FIRESTOP	Around periphery, spaced from column
PSC60.2A	60/–/–	2x13mm FIRESTOP or 1x25mm Shaftliner	Around periphery, spaced from column
PSC90.2A	90/–/–	2x16mm FIRESTOP	Around periphery, spaced from column
PSC120.2A	120/–/–	3x13mm FIRESTOP or 1x13mm FIRESTOP + 1x25mm SHAFTLINER	Around periphery, spaced from column

PSC.3

FIRE RESISTANCE LEVEL
(refer to table)

FRL Basis: FCO–1972

SYSTEM DESCRIPTION

One or more layers of fire resistant pbd around periphery on Rondo 0.75mm BMT track forming gap around column

COLUMN PROTECTION – STEEL CHS SECTIONS

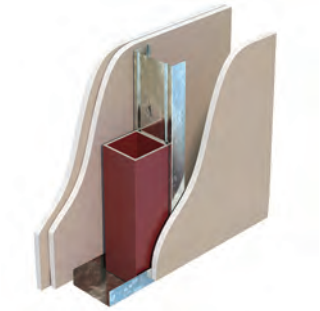
SYSTEM	FRL	LINING (All Sides)	FIXING
PSC30.3A	30/–/–	1x13mm FIRESTOP	Around periphery, spaced from column
PSC60.3A	60/–/–	2x13mm FIRESTOP or 1x25mm SHAFTLINER	Around periphery, spaced from column
PSC90.3A	90/–/–	2x16mm FIRESTOP	Around periphery, spaced from column
PSC120.3A	120/–/–	3x13mm FIRESTOP or 1x13mm FIRESTOP + 1x25mm SHAFTLINER	Around periphery, spaced from column

COLUMN PROTECTION

PSC.4

FIRE RESISTANCE LEVEL
(refer to table)

FRL Basis: FCO–1972



SYSTEM DESCRIPTION

One or more layers of fire resistant pbd direct fixed to studs forming min 10mm gap from column

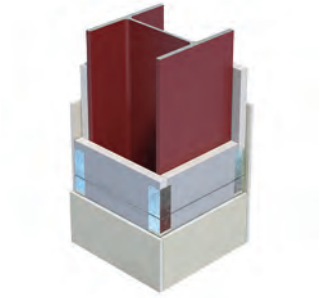
COLUMN PROTECTION – STEEL COLUMNS WITHIN WALL

SYSTEM	FRL	LINING (Both Sides)	FIXING
PSC30.4A	30/–/–	1x13mm FIRESTOP	Direct to stud
PSC60.4A	60/–/–	2x13mm FIRESTOP	Direct to stud
PSC90.4A	90/–/–	2x16mm FIRESTOP	Direct to stud
PSC120.4A	120/–/–	3x13mm FIRESTOP	Direct to stud

PSC.5

FIRE RESISTANCE LEVEL
(refer to table)

FRL Basis: FCO–1972, BHP980804, BHP980216, BHP940810, BHP950915



SYSTEM DESCRIPTION

One or more layers of 25mm Shaftliner pbd direct fixed around periphery with corner angles and wire ligatures 1x10mm Regular pbd direct fixed over Shaftliner pbd (PSC120.5A only)

COLUMN PROTECTION – STEEL I-SECTIONS

SYSTEM	FRL INCREASE	LINING (All Sides)	FIXING
PSC120.5A	120/–/–	1x25mm SHAFTLINER + 1x10mm REGULAR	Direct to column of ESA/M<9.45m²/t*
PSC120.5B	120/–/–	2x25mm SHAFTLINER	Direct to column of ESA/M<45m²/t*
PSC180.5A	180/–/–	3x25mm SHAFTLINER	Direct to column of ESA/M<45m²/t*

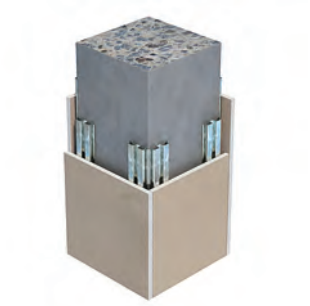
* ESA/M – Ratio of exposed surface area (m^2) to mass (t) per metre length

COLUMN PROTECTION

PCC.1

FIRE RESISTANCE LEVEL
(refer to table)

FRL Basis: FCO–2074



SYSTEM DESCRIPTION
1x fire resistant pbd furred

COLUMN PROTECTION - CONCRETE COLUMNS

SYSTEM	FRL INCREASE	LINING (All Sides)	FIXING
PCC30.1A	30/–/–	1x13mm FIRESTOP	Furred
PCC120.1A	120/–/–	1x25mm SHAFTLINER	Furred

PTC.1

FIRE RESISTANCE LEVEL
(refer to table)

FRL Basis: 91/183, 91/169

SYSTEM DESCRIPTION
One or more layers of fire resistant pbd direct fixed or furred (refer to table)

