

Breeze Block Masonry



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A BRAND OF

BRICKWORKS

Our Story

The GB Masonry collection has been a symbol of quality in the masonry industry since 1978 when our company was founded. For products that show the skill of the master craftsmen there is no rival to the GB Masonry collection of premium masonry.

GB Masonry sources the best quality sand and aggregates, achieving distinctive colour and finishes thanks to outstanding attention to detail and extensive expertise. Our masonry products have become a hallmark of architectural style and design, with a range that includes sleek honed options, bold textured finishes in the split face and rock face ranges, and the timeless style of our smooth finished ranges.



Features and Benefits

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Features and Benefits

1.

Low maintenance

Minimal maintenance, maximum impact. You're guaranteed a long-lasting, tough, and easy to care for solution.

2.

All-weather resistant

Heavy storms. Blistering heat. Sub-zero frosts. Our products are designed to hold up to anything our weather systems are capable of throwing at it.

3.

Fire resistant

All of our products are non-combustible and highly fire resistant – making them ideal for bushfire prone areas.

4.

Termite resistant

With no organic wood materials present in our concrete formulations, our masonry range is naturally termite resistant.

5.

Simple installation

Easy to install and structurally robust – our products are perfect for 'do it yourself' installations.

6.

Environmentally aware

We've designed our production processes to minimise effects on the environment ensuring they do not deplete precious natural resources.

7.

Impact resistance

Our masonry range is also renowned for its toughness and hard-wearing properties, and can handle impacts from many external forces.



Product
Range

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Concrete Breeze Blocks

The range is currently available in seven designs which have already drawn an enthusiastic response from our customers looking for a distinctive walling option that offers a unique aesthetic and ventilation.

Shapes



Arc Breeze



Cloud Breeze



Diamond Breeze



Wedge Breeze



Flower Breeze



Circle Breeze



Linear Breeze

Colours



Porcelain



Nickel



Pewter

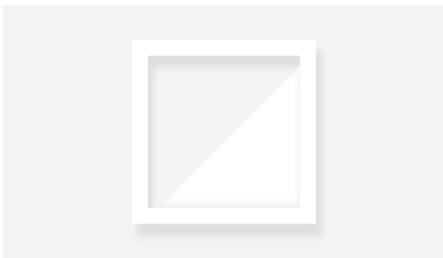


Pottery*

Kite Breeze

Kite Breeze brings a unique dappled light experience to façades, spaces and passageways – allowing you to create captivating shadow patterns and graphic structures with its limitless configurations. Available in three iconic colours and two distinctive finishes.

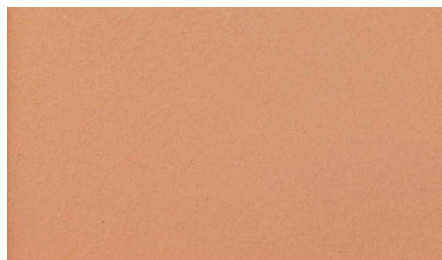
Shapes



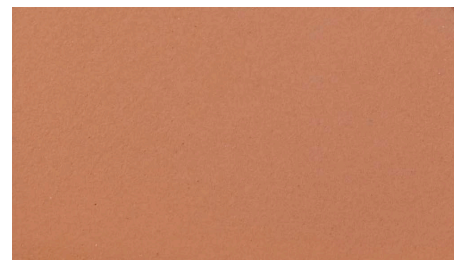
Colours



White | Glazed



Dune | Matte



Terracotta | Matte



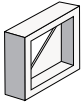
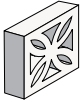
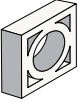


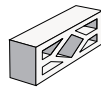
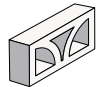


Specifications

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Specifications

Table 1

	Kite Breeze	Flower Breeze	Circle Breeze	Linear Breeze	Cloud Breeze	Diamond Breeze	Wedge Breeze	Arc Breeze
	90KB-1-2929	10-908	10-906	10-960	10-939	15-936	15-937	20-414
								
Size	290L x 90W x 290H mm	290L x 90W x 290H mm	290L x 90W x 290H mm	390L x 95W x 80H mm	390L x 90W x 190H mm*	390L x 140W x 190H mm	390L x 140W x 190H mm	390L x 180W x 190H mm
Material	Terracotta	Concrete	Concrete	Concrete	Concrete	Concrete	Concrete	Concrete
Dimensional Category	DW2	DW2	DW2	DW2	DW2	DW2	DW2	DW2
Core Volume	56%	36%	43%	33%	38%	45%	45%	38%
Minimum Shell Thickness	25 mm	25 mm	25 mm	25 mm	25 mm	25 mm	25 mm	25 mm
Characteristic unconfined compressive strength	>3.2 MPa	>5 MPa	>3 MPa	>3 MPa	>3MPa	>4 MPa	>7 MPa	>6 MPa
Average weight	5.8 kg	9.4 kg	9.2 kg	4.7 kg	8.3 kg	12.5 kg	12 kg	14.5 kg
Durability class	General Purpose	Exposure Grade	Exposure Grade	Exposure Grade	Exposure Grade	Exposure Grade	Exposure Grade	Exposure Grade
Max cold water absorption	<18 %	<7 %	<7 %	<7 %	<7 %	<7 %	<7 %	<7 %
Initial rate of absorption	0.65-1.6	1.3-1.9	1.3-1.9	1.3-1.9	1.3-1.9	1.3-1.9	1.3-1.9	1.3-1.9

