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Fire & Acoustic Technical Manual

Island Block & Paving Fire & Acoustic Technical Manual

Contents

30 YEAR MEMBER OF THE CMAA CONCRETE MASONRY ASSOCIATION OF AUSTRALIA

Concrete Masonry Association of Australia

The Concrete Masonry Association (CMAA) is the peak body that represents Australia's concrete masonry manufacturers of bricks, blocks, pavers and retaining wall block systems. The CMAAS's National Technical Committee monitors, develops and extensively researches concrete masonry technical issues. The CMAA provides direction and support to standards Australia that develops masonry codes and standards.
Free technical publications can be found at cmaa.com.au

Introduction

The Island Block & Paving Fire & Acoustic technical manual outlines the fire and acoustic performance of Island Block & Paving masonry units for various wall applications. It has been prepared to provide design, installation, and technical information for builders, building consultants, engineers, and architects. Any variation of the system outlined in this manual is considered outside the scope and must be evaluated by the relevant professional consultant.

Island Block & Paving products are suitable for use in load bearing and non-load bearing walls for all types of buildings. The material composition and specific unit dimensions have been optimized, tested and assessed by leading organization's around Australia in order to provide exceptional fire and acoustic performances.

Island Block & Paving offer two types of concrete blocks that are recommended where specific fire and acoustic performance is required. These are "LIGHTWEIGHT" Block units and "DENSE WEIGHT" Block units (the dense weight blocks are available in Natural Grey, Coloured Blocks for the Future and Tech Dry water repellent ranges). All types are available in various unit sizes and are suitable for core filled and non-core filled applications. Manufactured within the scope of Island Block & Paving's Quality Management System ISO 9001:2015.

LIGHTWEIGHT Blocks- Minimum 15 Mpa compressive strength, even texture, 30 % lighter in weight and less than 1800 kg/M3 density in manufacture due to the use of reclaimed boiler ash and fly ash; pre exposed to high temperatures thus resulting in superior fire resistance to dense weight blocks.

DENSE WEIGHT Blocks- Minimum 15 Mpa compressive strength, even texture, greater than 1800 kg/M3 density in manufacture, consisting of greater than 45% basalt content.

Material properties

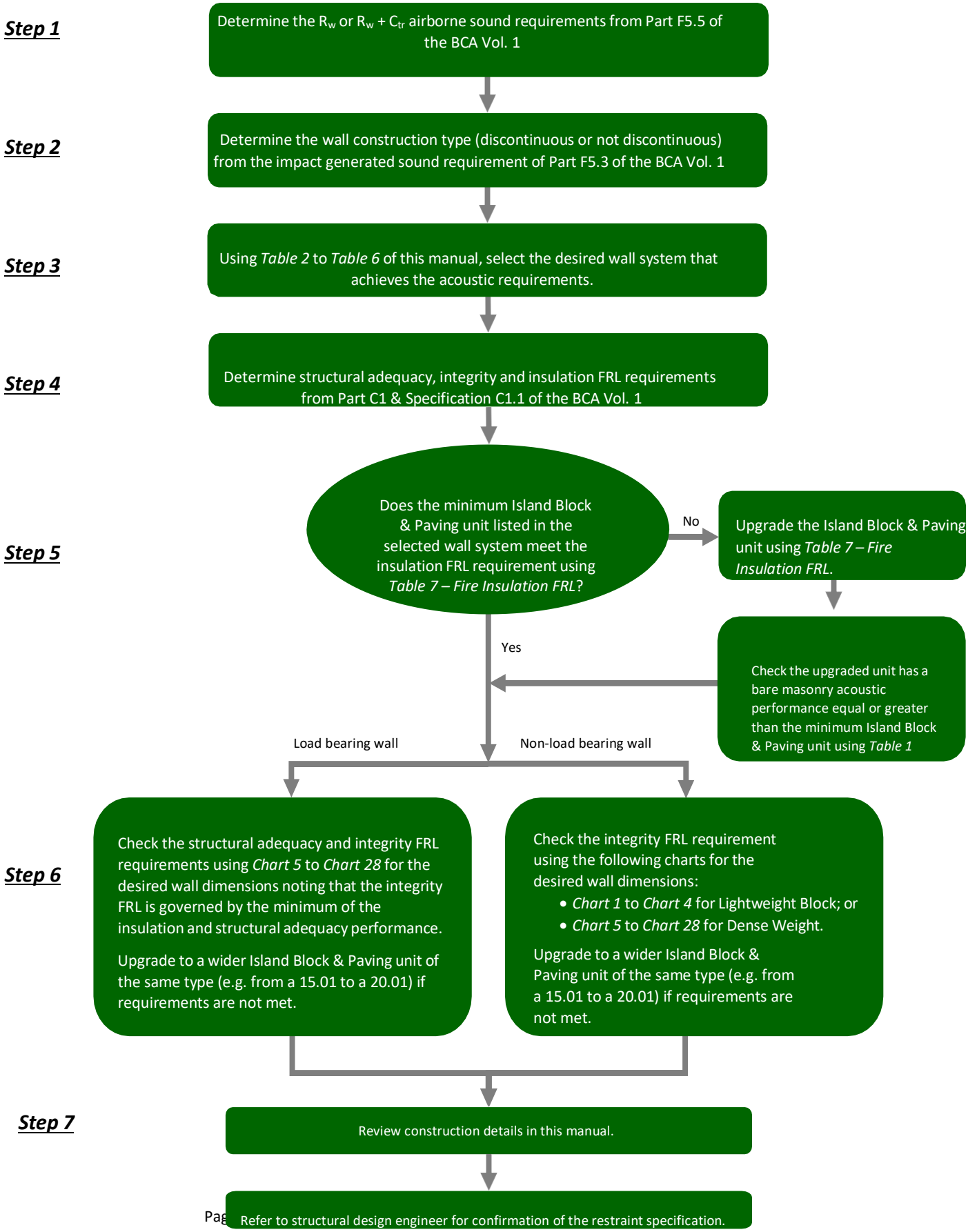
Property	Light Weight	Dense Weight
Concrete Density	<1800 kg/m^3	>1800 kg/m^3
Basaltic aggregate	< 45%	> 45%
Unconfined compressive strength f'_{uc}	≥ 15 MPa	≥ 15 MPa

Limitations

The information contained in this technical manual relates specifically to Island Block & Paving products and must not be used in relation to any other products or masonry manufacturers. The technical manual does not replace the need for qualified designers (e.g. engineers & architects) to specify project specific information and it is their responsibility to confirm the suitability of using Island Block & Paving products for a particular project. Island Block & Paving accepts no liability for errors or omissions in this technical manual and it is the user's responsibility to ensure the current edition of the manual is being used.

User Guide

The flow chart below illustrates how this manual can be used to achieve the fire and acoustic requirements of the National Construction Code – Building Code of Australia (BCA) for load bearing and non-load bearing walls incorporating Island Block & Paving units.



Acoustic Performance

Where necessary, the acoustic performance of a wall must be considered to safeguard the occupants of a part of a building from illness or loss of comfort. The two main aspects of consideration in regard to acoustic performance are airborne sound and impact generated sound.

Airborne sound is commonly measured by playing a series of differing frequency sounds on one side of a wall and measuring the sound loss on the other side. It is stated in terms of a weighted sound index (R_w), the higher the index value, the higher the element prevents the transmission of the sound. An adjustment factor is typically associated with the weighted sound index which is called the spectrum adaptation term (C_{tr}) which accounts for low frequency noise. This adjustment factor is always a negative number and is added to the weighted sound index to give a combined value lower than R_w. For example, an R_w of 53 with a C_{tr} of -6 gives an $R_w + C_{tr}$ of 47. These values are typically obtained from testing in accordance with AS/NZS 1276.1 or ISO 717.1.

Acoustic BCA Requirements

For airborne sound, the BCA outlines the requirements of walls in part F5.5 & F5.6 of Volume I for Class 2-9 buildings. For impact generated sound, the BCA requires that some walls are constructed using discontinuous construction; refer to Part F5.5 for class 2-9 buildings. These requirements can be summarized with the following list of wall types:

- Walls Separating Habitable Areas (not discontinuous construction) $R_w + C_{tr} \geq 50$
- Walls Separating Habitable and/or Wet Areas (discontinuous construction) $R_w + C_{tr} \geq 50$
- Walls Separating Common Areas (not discontinuous construction) $R_w \geq 50$
- Walls Separating Plant Room / Lift Shaft Areas (discontinuous construction) $R_w \geq 50$
- Walls Separating Class 9c Aged Care Sole Occupancy Units (not discontinuous construction) $R_w \geq 45$

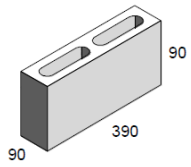
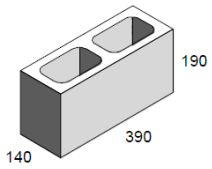
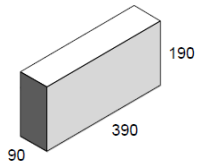
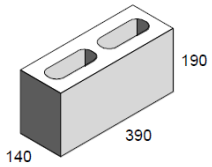
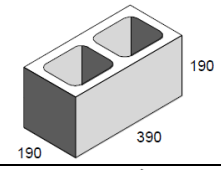
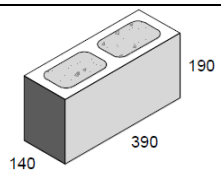
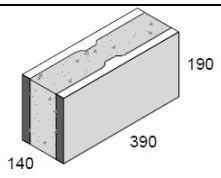
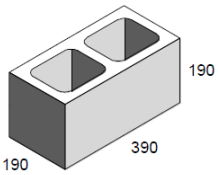
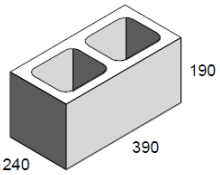
Discontinuous construction is defined by the BCA as a wall having a minimum 20 mm cavity between 2 separate leaves, and

- for masonry, where wall ties are required to connect leaves, the ties are of the resilient type; and
- for other than masonry, there is no mechanical linkage between leaves except at the periphery.

The acoustic performance of internal Island Block & Paving walls has been assessed by a leading Australian acoustic firm (refer to report reference PKA-A168). The outcomes are summarized in the following acoustic performance tables that provide solutions incorporating Island Block & Paving units meeting the BCA requirements with and without discontinuous construction.

Acoustic Performance - Bare Masonry

The table below outlines the acoustic performance of the various Island Block & Paving units alone.

Unit Code	Product type	Core-filled	Diagram	Sound Insulation Rating (R_w)
10.01	Lightweight	No		42
15.01	Lightweight	No		45
10.31	Lightweight	No		46
15.31	Lightweight (Wall thickness 127mm)	No		47
20.01	Lightweight	No		47
15.01	Lightweight	Yes		50
15.48	Lightweight	Yes		50
20.01	Dense weight	No		50
25.01	Dense weight	No		50

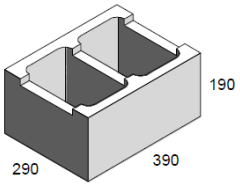
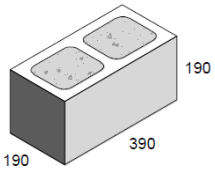
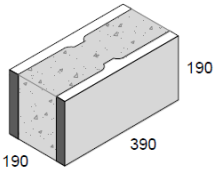
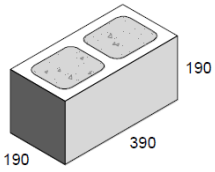
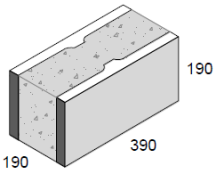
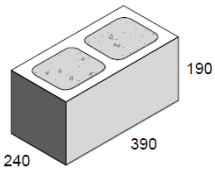
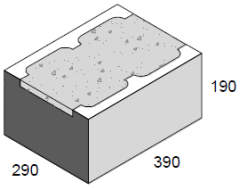
30.934	Lightweight	No		51
20.01	Lightweight	Yes		53
20.48	Lightweight	Yes		54
20.01	Dense weight	Yes		55
20.48	Dense weight	Yes		55
25.01	Dense weight	Yes		56
30.934	Lightweight	Yes		57

Table 1 – Acoustic Performance - Bare Masonry

Acoustic Performance - Walls Separating Habitable Areas (not discontinuous construction) $R_w + C_{tr} \geq 50$

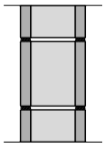
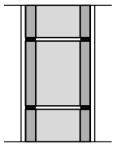
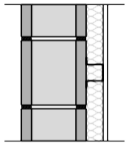
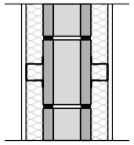
ID	Diagram	Description	Lining 1	Cavity 1	IB&P product type	Core-filled	Cavity 2	Lining 2	Wall Thickness	Acoustic Performance	
										R_w	R_w+C_{tr}
01		Bare masonry	-	-	20.48 Lightweight	YES	-	-	190 mm	54	51
02					20.01 Lightweight				190 mm	54	51
03					20.01 Dense Weight				190 mm	55	52
04		Lining 1 IB&P Lining 2	13 mm render	-	20.48 Lightweight	YES	-	13 mm render	216 mm	55	52
05					20.01 Lightweight				216 mm	55	52
06		IB&P Cavity Lining 2	-	-	20.01 Dense Weight	NO	Furring channel with adjustable clip (50 mm cavity) 50 mm glass wool	13 mm plasterboard	253 mm	59	51
07					15.01 Lightweight	YES			203 mm	60	52
08		Lining 1 Cavity IB&P Cavity Lining 2	13 mm plasterboard	Furring channel with adjustable clip (50 mm cavity) 50 mm glass wool	15.01 Lightweight	YES	Furring channel with adjustable clip (50 mm cavity) 50 mm glass wool	13 mm plasterboard	266 mm	66	51
					20.01 Lightweight	YES			316 mm	69	54

Table 2 - Acoustic Performance - Walls Separating Habitable Areas (not discontinuous construction)

Notes:

1. '13 mm plasterboard' refers to 13 mm standard grade plasterboard (8.4 kg/m²). A higher grade or increased thickness plasterboard will provide better acoustic performance.
2. '50 mm glass wool' refers to 50 mm thickness glass wool or mineral wool insulation (11 kg/m³). An increased thickness of density of insulation will provide better acoustic performance.
3. 'Furring channel' refers to 28 mm furring channel 0.5 BMT equivalent to Rondo 129.
4. 'Adjustable clip' refers to 30 mm adjustable clip equivalent to Rondo BetaGrip.
5. '64 mm steel stud' refers to 64 mm steel stud 0.75 BMT equivalent to Rondo 491.

Acoustic Performance - Walls Separating Habitable and/or Wet Areas (discontinuous construction) $R_w + C_{tr} \geq 50$

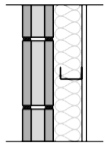
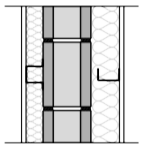
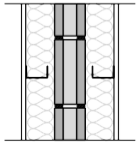
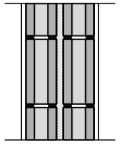
ID	Diagram	Description	Lining 1	Cavity 1	IB&P product type	Core-filled	Cavity 2	Lining 2	Wall Thickness	Acoustic Performance	
										R_w	R_w+C_{tr}
01		IB&P Masonry Cavity Lining 2	-	-	10.01 Lightweight	NO	20 mm gap 64 mm steel studs 75 mm glass wool	13 mm plasterboard	187 mm	60	52
02		Lining 1 Cavity 1 IB&P Masonry Cavity 2 Lining 2	13 mm plasterboard	Furring channel with adjustable clip (50 mm cavity) 50 mm glass wool	15.01 Lightweight	NO	20 mm gap 64 mm steel studs 75 mm glass wool	13 mm plasterboard	300 mm	66	50
03					10.31 Lightweight	-			250 mm	67	52
04		Lining 1 Cavity 1 IB&P Masonry Cavity 2 Lining 2	13 mm plasterboard	64 mm steel studs 75 mm glass wool 20 mm gap	10.01 Lightweight	NO	20 mm gap 64 mm steel studs 75 mm glass wool	13 mm plasterboard	284 mm	68	53
05		Lining 1 IB&P Masonry Cavity 1 IB&P Masonry Lining 2	13 mm render	20 mm gap 25 mm glass wool	Two skins of 10.01 Lightweight	NO	-	13 mm render	226 mm	58	52

Table 3 - Acoustic Performance - Walls Separating Habitable and/or Wet Areas (discontinuous construction)

Notes:

1. '13 mm plasterboard' refers to 13 mm standard grade plasterboard (8.4 kg/m^2). A higher grade or increased thickness plasterboard will provide better acoustic performance.
2. '75 mm glass wool' refers to 75 mm thickness glass wool or mineral wool insulation (14 kg/m^3). An increased thickness of density of insulation will provide better acoustic performance.
3. '50 mm glass wool' refers to 50 mm thickness glass wool or mineral wool insulation (11 kg/m^3). An increased thickness of density of insulation will provide better acoustic performance.
4. '25 mm glass wool' refers to 25 mm thickness glass wool or mineral wool insulation (18 kg/m^3). An increased thickness of density of insulation will provide better acoustic performance.
5. 'Furring channel' refers to 28 mm furring channel 0.5 BMT equivalent to Rondo 129.
6. 'Adjustable clip' refers to 30 mm adjustable clip equivalent to Rondo BetaGrip.
7. '64 mm steel stud' refers to 64 mm steel stud 0.75 BMT equivalent to Rondo 491.