COLUMN PROTECTION - TIMBER COLUMNS

SYSTEM	FRL INCREASE	LINING (All Sides)	FIXING
PTC30.1A	30/–/–	1x13mm FIRESTOP	Direct or Furred
PTC60.1A	60/–/–	2x13mm FIRESTOP	Direct or Furred
PTC90.1A	90/–/–	3x13mm FIRESTOP	Direct or Furred
PTC120.1A	120/–/–	3x16mm FIRESTOP	Direct or Furred

BEAM PROTECTION

PSB.1

FIRE RESISTANCE LEVEL
(refer to table)

FRL Basis: FCO-1972, FCO-0410, FSU-0115, BHP930630

SYSTEM DESCRIPTION

Refer to table

BEAM PROTECTION - STEEL BEAMS

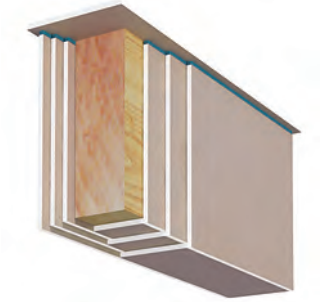
SYSTEM	FRL INCREASE	LINING (All Sides)	FIXING
PSB30.1A	30/–/–	1x16mm FIRESTOP	Over SHAFTLINER packers to sides and bottom of steel beam of ESA/m < 30m²/t
PSB120.1A	120/–/–	3x13mm FIRESTOP or 1x25mm SHAFTLINER + 1x13mm FIRESTOP	Spaced from sides and bottom of steel beam
PSB120.1B	120/–/–	2x25mm SHAFTLINER cap to SHS	RHS steel beam supporting horizontal Shaft Wall
PSB120.1C	120/–/–	3x16mm FIRESTOP	PFC steel beam within wall clad both sides
PSB120.1D	120/–/–	Furring + 2x16mm FIRESTOP + Furring + 1x16mm FIRESTOP	Spaced from sides and bottom of steel supporting concrete floor
PSB120.1E	120/–/–	Ceiling bulkhead or Furring + 2x16mm FIRESTOP + Furring + 1x16mm FIRESTOP	Spaced from sides and bottom of steel beam supporting timber floor

* ESA/M – Ratio of exposed surface area (m²) to mass (t) per metre length

PTB.1

FIRE RESISTANCE LEVEL
(refer to table)

FRL Basis: 93/402



SYSTEM DESCRIPTION

One or more layers of fire resistant pbd direct fixed

BEAM PROTECTION - TIMBER BEAMS

SYSTEM	FRL INCREASE	LINING (All Sides)	FIXING
PTB30.1A	30/–/–	1x13mm FIRESTOP	Direct
PTB60.1A	60/–/–	2x13mm FIRESTOP	Direct
PTB90.1A	90/–/–	3x13mm FIRESTOP	Direct
PTB120.1A	120/–/–	3x16mm FIRESTOP	Direct

FIRE TUNNEL

FT

FIRE RESISTANCE LEVEL
(refer to table)

FRL Basis: FCO–0645R, FCO–0411R, FCO–1160, FCO–1161, FCO–1162, FCO–1213

SYSTEM DESCRIPTION

One or more layers of fire resistant pbd direct fixed to both sides of steel framed walls and ceiling.

FIRE TUNNELS

SYSTEM	FRL	FRAME	LINING
FT60.1A	–/60/60 from outside	Welded steel frame ex 150mm Rondo studs, track and corner angles	1x16mm FIRESTOP over and under ceiling 1x16mm FIRESTOP to both sides of wall frame
FT60.2A	–/60/60 from both sides	Welded steel frame ex 150mm Rondo studs, track and corner angles	2x16mm FIRESTOP over and under ceiling 1x16mm FIRESTOP to both sides of wall frame
FT90.1A	–/90/90 from outside	Welded steel frame ex 150mm Rondo studs, track and corner angles	2x13mm FIRESTOP over ceiling and outside walls 1x13mm FIRESTOP under ceiling and inner walls
FT120.1A	–/120/120 from outside	Welded steel frame ex 150mm Rondo studs, track and corner angles	2x16mm FIRESTOP over ceiling and outside walls 1x16mm FIRESTOP + 1x10mm REGULAR under ceiling and inner walls
FT120.2A	–/120/120 from both sides	Welded steel frame ex 150mm Rondo studs, track and corner angles	2x16mm FIRESTOP over ceiling 3x16mm FIRESTOP under ceiling 2x16mm FIRESTOP to both sides of wall frame
FT180.1A	–/180/180 from outside	Structural support steel frames	2x25mm SHAFTLINER over ceiling 1x16mm FIRESTOP under ceiling 2x16mm FIRESTOP to both sides of NLB wall frame