Acoustic Performance - Walls Separating Common Areas (not discontinuous construction) $R_w \geq 50$

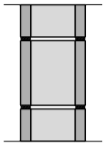
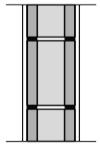
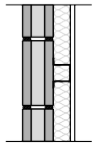
ID	Diagram	Description	Lining 1	Cavity 1	IB&P product type	Core-filled	Cavity 2	Lining 2	Wall Thickness	Acoustic Performance
										R_w
01		Bare masonry	-	-	15.01 Lightweight Block	YES	-	-	140 mm	51
02					20.01 Dense Weight	NO		-	190 mm	50
03		Lining 1 IB&P Lining 2	13 mm render	-	15.31 Lightweight Fire Block	NO	-	13 mm render	166 mm	50
04		IB&P Cavity Lining 2	-	-	10.01 Lightweight Block	NO	Furring channel with adjustable clip (50 mm cavity) 50 mm glass wool	13 mm plasterboard	153 mm	51

Table 4 - Acoustic Performance - Walls Separating Common Areas (not discontinuous construction)

Notes:

1. '13 mm plasterboard' refers to 13 mm standard grade plasterboard (8.4 kg/m^2). A higher grade or increased thickness plasterboard will provide better acoustic performance.
2. '75 mm glass wool' refers to 75 mm thickness glass wool or mineral wool insulation (14 kg/m^3). An increased thickness of density of insulation will provide better acoustic performance.
3. '50 mm glass wool' refers to 50 mm thickness glass wool or mineral wool insulation (11 kg/m^3). An increased thickness of density of insulation will provide better acoustic performance.
4. '25 mm glass wool' refers to 25 mm thickness glass wool or mineral wool insulation (18 kg/m^3). An increased thickness of density of insulation will provide better acoustic performance.
5. 'Furring channel' refers to 28 mm furring channel 0.5 BMT equivalent to Rondo 129.
6. 'Adjustable clip' refers to 30 mm adjustable clip equivalent to Rondo BetaGrip.
7. '64 mm steel stud' refers to 64 mm steel stud 0.75 BMT equivalent to Rondo 491.

Acoustic Performance - Walls Separating Plant Room / Lift Shaft Areas (discontinuous construction) $R_w \geq 50$

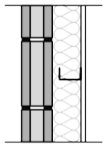
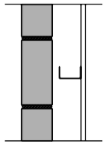
ID	Diagram	Description	Lining 1	Cavity 1	IB&P product type	Core-filled	Cavity 2	Lining 2	Wall Thickness	Acoustic Performance
										R_w
01		IB&P Cavity 2 Lining 2	-	-	10.01 Lightweight Block	NO	20 mm gap 64 mm steel studs 75 mm glass wool	13 mm plasterboard	187 mm	60
02		IB&P Cavity 2 Lining 2	-		10.31 Lightweight Block	-	20 mm gap 64 mm steel studs	13 mm plasterboard	187 mm	52

Table 5 - Acoustic Performance - Walls Separating Plant Room / Lift Shaft Areas (discontinuous construction)

Notes:

1. '13 mm plasterboard' refers to 13 mm standard grade plasterboard (8.4 kg/m^2). A higher grade or increased thickness plasterboard will provide better acoustic performance.
2. '75 mm glass wool' refers to 75 mm thickness glass wool or mineral wool insulation (14 kg/m^3). An increased thickness of density of insulation will provide better acoustic performance.
3. '50 mm glass wool' refers to 50 mm thickness glass wool or mineral wool insulation (11 kg/m^3). An increased thickness of density of insulation will provide better acoustic performance.
4. '25 mm glass wool' refers to 25 mm thickness glass wool or mineral wool insulation (18 kg/m^3). An increased thickness of density of insulation will provide better acoustic performance.
5. 'Furring channel' refers to 28 mm furring channel 0.5 BMT equivalent to Rondo 129.
6. 'Adjustable clip' refers to 30 mm adjustable clip equivalent to Rondo BetaGrip.
7. '64 mm steel stud' refers to 64 mm steel stud 0.75 BMT equivalent to Rondo 491.

Acoustic Performance - Walls Separating Class 9c Aged Care Units (not discontinuous construction) $R_w \geq 45$

Note: This is only for walls that separate the sole occupancy units in class 9c aged care buildings.

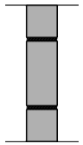
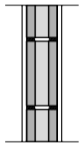
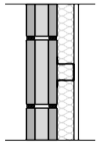
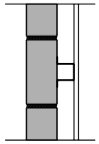
ID	Diagram	Description	Lining 1	Cavity 1	IB&P product type	Core-filled	Cavity 2	Lining 2	Wall Thickness	Acoustic Performance
										R_w
01		IB&P Masonry	-	-	10.31 Lightweight Block	-	-	-	90 mm	46
02					15.01 Lightweight Block	NO			140 mm	45
03		Lining 1 IB&P Masonry Lining 2	13 mm render	-	10.01 Lightweight Block	NO	-	13 mm render	116 mm	45
04		IB&P Masonry Cavity 2 Lining 2	-	-	10.01 Lightweight Block	NO	Furring channel with adjustable clip (50 mm cavity) 50 mm glass wool	13 mm plasterboard	153 mm	51
05		IB&P Masonry Cavity 2 Lining 2	-	-	10.31 Lightweight Block	YES	Furring channel with adjustable clip (50 mm cavity)	13 mm plasterboard	153 mm	48

Table 6 - Acoustic Performance - Walls Separating Class 9c Aged Care Sole Occupancy Units (not discontinuous construction)

Notes:

1. '13 mm plasterboard' refers to 13 mm standard grade plasterboard (8.4 kg/m^2). A higher grade or increased thickness plasterboard will provide better acoustic performance.
2. '75 mm glass wool' refers to 75 mm thickness glass wool or mineral wool insulation (14 kg/m^3). An increased thickness of density of insulation will provide better acoustic performance.
3. '50 mm glass wool' refers to 50 mm thickness glass wool or mineral wool insulation (11 kg/m^3). An increased thickness of density of insulation will provide better acoustic performance.
4. '25 mm glass wool' refers to 25 mm thickness glass wool or mineral wool insulation (18 kg/m^3). An increased thickness of density of insulation will provide better acoustic performance.
5. 'Furring channel' refers to 28 mm furring channel 0.5 BMT equivalent to Rondo 129.
6. 'Adjustable clip' refers to 30 mm adjustable clip equivalent to Rondo BetaGrip.
7. '64 mm steel stud' refers to 64 mm steel stud 0.75 BMT equivalent to Rondo 491.

Fire resistance performance

The fire resistance performance of a masonry wall is considered with regards to three characteristics: *structural adequacy, integrity & insulation*. Each characteristic is expressed in terms of the number of minutes that the wall can resist a particular fire intensity defined by AS 1530.4-2005. For example, a fire resistance level (FRL) of 180/120/120 implies 180 minutes of resistance for structural adequacy, 120 minutes of resistance for integrity and 120 minutes of resistance for insulation. Each characteristic is defined by AS 1530.4-2005 as follows:

Structural adequacy:	The ability of a load-bearing element of construction to support a load when tested in accordance with AS 1530.4-2005.
Integrity:	The ability of an element of construction to resist the passage of flames and hot gases from one space to another, when tested in accordance with AS 1530.4-2005.
Insulation:	The ability of an element of construction to maintain a temperature on the surface that is not exposed to the furnace, below the limits specified, when tested in accordance with AS 1530.4-2005.

When a wall is in a non-load bearing situation, the FRL for structural adequacy is stated as a dash, e.g. -/120/120.

Fire BCA Requirements

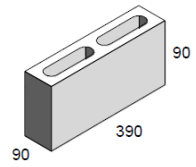
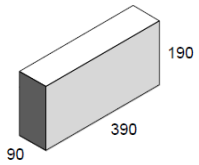
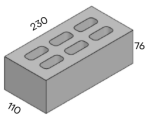
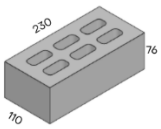
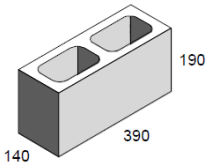
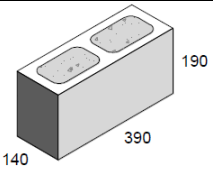
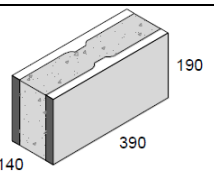
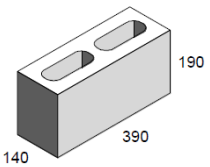
The BCA sets out the FRL requirements for all wall situations in various building types, refer to Part C1 and Specification C1.1 of the BCA Volume 1. For masonry structures, the BCA allows the use of AS 3700-2011 to determine the FRL of a particular masonry wall solution, as stated in specification A2.3 of BCA Volume I, to meet the required FRL. That is, by designing a masonry wall in accordance with AS 3700-2011 for an FRL equal to or greater than the FRL required by the BCA, the requirements of the BCA are satisfied.

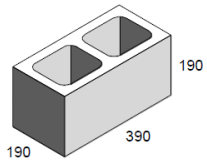
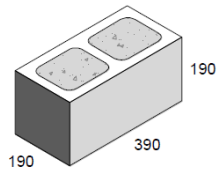
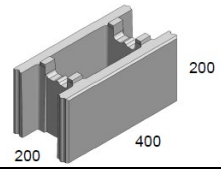
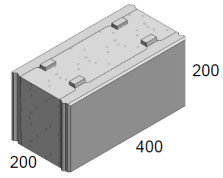
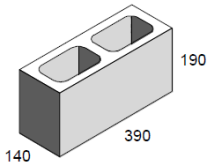
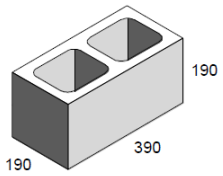
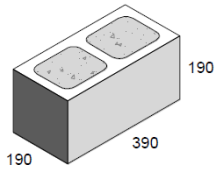
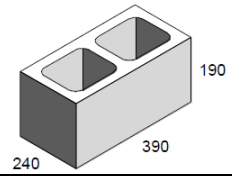
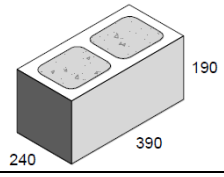
AS 3700-2011 provides two methods for determining the fire resistance of a masonry wall in section 6 of the standard. The methods consist of a) design from tabulated values; and b) design based on test results.

The results of these tests have been used in accordance with section 6 of AS 3700-2011 to provide the insulation and integrity FRL's listed in the manual for the Lightweight products. For all other products and situations, the FRL's stated in this manual have been designed by the tabulated values of AS 3700-2011.

Fire Insulation Performance - Load Bearing & Non-load Bearing Walls

The table below outlines the fire resistance performance of IB&P units for insulation FRL's.

Insulation FRL for IB&P Masonry Load Bearing & Non-load bearing walls											
Unit Code	**Product type**	**Core-filled**	**Diagram**	**Material Thickness (mm)**	**Fire resistance level for insulation FRL (mins)**						**Reference document**
					30	**60**	**90**	**120**	**180**	**240**	
10.01	Lightweight	No		64.1			**90**				Deemed to satisfy AS 3700
10.31	Lightweight	No		90.0				**120**			Deemed to satisfy AS 3700
120.715	Lightweight	No		90.0				**120**			Deemed to satisfy AS 3700
120.715	Dense weight	No		90.0			**90**				Deemed to satisfy AS 3700
15.01	Lightweight	No		92.0				**120**			CSIRO Test No. 0386
15.01	Lightweight	Yes		140.0				**120**			CSIRO Test No. 0386
15.48	Lightweight	Yes		140.0				**120**			CSIRO Test No. 0386
15.31	Lightweight Fire Block	No		127.0						**240**	Deemed to satisfy AS 3700

20.01	Lightweight	No		98.2	**120**	Deemed to satisfy AS 3700
20.01	Lightweight	Yes		190.0	**240**	Deemed to satisfy AS 3700
DIY	Lightweight	No		98.5	**120**	Deemed to satisfy AS 3700
DIY	Lightweight	Yes		199.5	**240**	Deemed to satisfy AS 3700
15.01	Dense weight	No		92.0	**60**	Deemed to satisfy AS 3700
20.01	Dense weight	No		103.0	**90**	Deemed to satisfy AS 3700
20.01	Dense weight	Yes		190.0	**240**	Deemed to satisfy AS 3700
25.01	Dense weight	No		127.0	**120**	Deemed to satisfy AS 3700
25.01	Dense weight	Yes		240.0	**240**	Deemed to satisfy AS 3700

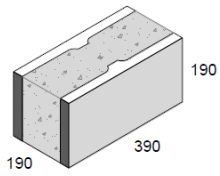
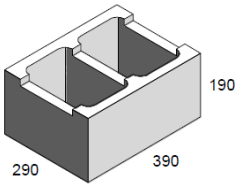
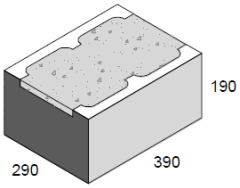
20.48	Lightweight	Yes		190.0	**240**	Deemed to satisfy AS 3700
30.934	Lightweight	No		137.1	**180**	Deemed to satisfy AS 3700
30.934	Lightweight	Yes		290.0	**240**	Deemed to satisfy AS 3700

Table 7 – Fire Insulation FRL performance

Addition products

For all other product types please refer the table 8 extract from Concrete Masonry Association Australia's technical manual CMAA MA55 FIRE

FIRE RESISTANCE LEVEL FOR INSULLATION

Masonry Unit Thickness (mm) and Type	Material Thickness (mm)	INSULATION FIRE RESISTANCE LEVEL (minutes) Material Density > 1800 kg/m³	Material Density ≤ 1800 kg/m³
90 cored or solid[1]	90	60	90
90 cored or solid[1] + 12 mm cement render each face	102	90	90
110 cored or solid[1]	110	90	120
110 cored or solid[1] + 12 mm cement render each face	122	120	120
140 hollow[2] (ET[3] ≥ 80)	80	60	60
140 hollow (ET[3] ≥ 98)	140	120	180
140 hollow[2] fully grouted	140	120	180
140 hollow[2] (ET[3] ≥ 88)+ 12 mm cement render each face	100	90	90
140 hollow[2] (ET[3] ≥ 110) + 12 mm cement render each face	152	180	180
190 hollow[2] (ET[3] ≥ 90)	90	60	90
190 hollow[2] (ET[3] ≥ 100)	100	90	90
190 hollow fully grouted	190	240	240
190 hollow[2] (ET[3] ≥ 90)+ 12 mm cement render each face	102	90	90
190 hollow[2] (ET[3] ≥ 100) + 12 mm cement render each face	112	90	120
90 cored or solid + 90 cored or solid[1] cavity wall	180	240	240
90 cored or solid + 110 cored or solid[1] cavity wall	200	240	240
110 cored or solid + 110 cored or solid[1] cavity wall	220	240	240

NOTES:
1 Cores less than 30% of the unit volume
(For 90 mm and 110 mm units, material thickness will be 90 mm and 110 mm respectively, irrespective of how the units are bedded)
2 Cores greater than 30% of the unit volume
3 Equivalent thickness of the masonry unit (net volume divided by face area)

Table 8 – CMAA MA55 FIRE manual

Fire Integrity Performance - Non-load Bearing IB&P Masonry Walls

The fire tests undertaken on the Lightweight Block products showed that for integrity the fire resistance is 241 minutes based on a slenderness of 25, which considers the overall thickness of the units and the support conditions of the test. Based on this result, the following charts have been prepared to show the maximum spans of IB&P Lightweight Block non-load bearing walls for various support conditions for 240 minutes integrity FRL.

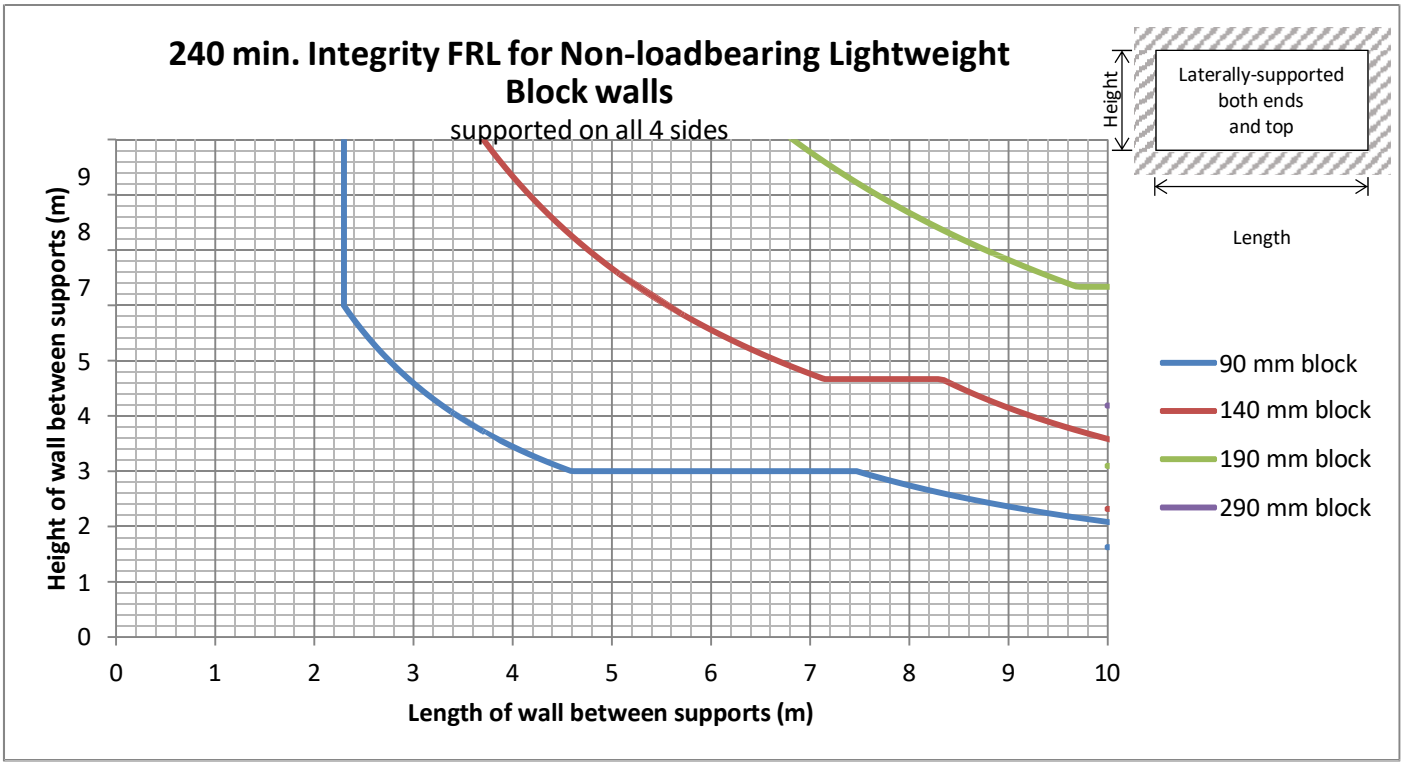


Chart 1 – Lightweight Block 240 min. Integrity FRL for walls supported on all sides

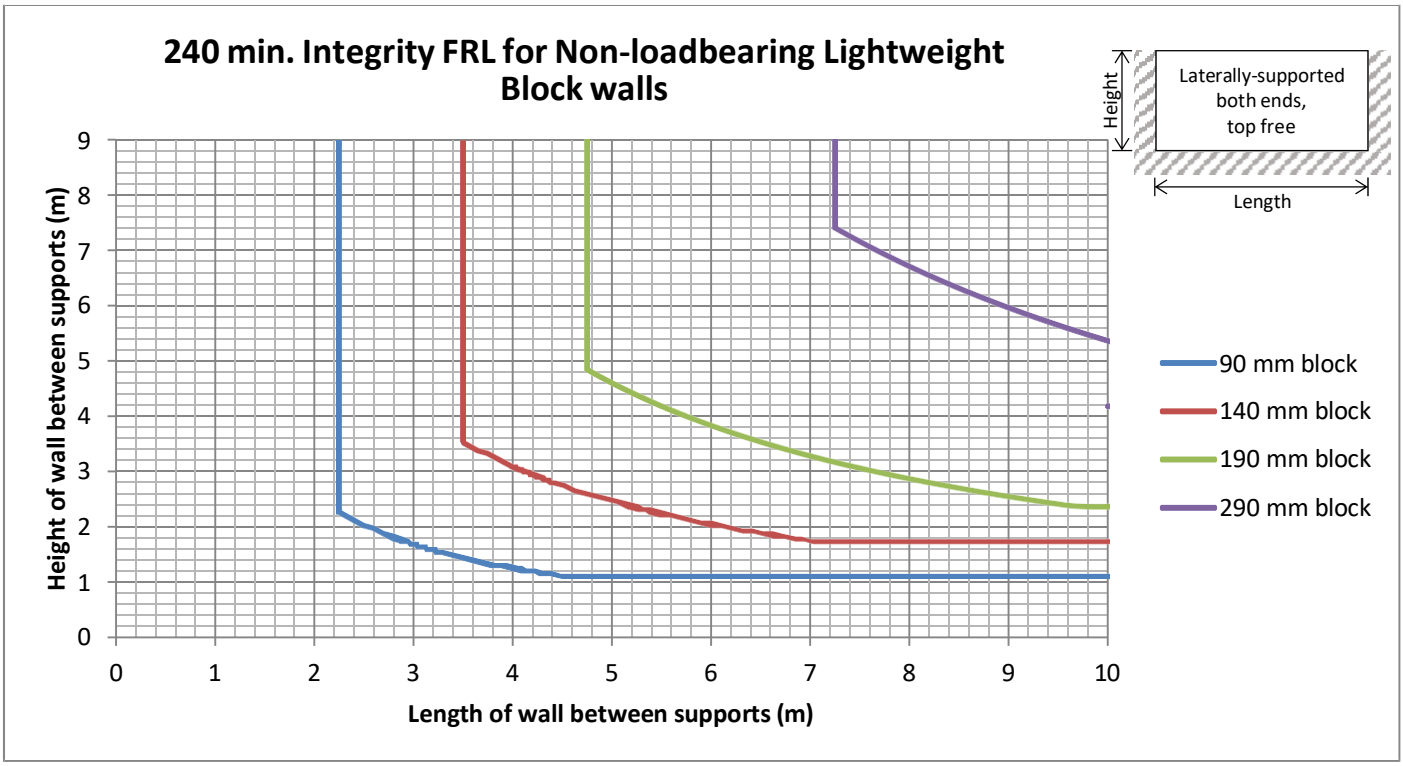


Chart 2 – Lightweight Block 240 min. Integrity FRL for walls supported on 3 sides (top free)

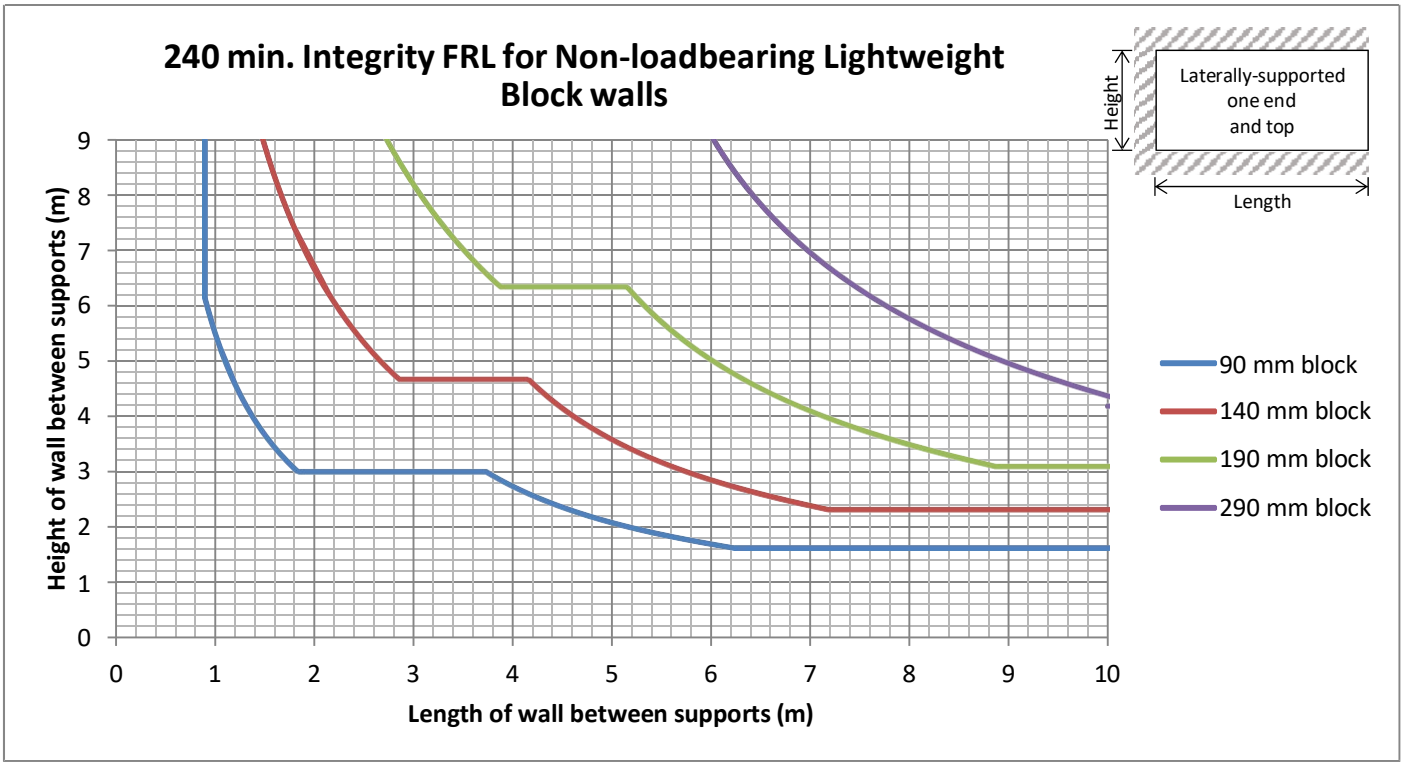


Chart 3 – Lightweight Block 240 min. Integrity FRL for walls support on 3 sides (edge free)

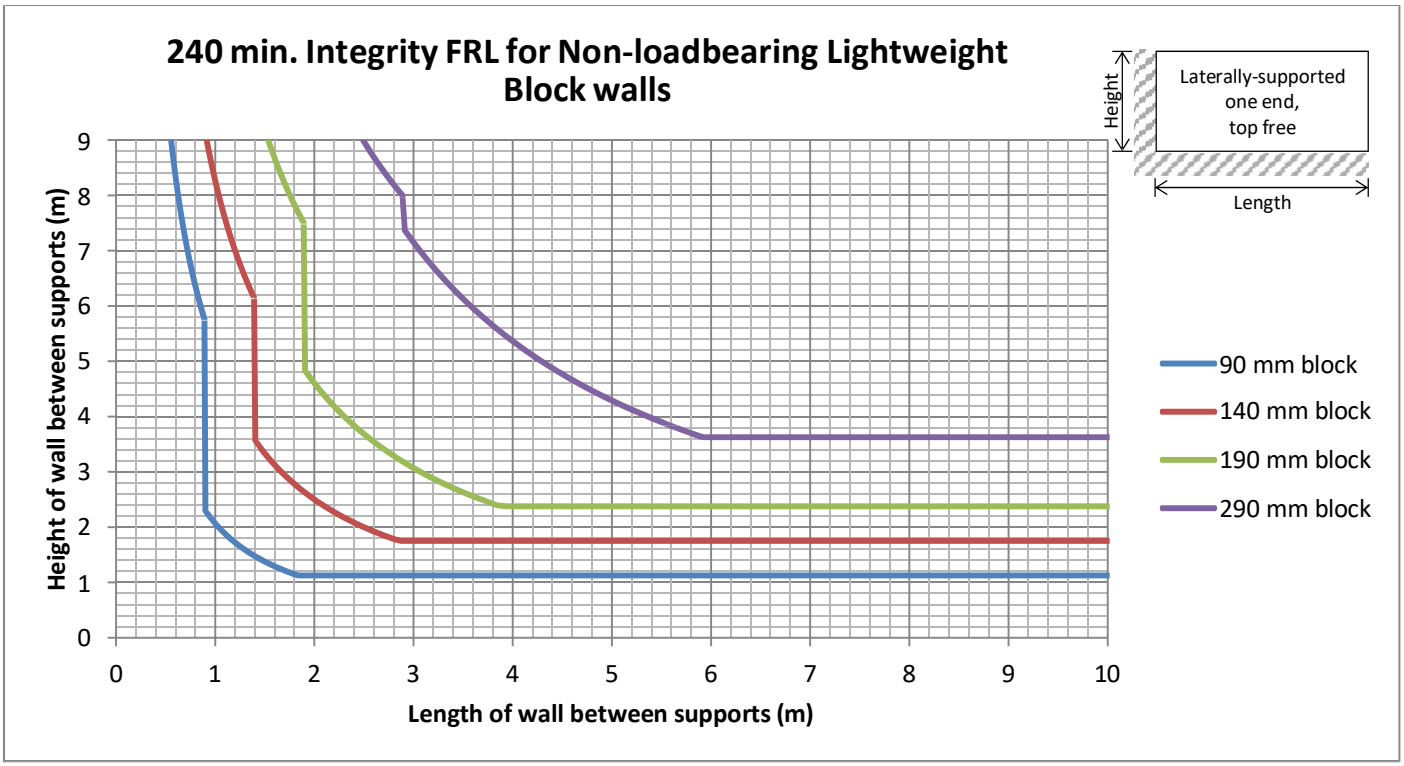


Chart 4 – Lightweight Block 240 min. Integrity FRL for walls supported on side and base only (top & other side free)

Fire Integrity Performance - Non-load Bearing Dense Weight Walls

The following charts have been calculated using the tabulated value method of AS 3700-2011 to show the maximum spans of Dense Weight non-load bearing walls for various fire integrity FRL's and support conditions.

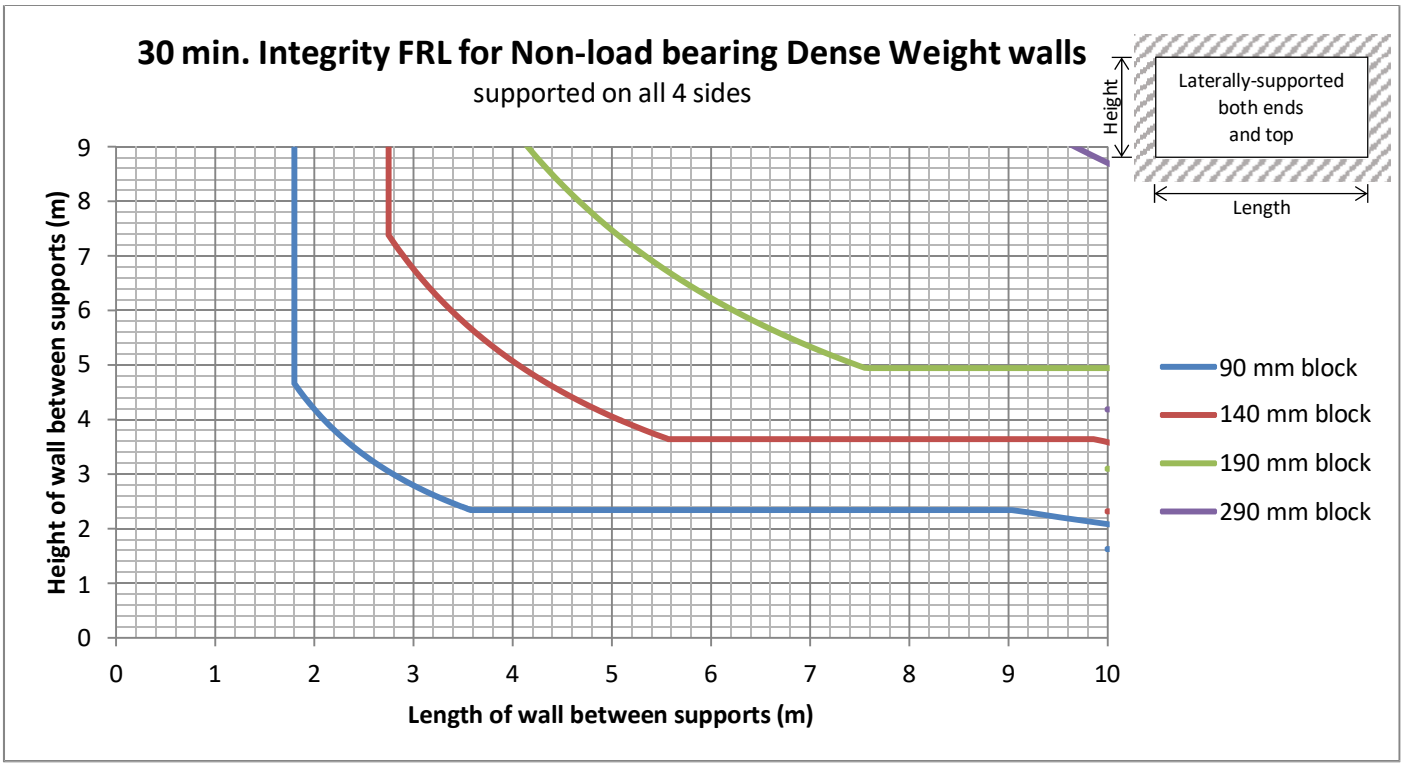


Chart 5 – Dense Weight 30 min. Integrity FRL for walls supported on all sides

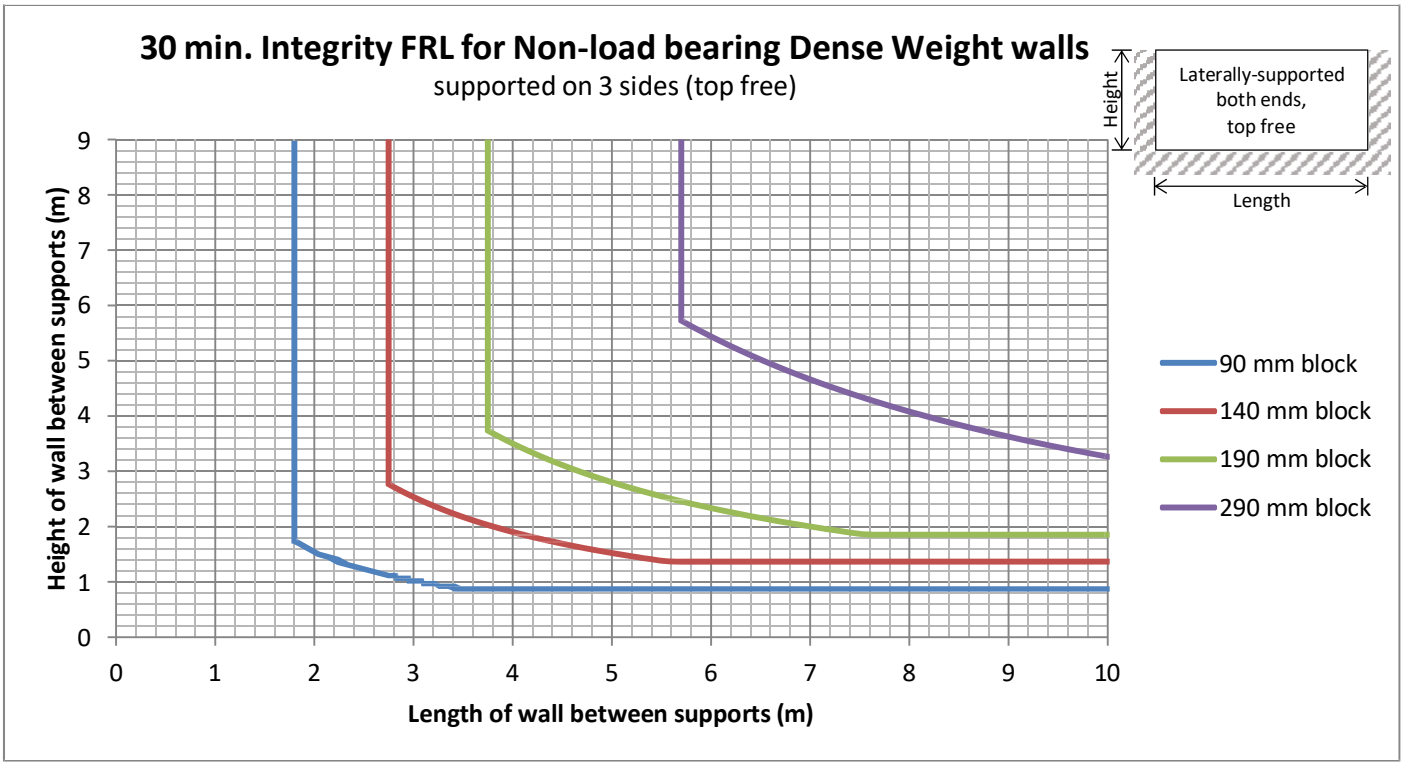


Chart 6 – Dense Weight 30 min. Integrity FRL for walls supported on 3 sides (top free)

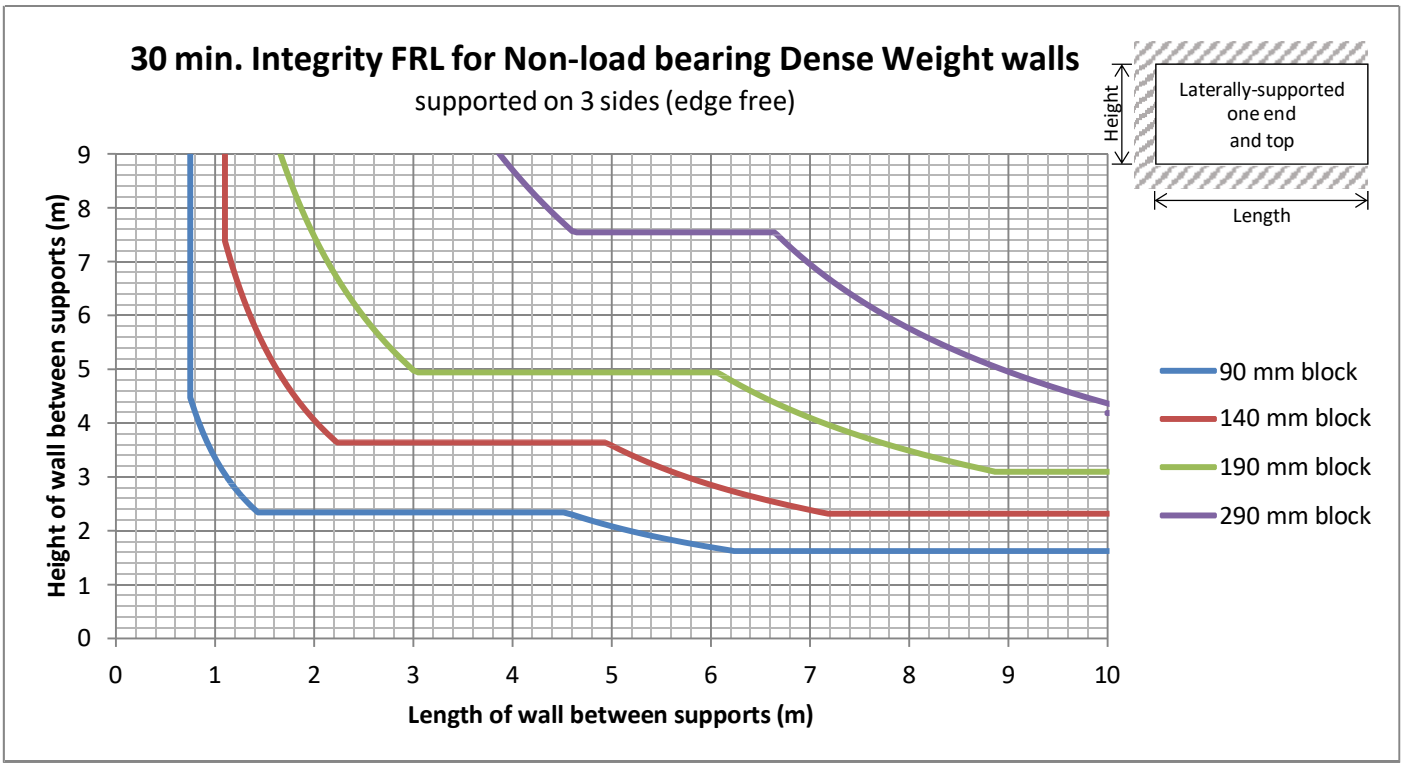


Chart 7 – Dense Weight 30 min. Integrity FRL for walls support on 3 sides (edge free)

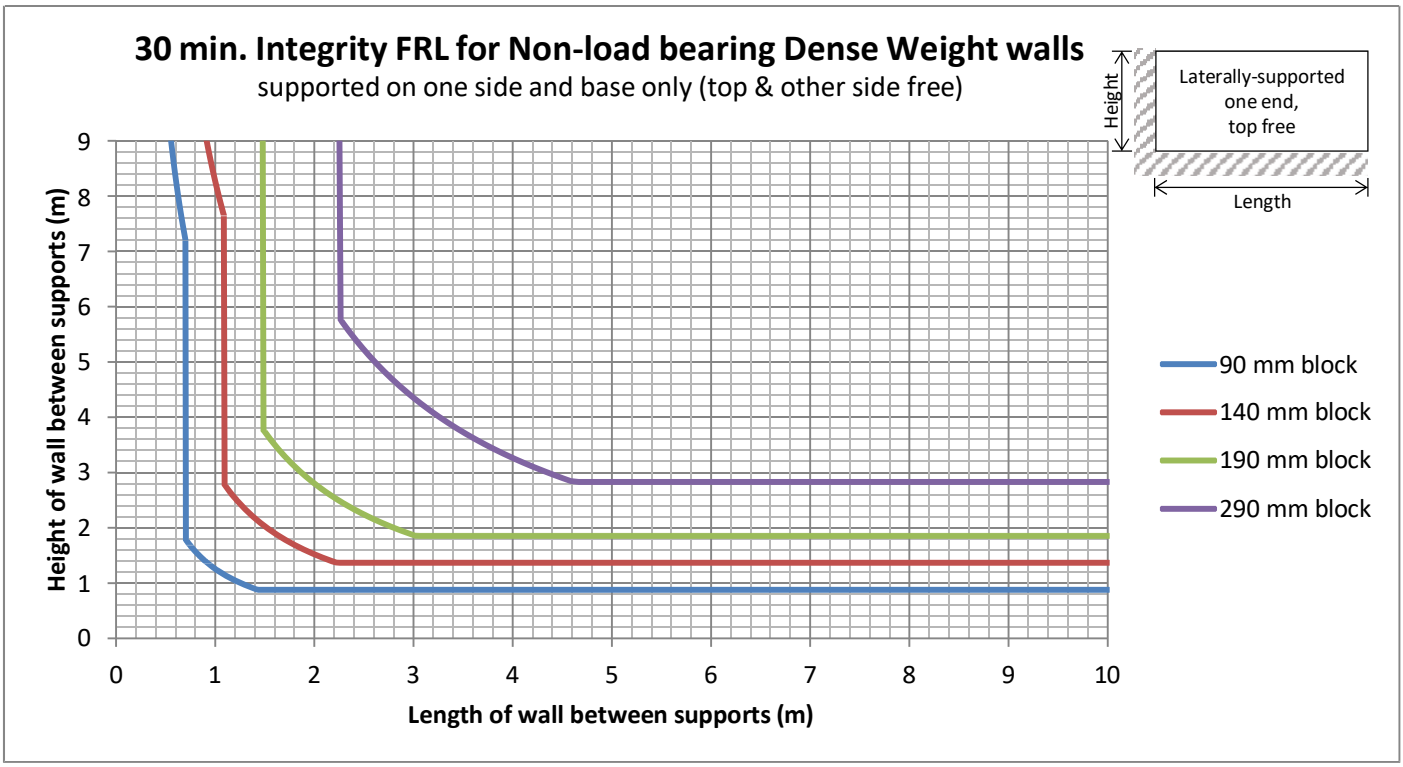


Chart 8 – Dense Weight 30 min. Integrity FRL for walls supported on side and base only (top & other side free)

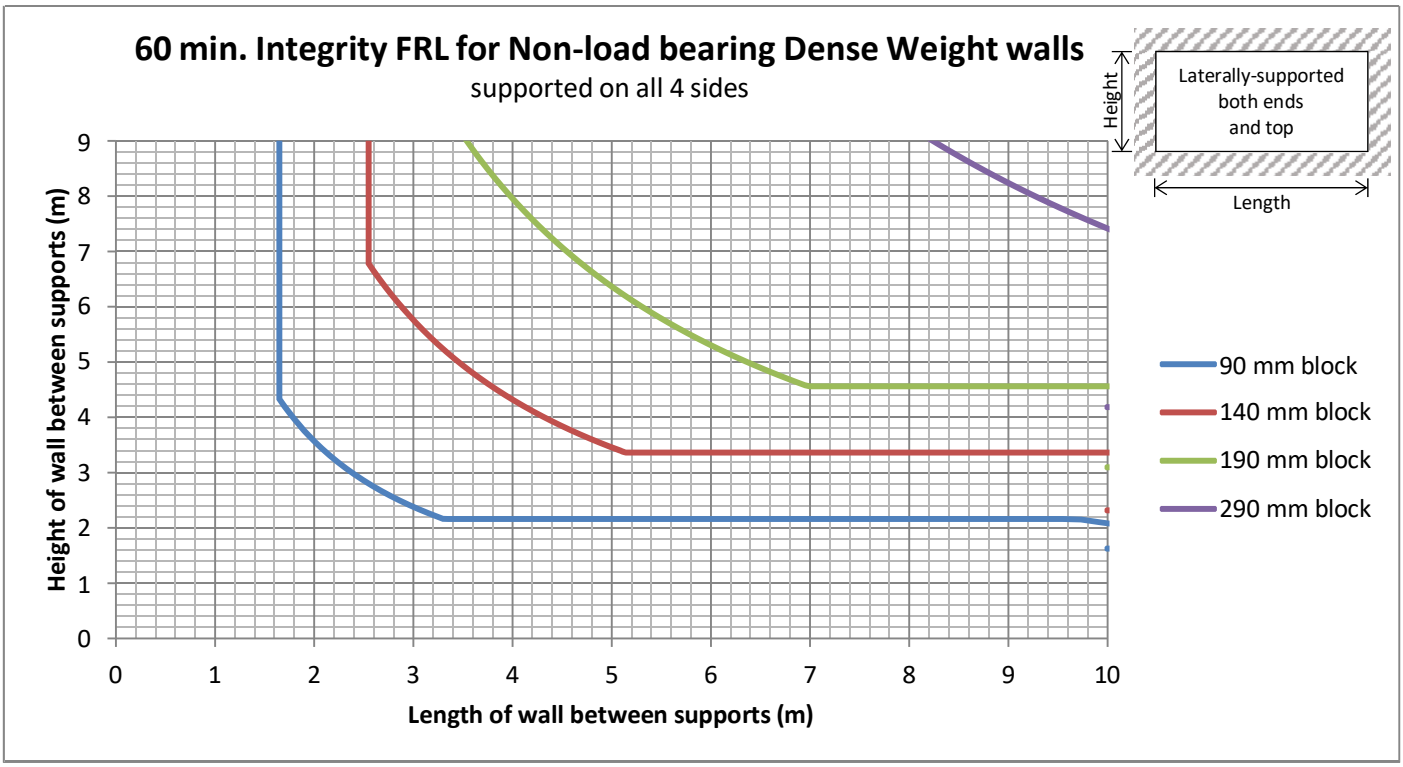


Chart 9 – Dense Weight 60 min. Integrity FRL for walls supported on all sides

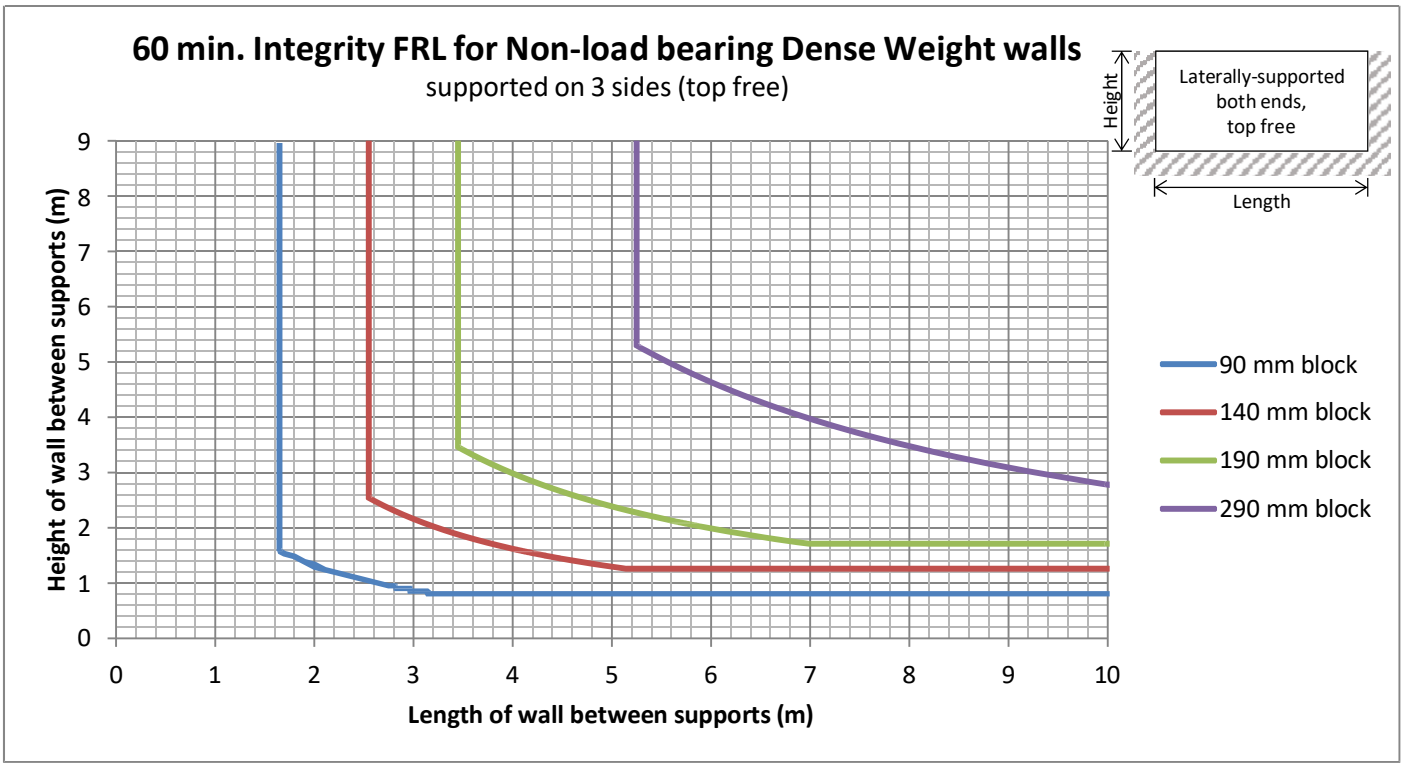


Chart 10 – Dense Weight 60 min. Integrity FRL for walls supported on 3 sides (top free)

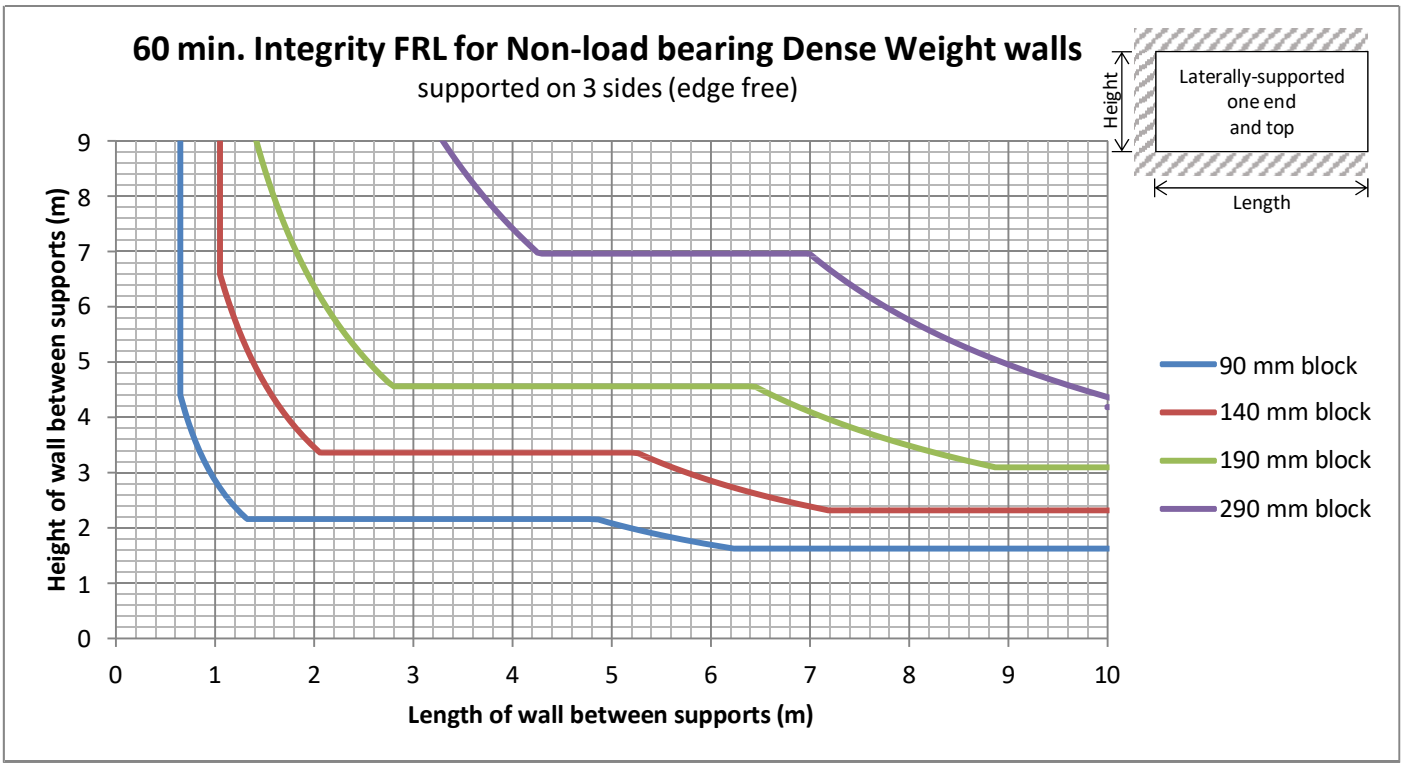


Chart 11 – Dense Weight 60 min. Integrity FRL for walls support on 3 sides (edge free)

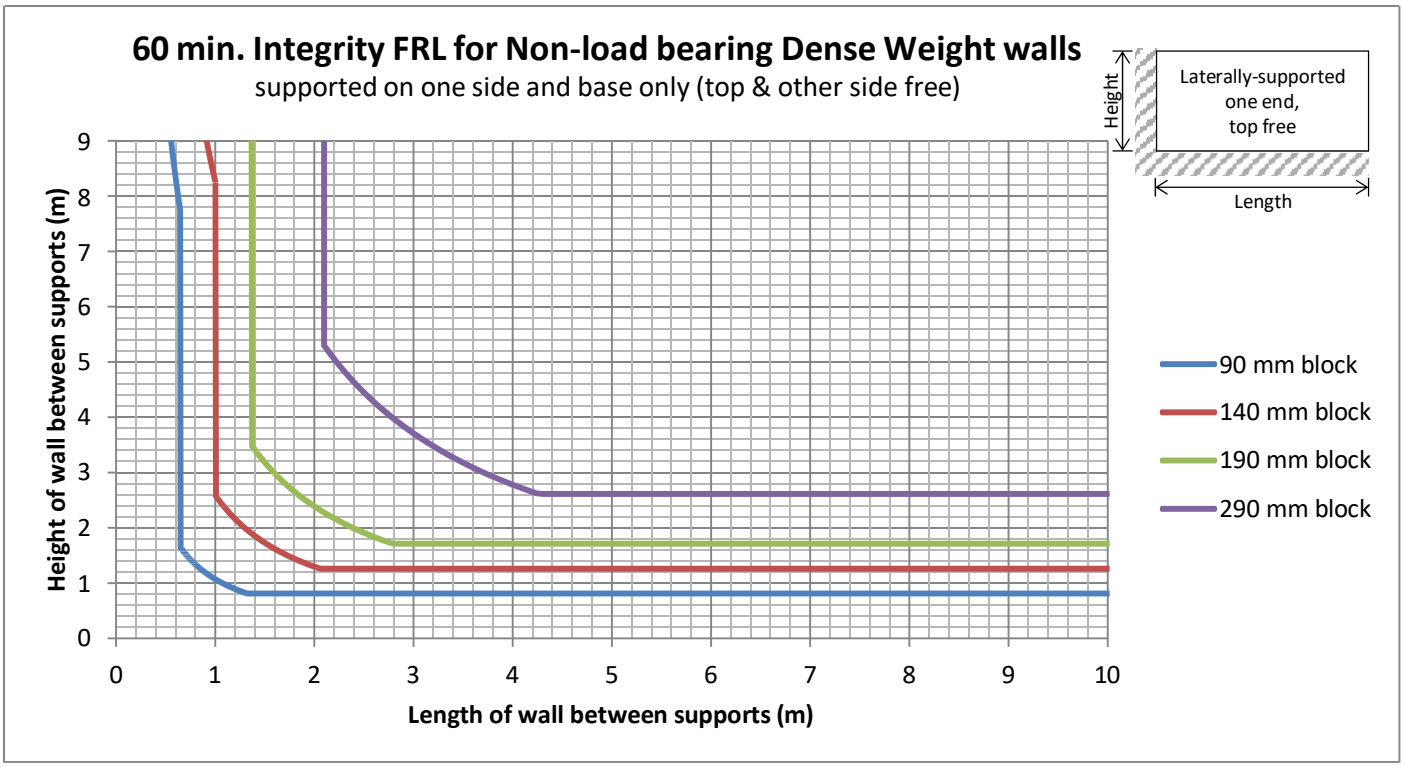


Chart 12 – Dense Weight 60 min. Integrity FRL for walls supported on side and base only (top & other side free)

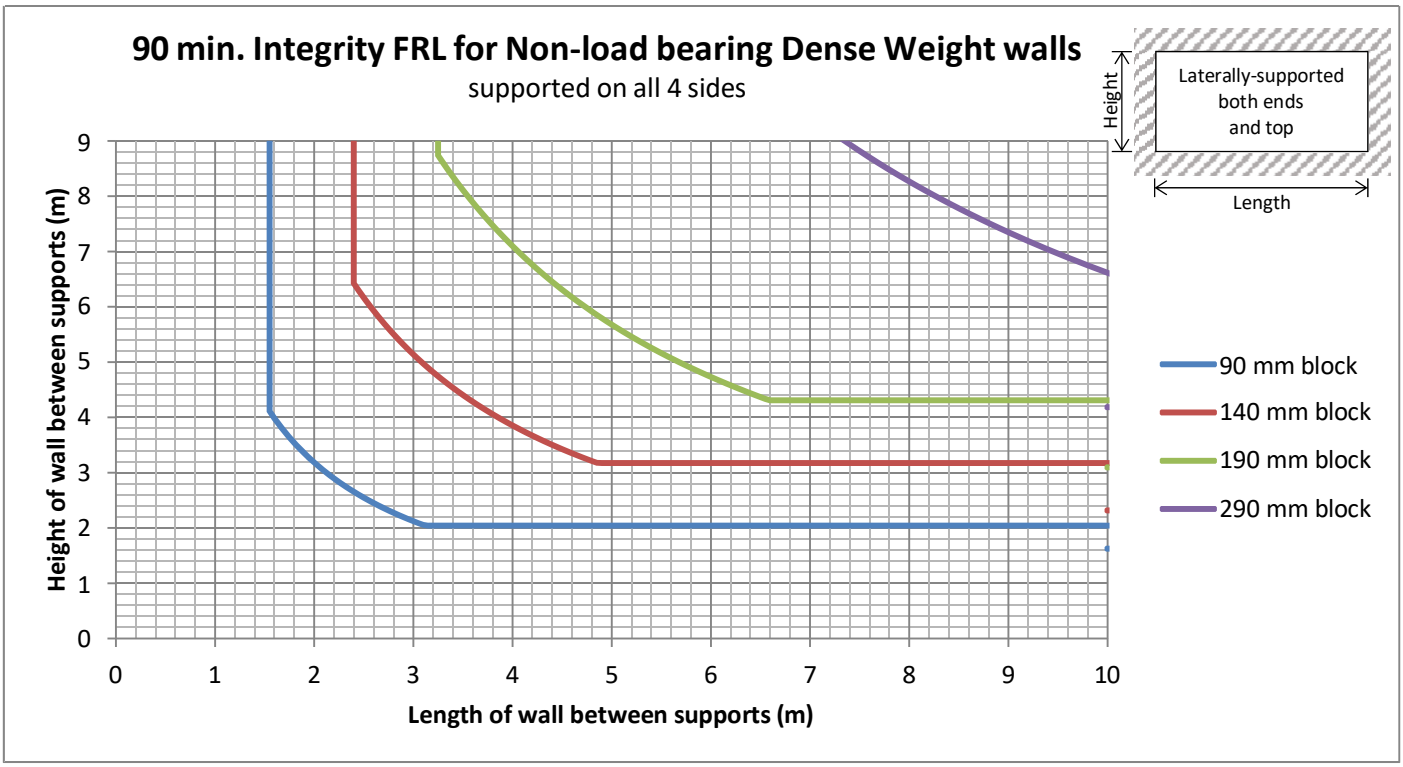


Chart 13 – Dense Weight 90 min. Integrity FRL for walls supported on all sides

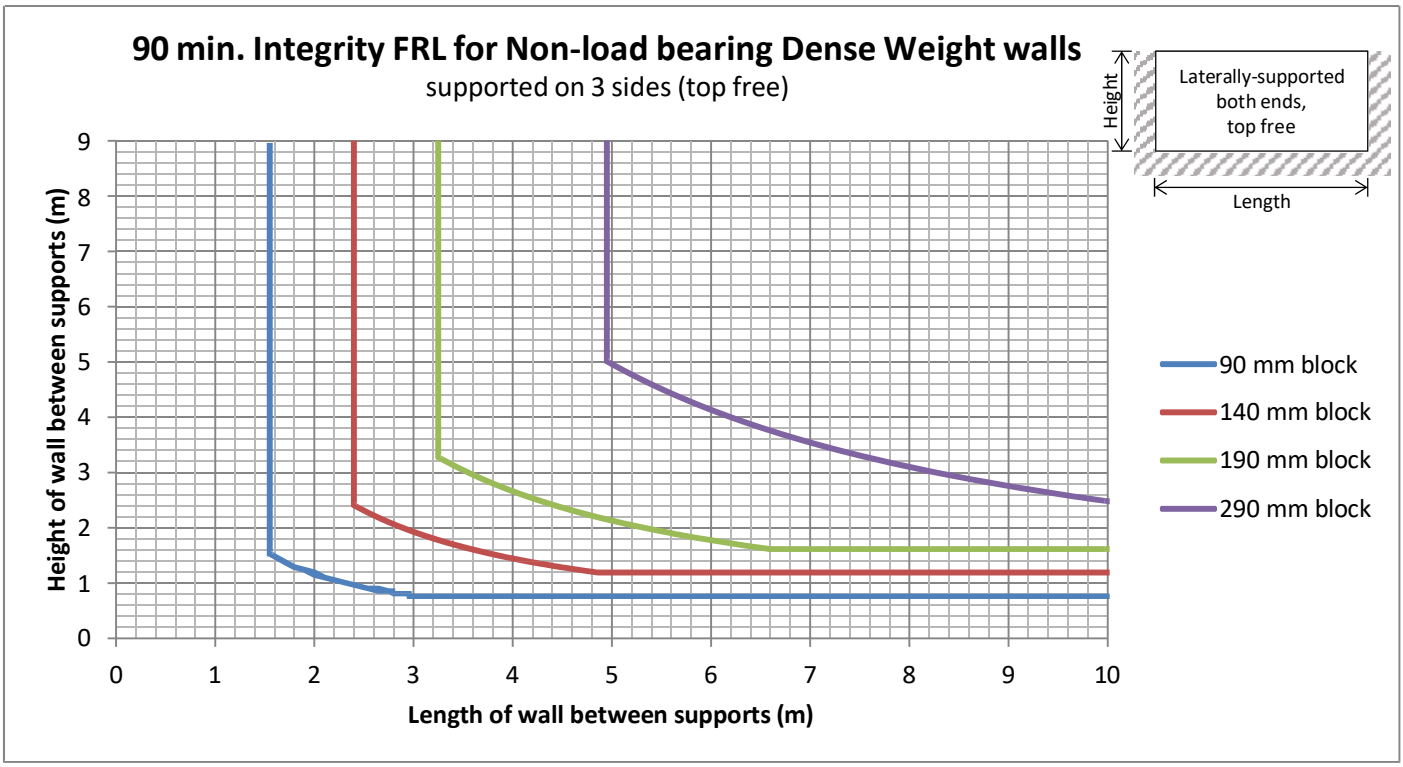


Chart 14 – Dense Weight 90 min. Integrity FRL for walls supported on 3 sides (top free)

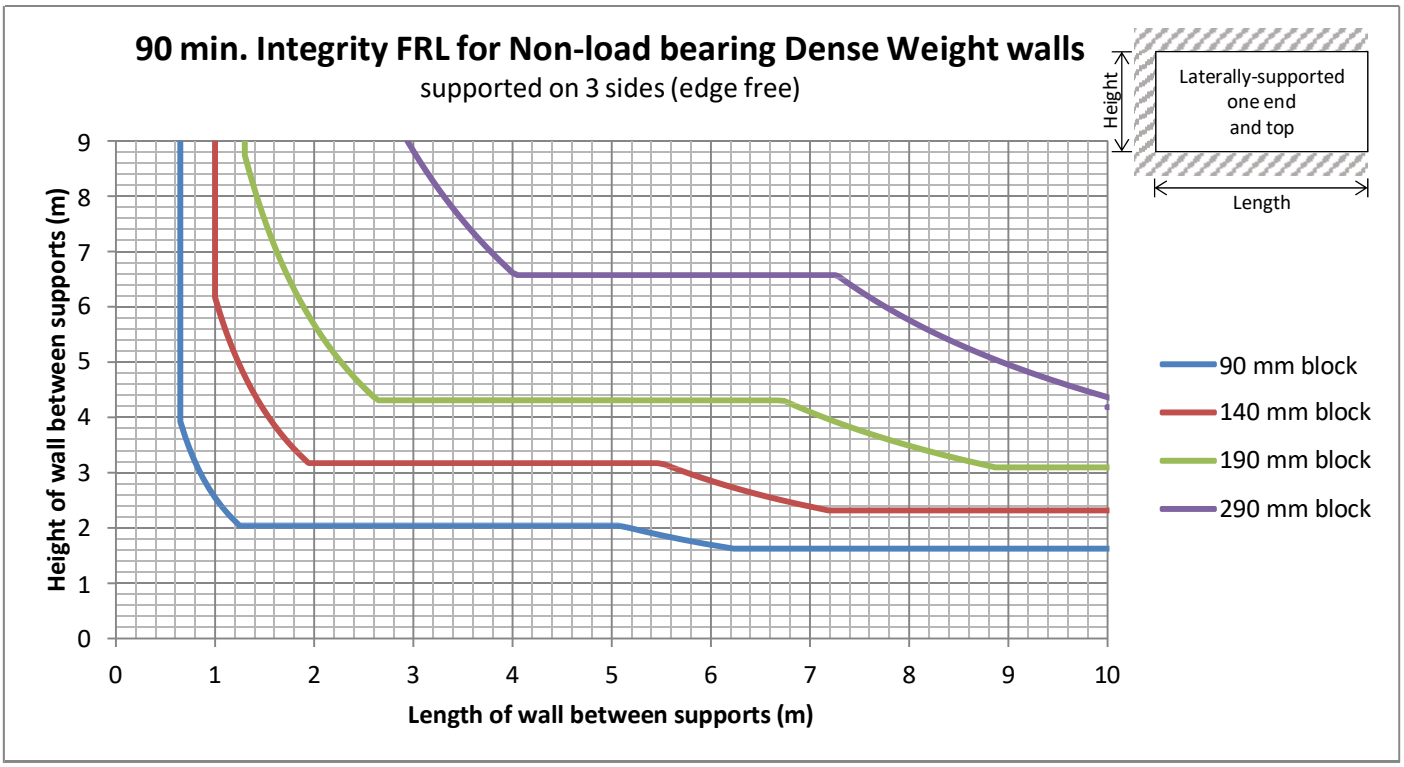


Chart 15 – Dense Weight 90 min. Integrity FRL for walls support on 3 sides (edge free)

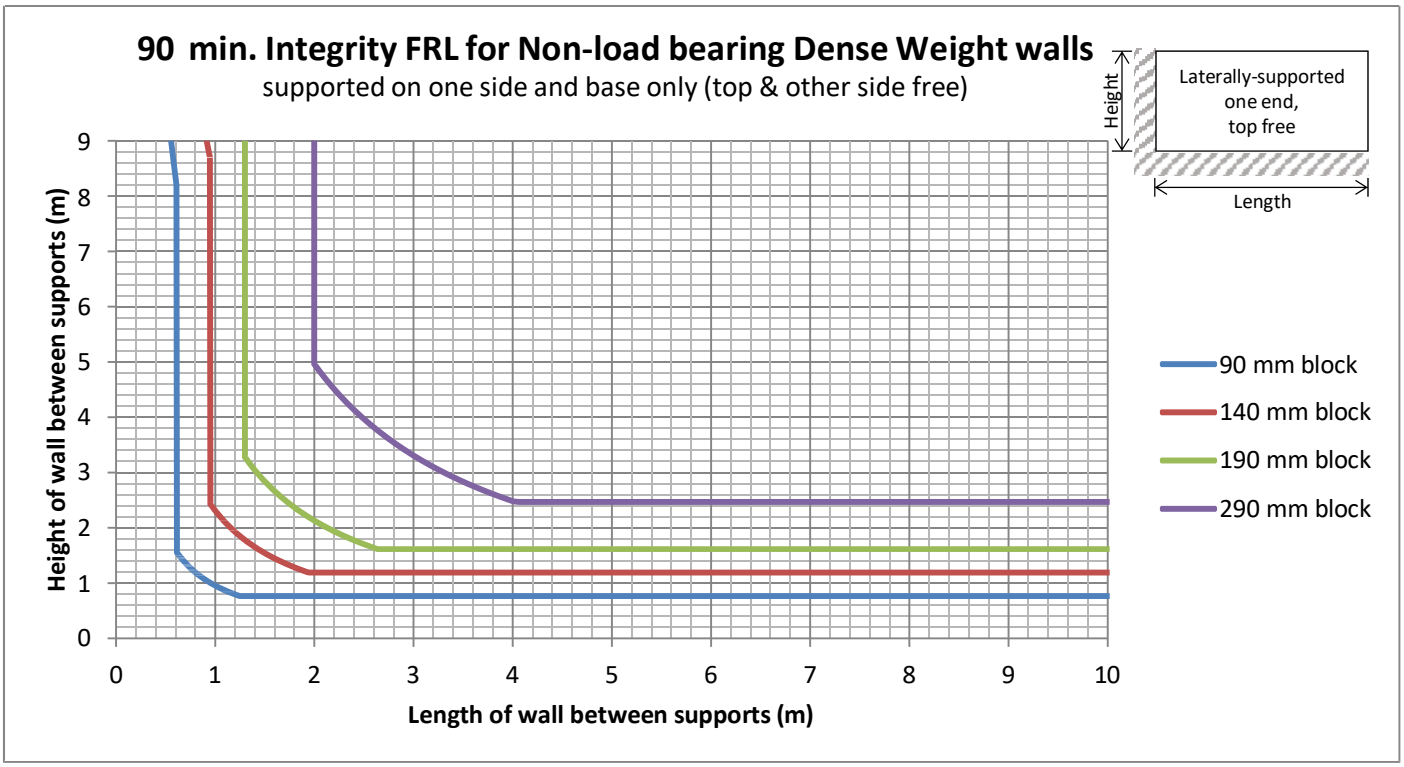


Chart 16 – Dense Weight 90 min. Integrity FRL for walls supported on side and base only (top & other side free)

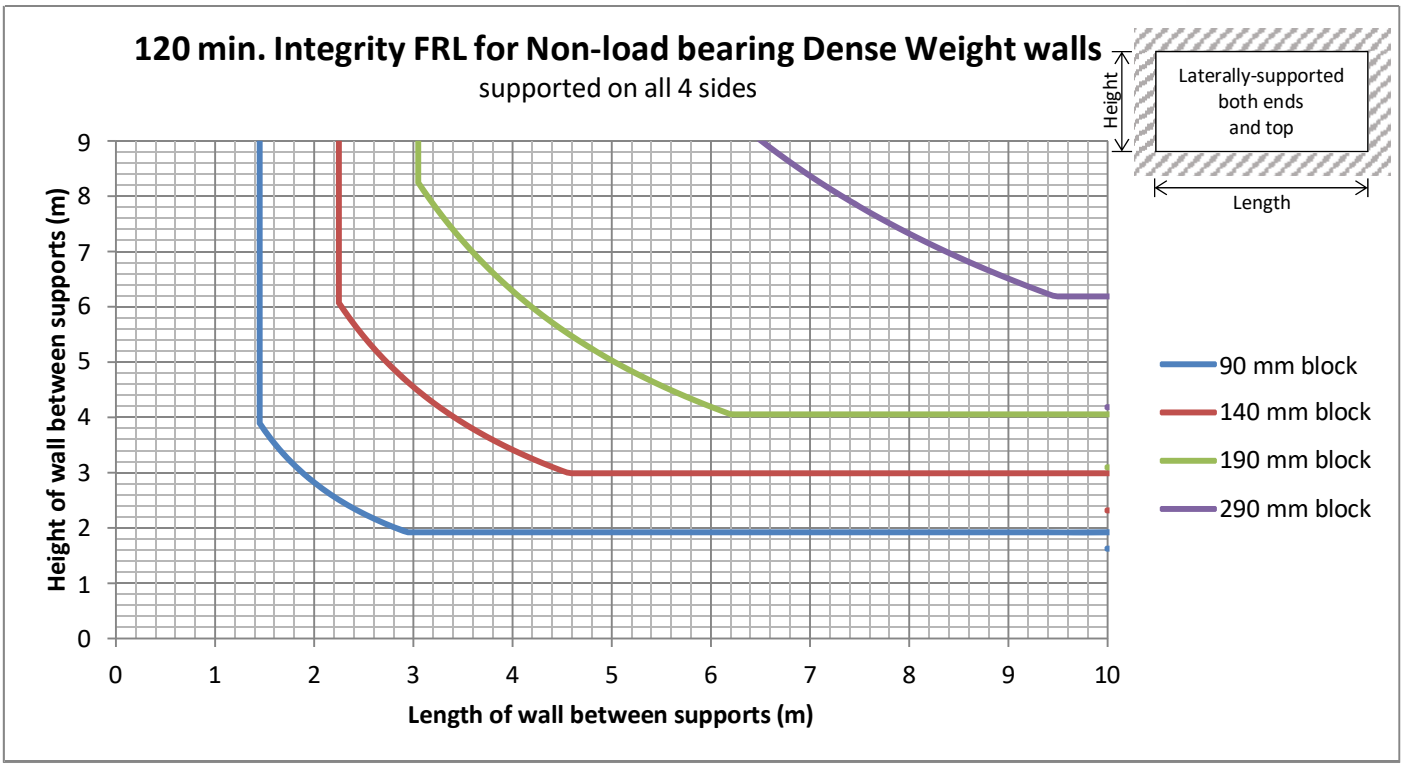


Chart 17 – Dense Weight 120 min. Integrity FRL for walls supported on all sides

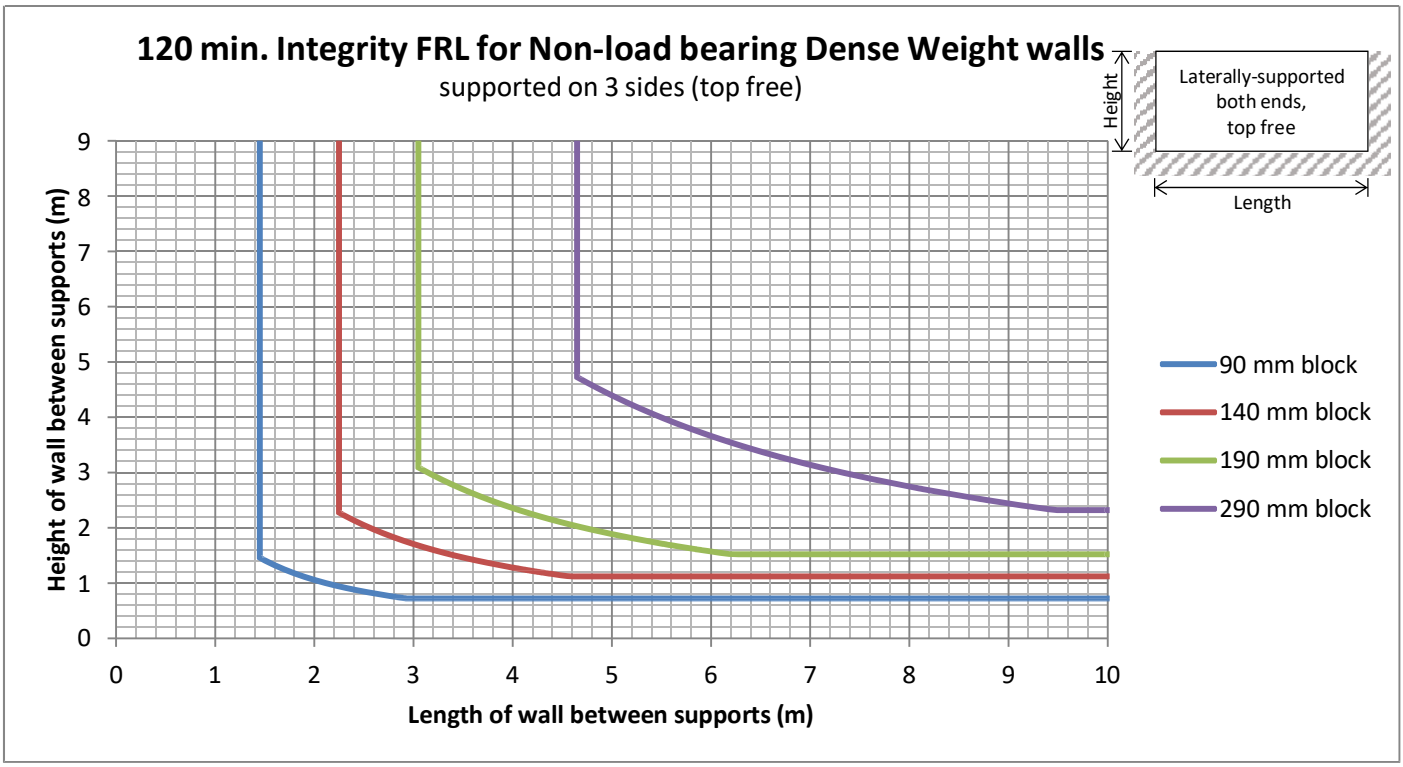


Chart 18 – Dense Weight 120 min. Integrity FRL for walls supported on 3 sides (top free)

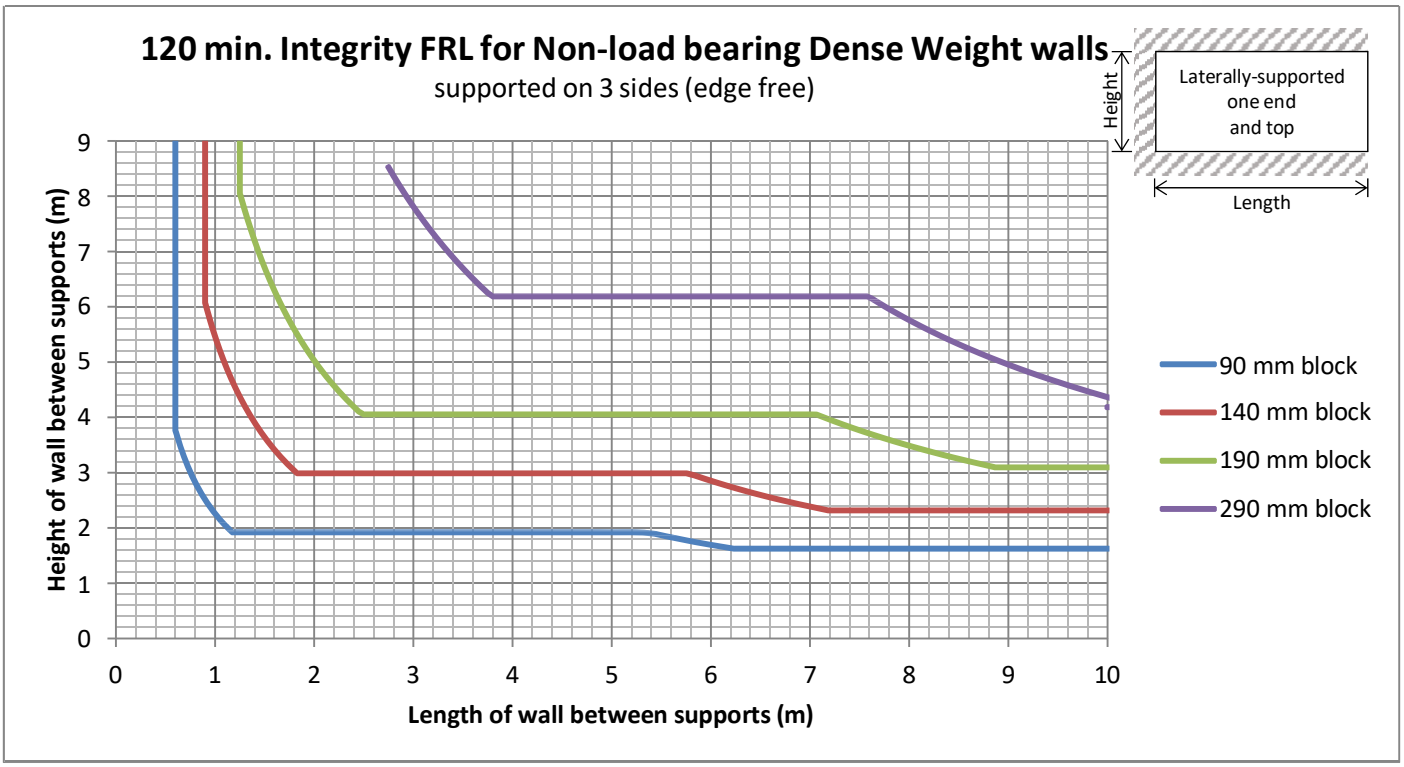


Chart 19 – Dense Weight 120 min. Integrity FRL for walls support on 3 sides (edge free)

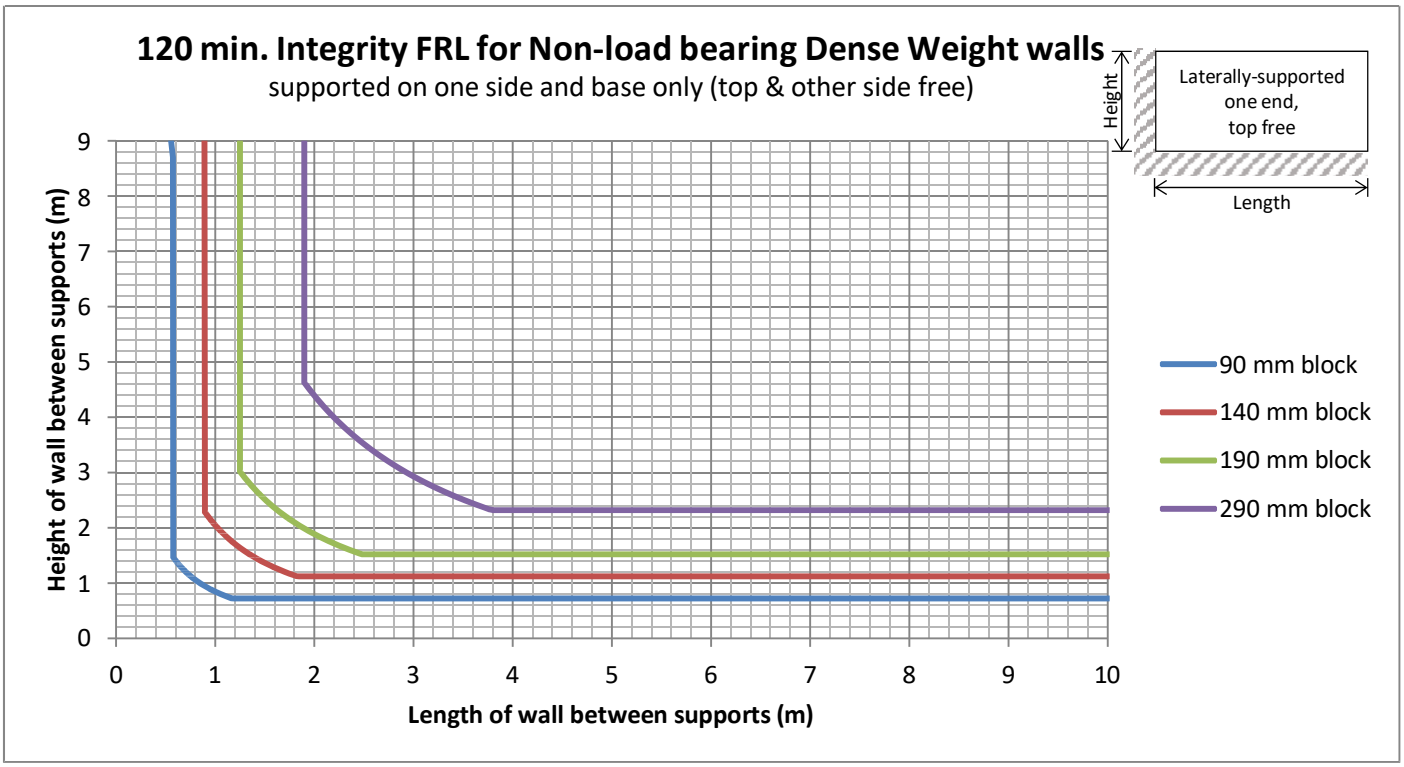


Chart 20 – Dense Weight 120 min. Integrity FRL for walls supported on side and base only (top & other side free)

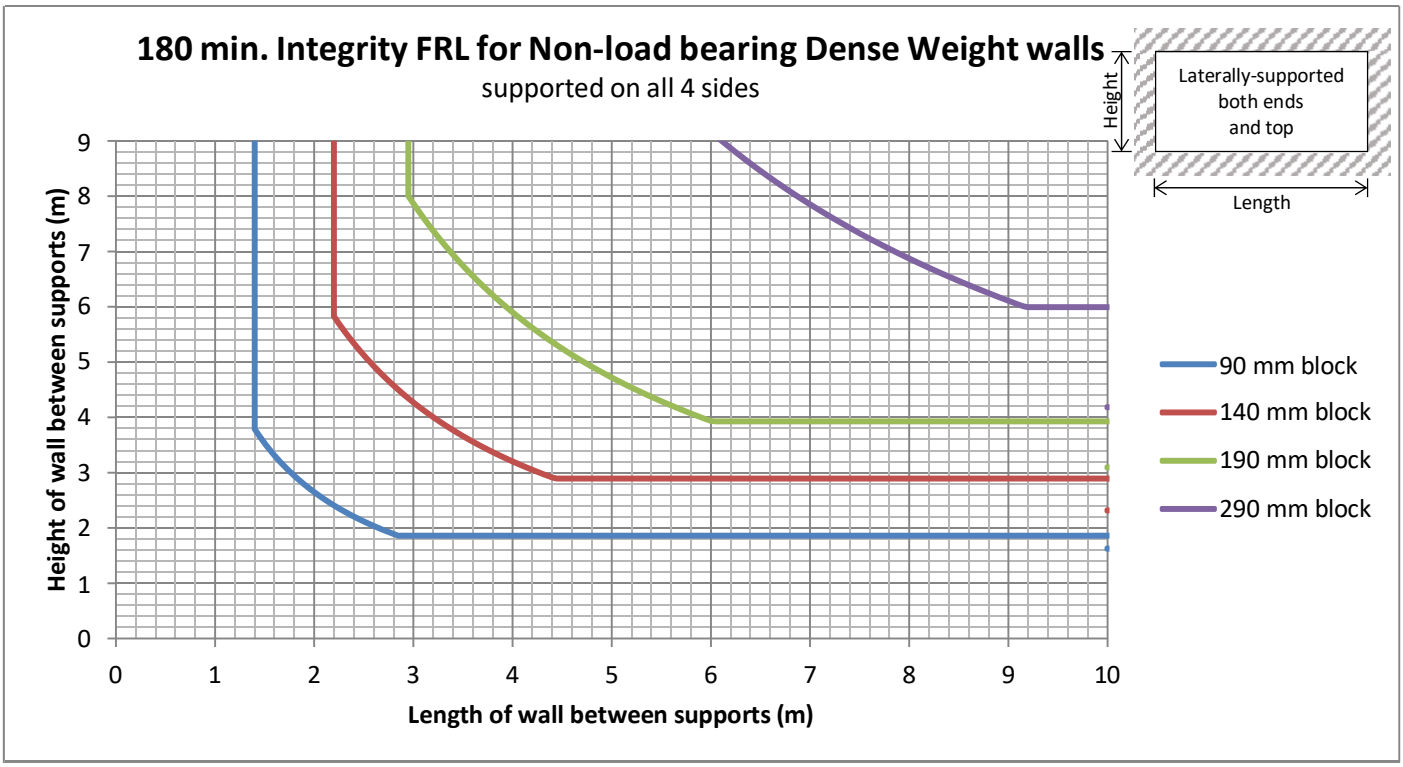


Chart 21 – Dense Weight 180 min. Integrity FRL for walls supported on all sides

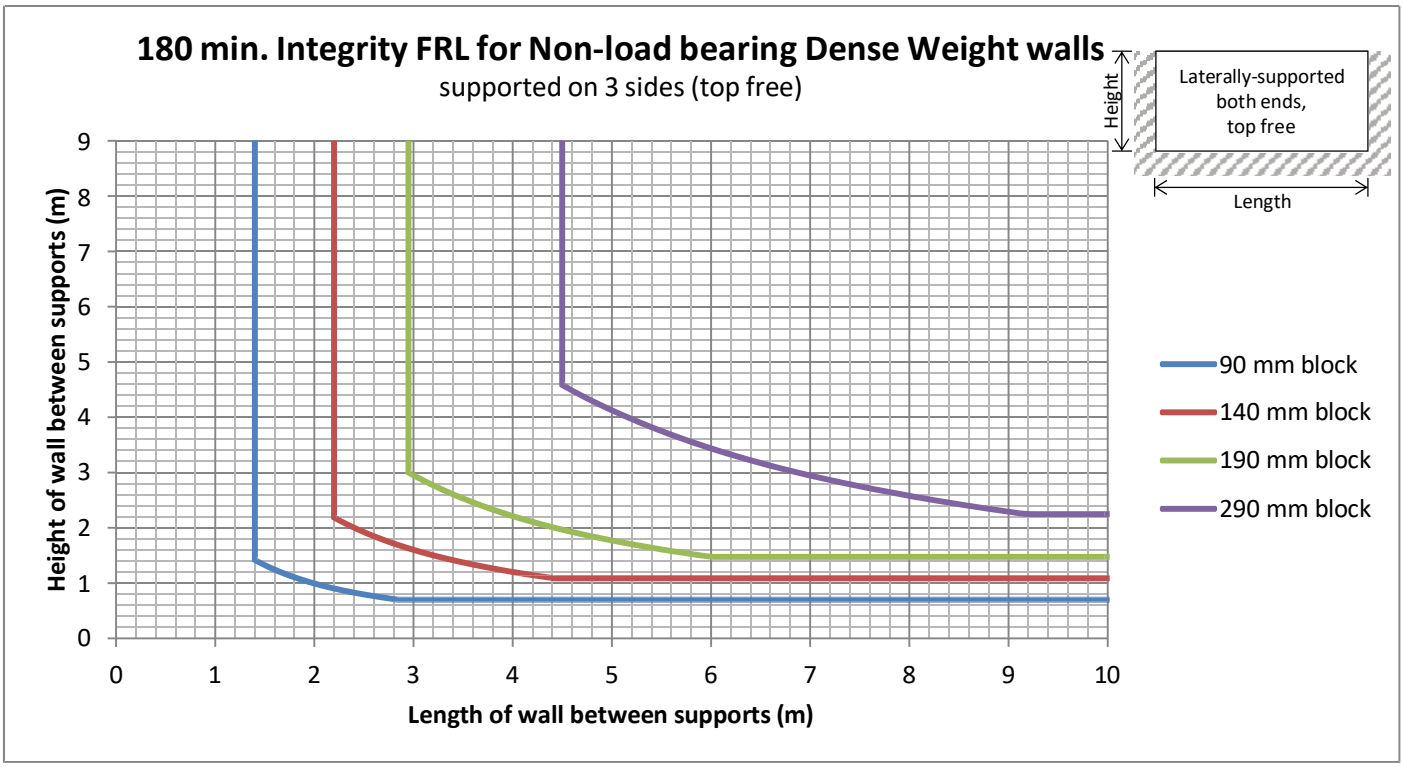


Chart 22 – Dense Weight 1800 min. Integrity FRL for walls supported on 3 sides (top free)

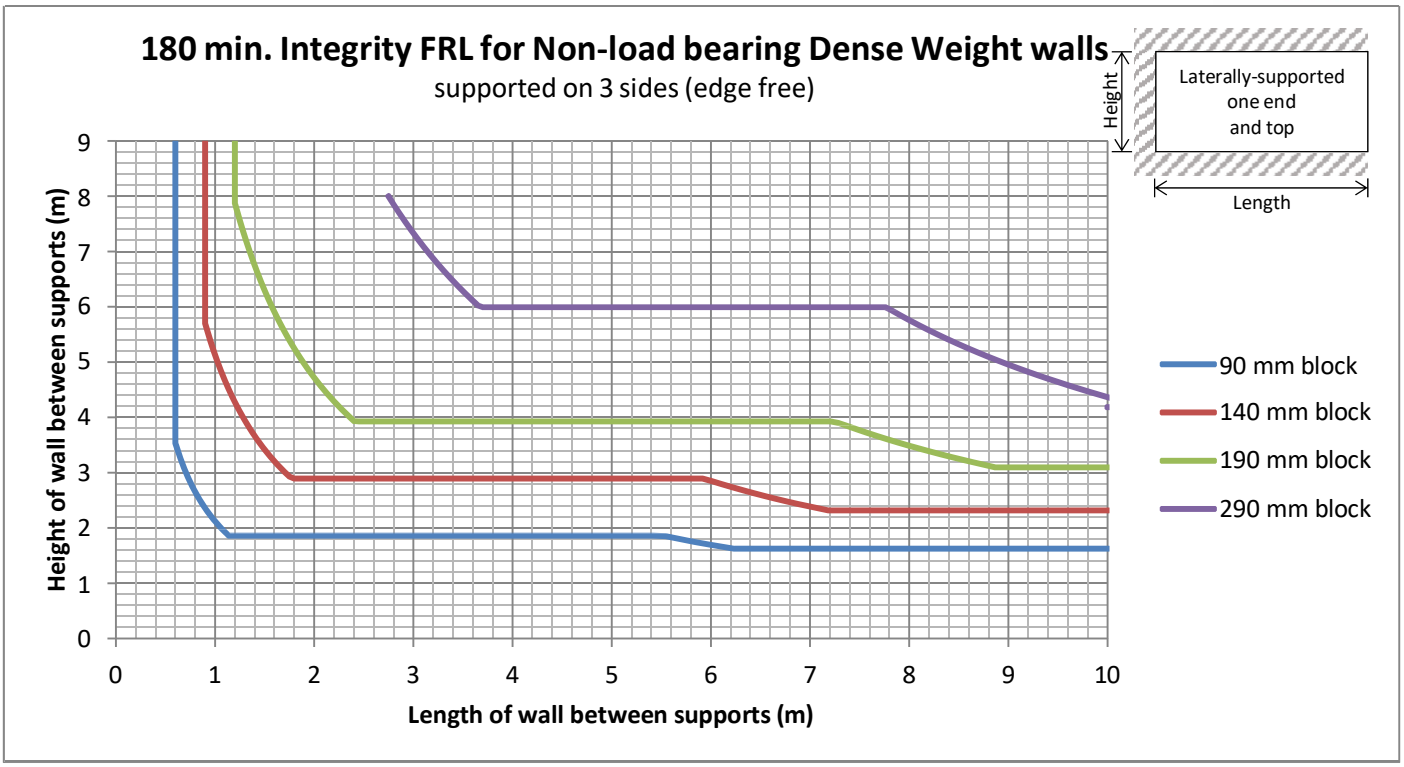


Chart 23 – Dense Weight 180 min. Integrity FRL for walls support on 3 sides (edge free)

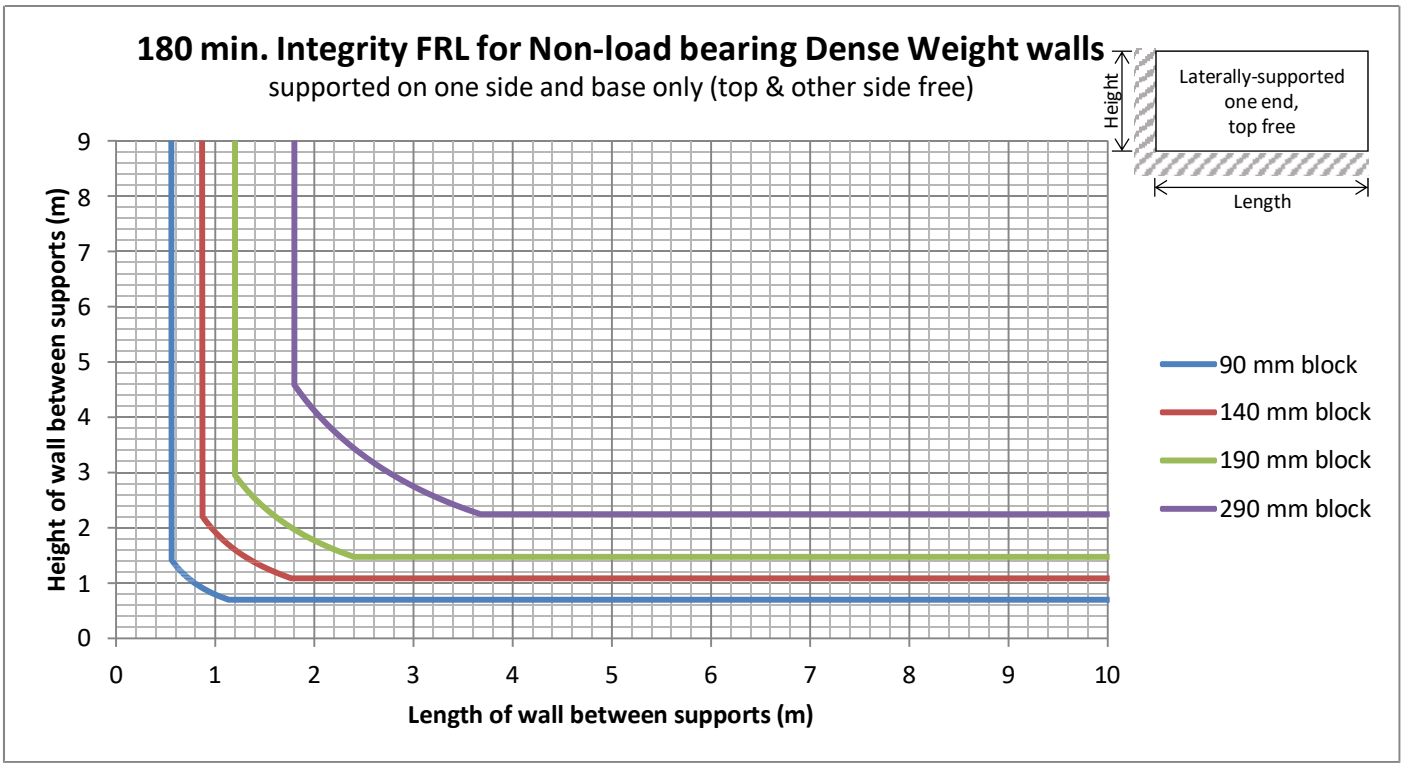


Chart 24 – Dense Weight 180 min. Integrity FRL for walls supported on side and base only (top & other side free)

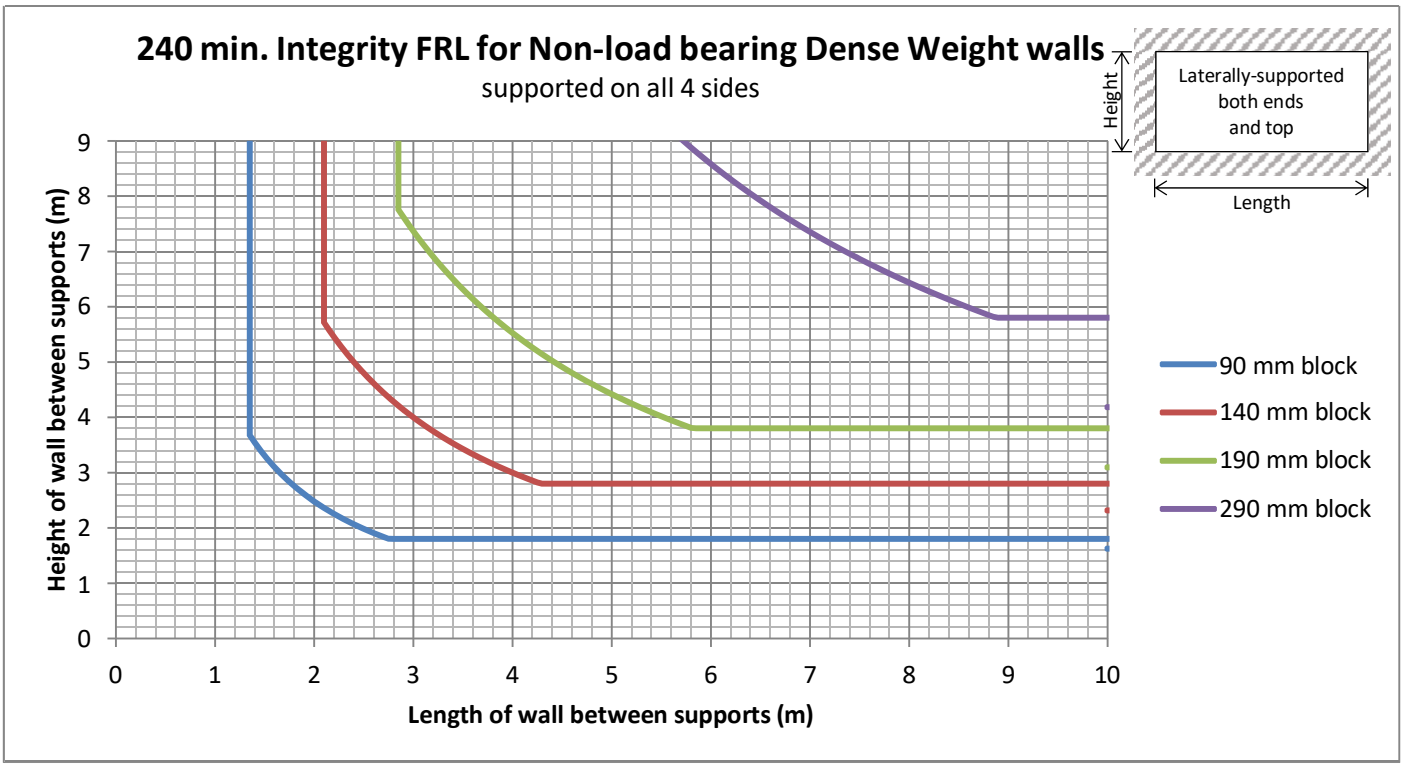


Chart 25 – Dense Weight 240 min. Integrity FRL for walls supported on all sides

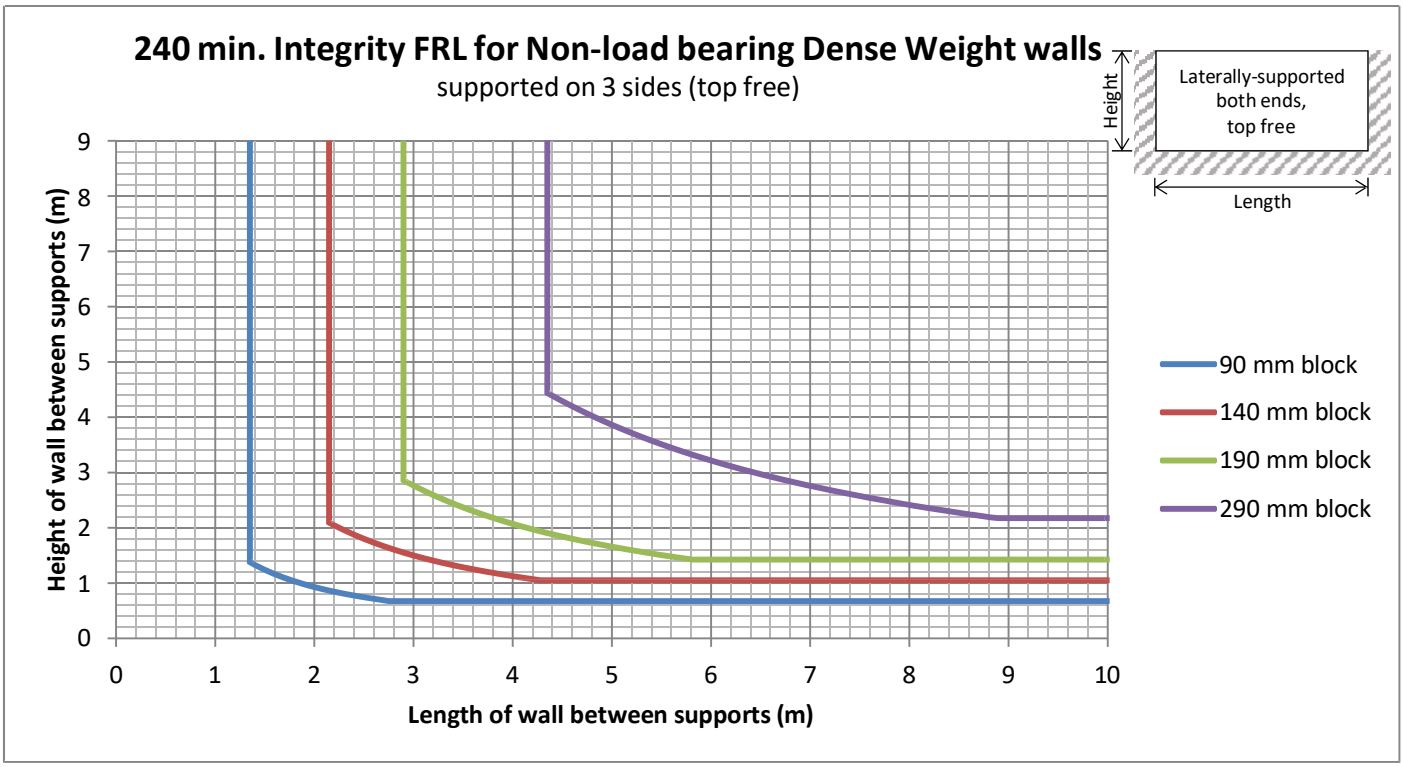


Chart 26 – Dense Weight 240 min. Integrity FRL for walls supported on 3 sides (top free)

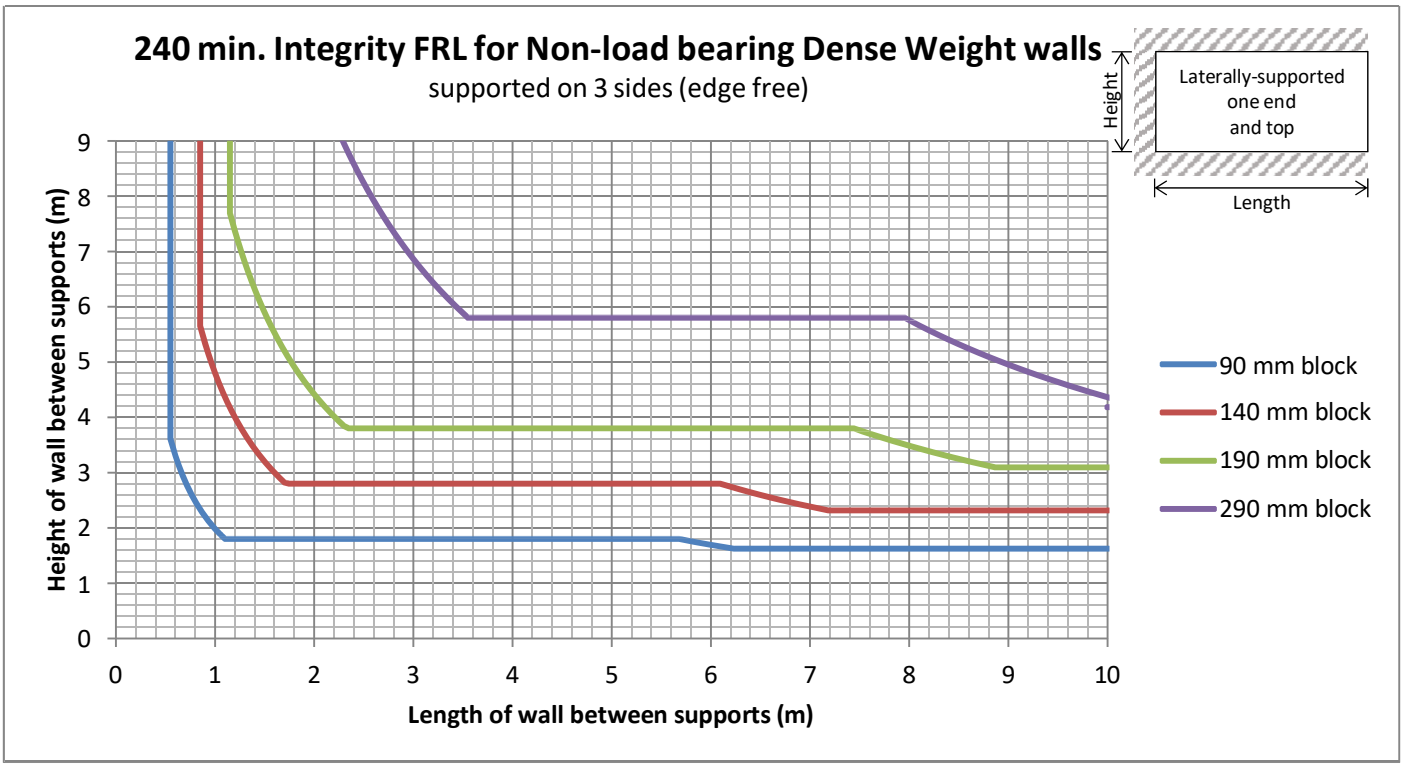


Chart 27 – Dense Weight 240 min. Integrity FRL for walls support on 3 sides (edge free)

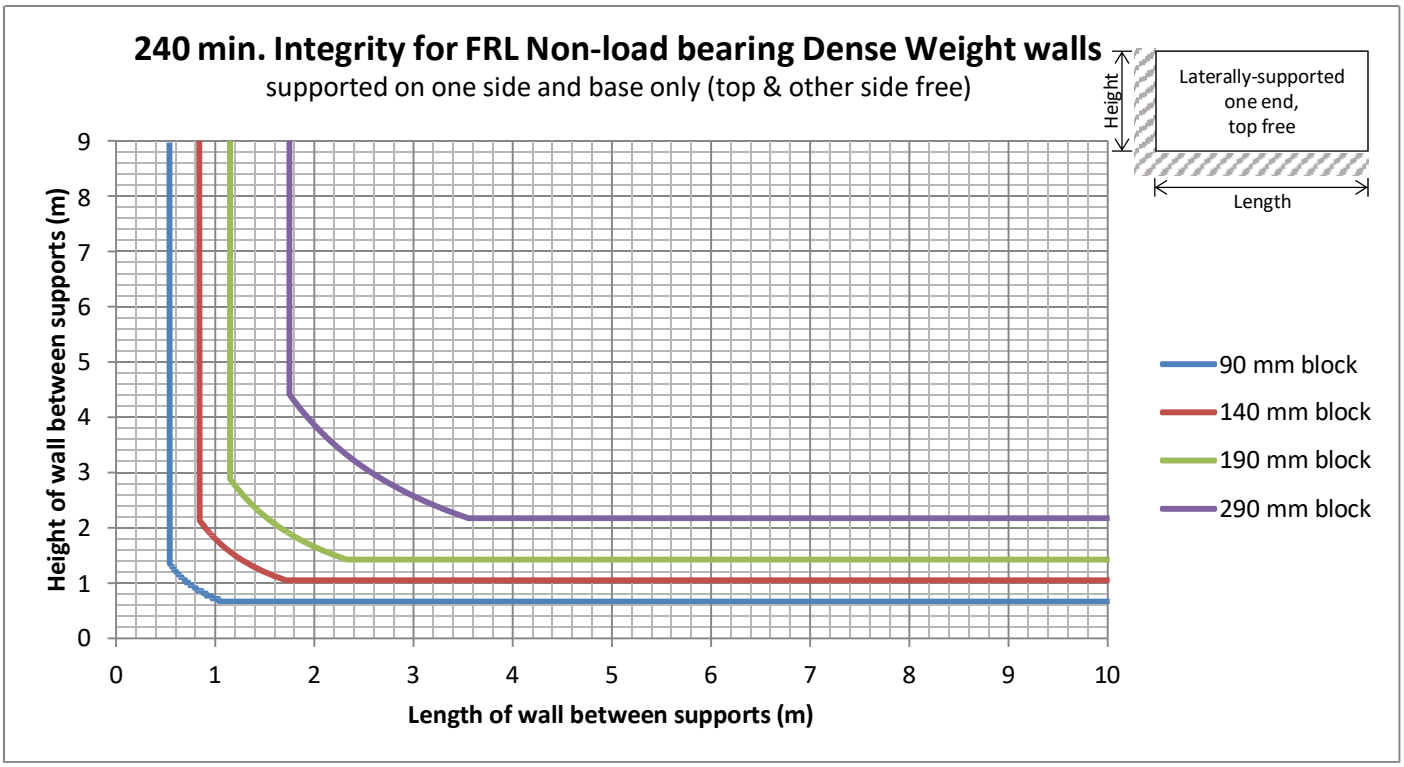


Chart 28 – Dense Weight 240 min. Integrity FRL for walls supported on side and base only (top & other side free)

Fire Structural Adequacy & Integrity Performance – Load Bearing Lightweight Block & Dense Weight Walls

For structural adequacy and integrity performance of load bearing walls using both Lightweight Blocks and Dense Weight units, use the charts for *Fire Integrity Performance - Non-load Bearing Dense Weight Walls* (*Chart 5* to *Chart 28*).

These charts have been calculated using the tabulated values of AS 3700-2011 and are the exact same charts for structural adequacy and integrity performance of load bearing walls using either Lightweight Blocks or Dense Weight units. However, it is important to remember that the integrity FRL is governed by the minimum of the insulation and structural adequacy performance.

Typical Head Details

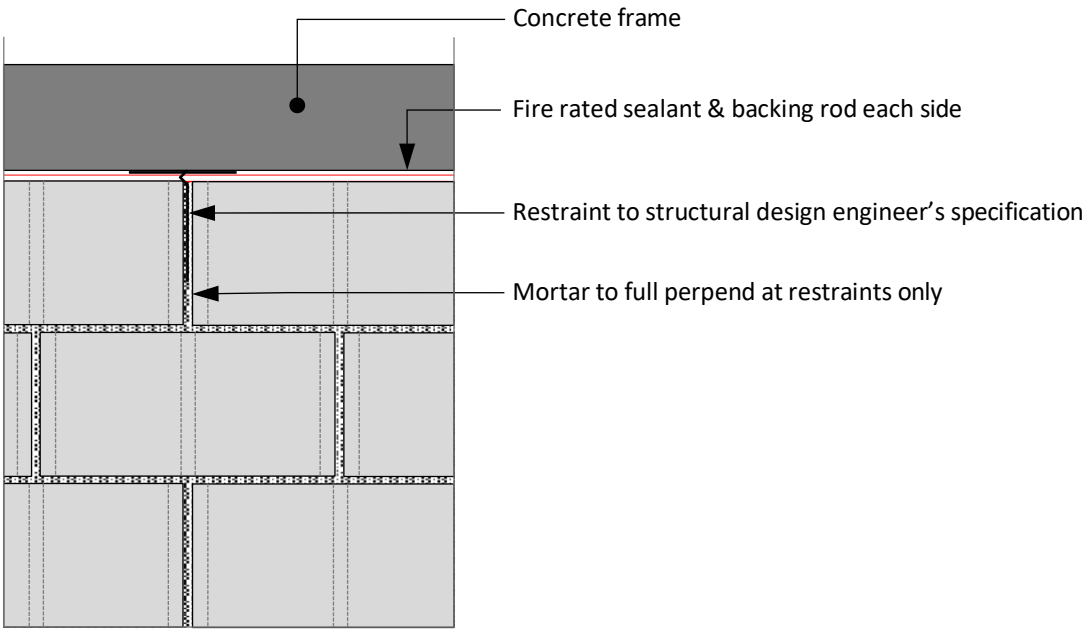


Figure 29 - Typical head detail elevation

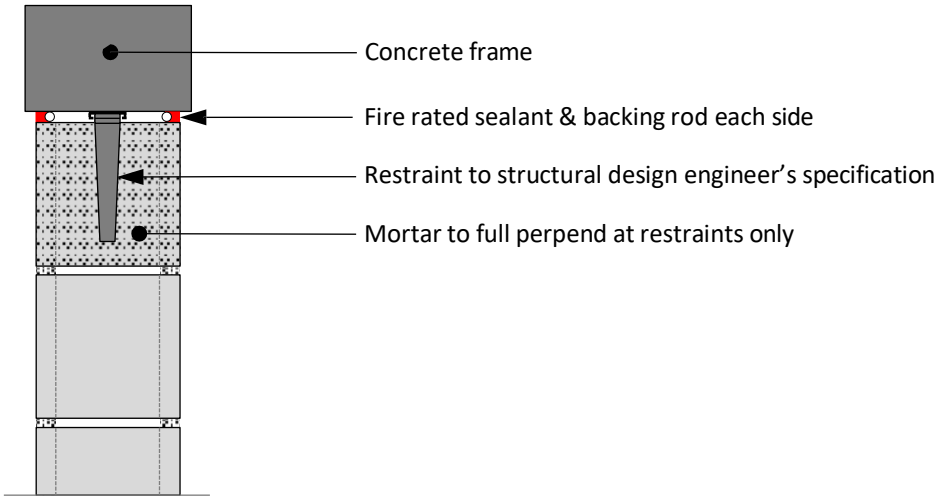


Figure 30 - Typical head detail section

Typical Edge Details

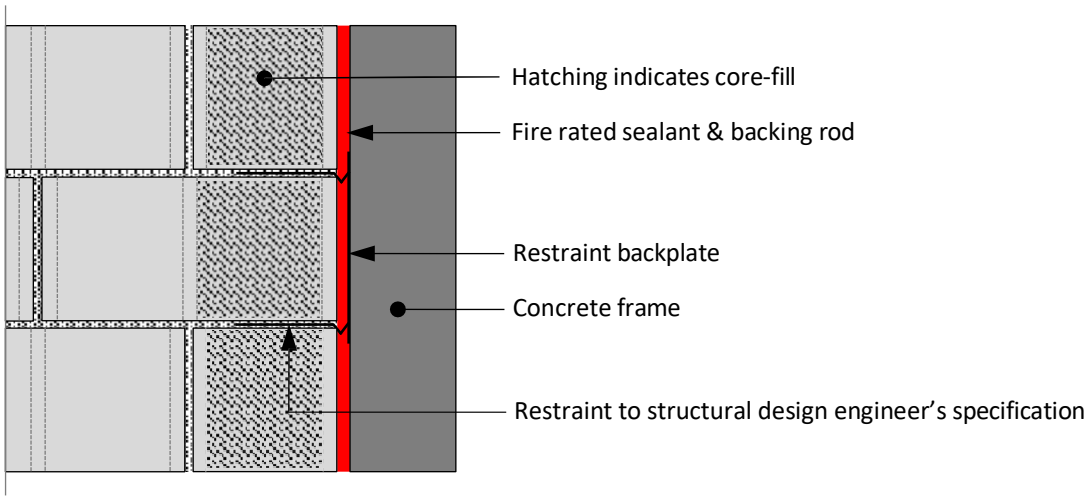


Figure 31 - Typical End of Wall Elevation

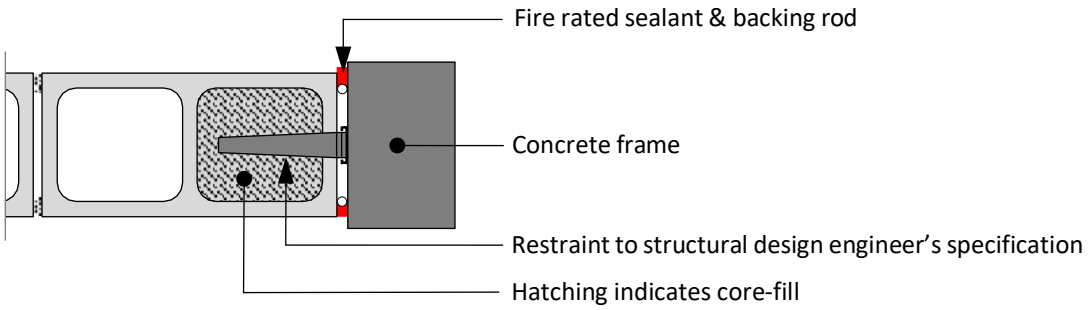


Figure 32 - Typical End of Wall Section

Typical Control Joint Detail

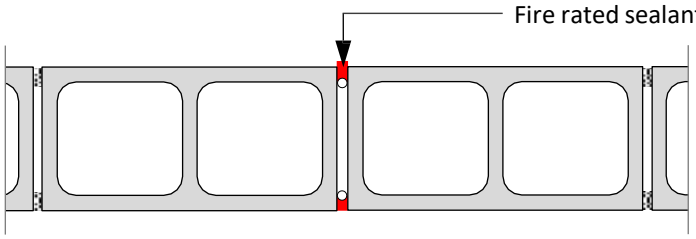


Figure 33 - Typical Control Joint Detail