1. This data represents average results from production lots based on the results achieved by samples selected at random for testing. Figures are accurate at date of publication and subject to change without notice. Contact us for confirmation of product specification. to change without notice.
2. Manufactured to AS/NZS 4455 and tested to AS/NZS 4456





Design Considerations

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Design Considerations

Mortar Selection

Mortex or M4 grade mortar is recommended and should match the durability requirements of the installation. Lime can be used to improve workability and should be used over chemical plasticisers or other air entraining admixtures

Mortar colour can be adjusted by your block layer by adding pigments. It is generally best practice to colour match the mortar and block to reduce the risk of visible mortar stains.

Joint finishing

All horizontal joints and perpendents are to be laid with full mortar bed joints and tooled off once thumbprint hard.

Control Joints

Control joints should be installed as detailed in AS 3700 and are recommended to be no more than 6m apart. All joint reinforcements should be discontinuous at control joints. Refer to Section 7.4.4 for more details.

Wind Loads

The wind loading applied within the span tables provided (W_u) is Ultimate Limit State. This is determined using a regional wind speed appropriate to the annual probability of exceedance (P) specified for ultimate limit states as given in AS/NZS 1170.0, or the Building Code of Australia, and the procedure as given in paragraph 2.1 of AS/NZS 1170.2 or determined as given in AS 4055. Please note that the span tables do not account for the Net Porosity Factor (K_p) factor within the wind loads provided. (Refer to Table 2 Porosity factors of Breeze Blocks for free standing walls for more information.)

Porosity factors of Breeze Blocks for Free Standing Walls

Wind load calculations for Breeze Block walls change depending if the structure is a free-standing structure or if it is within an exterior wall on a building.

In some cases, the porosity of the Breeze Block influences the wind load performance and can be accounted for by factors such as the:

- Porosity Factor (K_p): used for free standing walls (e.g., fence walls) and is determined in equation D1 of AS/NZS 1170.2 Appendix D paragraph D1.4
- Permeability cladding reduction factor (K_p), used for cladding/external on buildings, refer to AS/NZS 1170.2 clause 5.4.5.

Table 2 outlines the net porosity factor for each Breeze Block type when constructed as a free-standing wall. The Permeability cladding reduction factor (K_p) for a building

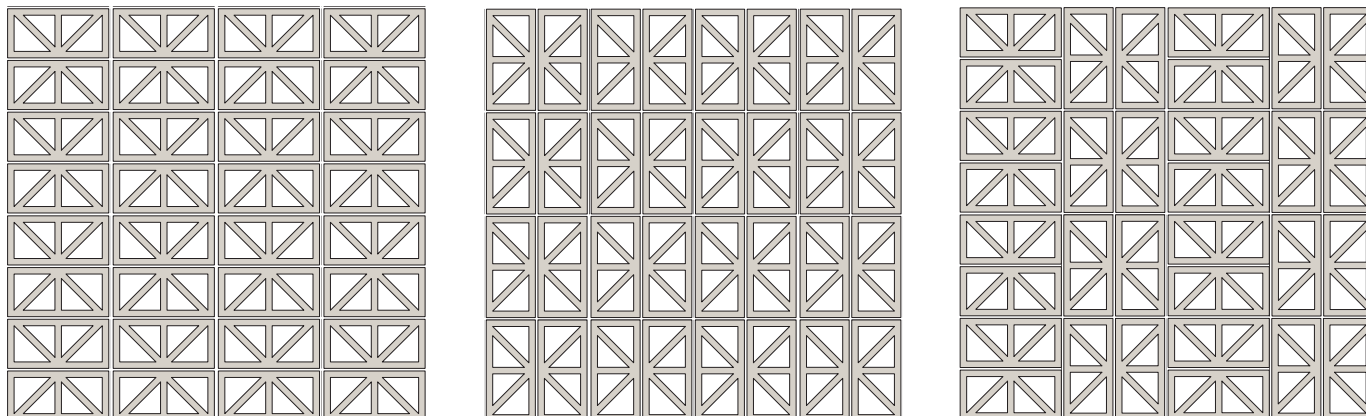
is dependent on building dimensions and location of the Breeze Block wall on the building. For project specific wind loads, refer to a suitably qualified structural engineer.

Table 2 - Porosity factors of Breeze Blocks

	Core Volume Porosity (%)	Solidity Ratio δ	K_p
Flower Breeze	36	0.64	0.87
Circle Breeze	48	0.52	0.77
Cloud Breeze	43	0.57	0.82
Diamond Breeze	45	0.55	0.80
Wedge Breeze	45	0.55	0.80
Arc Breeze	47	0.53	0.78
Linear Breeze	33	0.67	0.89
Kite Breeze (Single Skin)	56	0.44	0.69
Kite Breeze (Double Skin, 25% porosity)	25	0.75	0.94
Kite Breeze (Double Skin, 0% porosity)	0	1.00	1

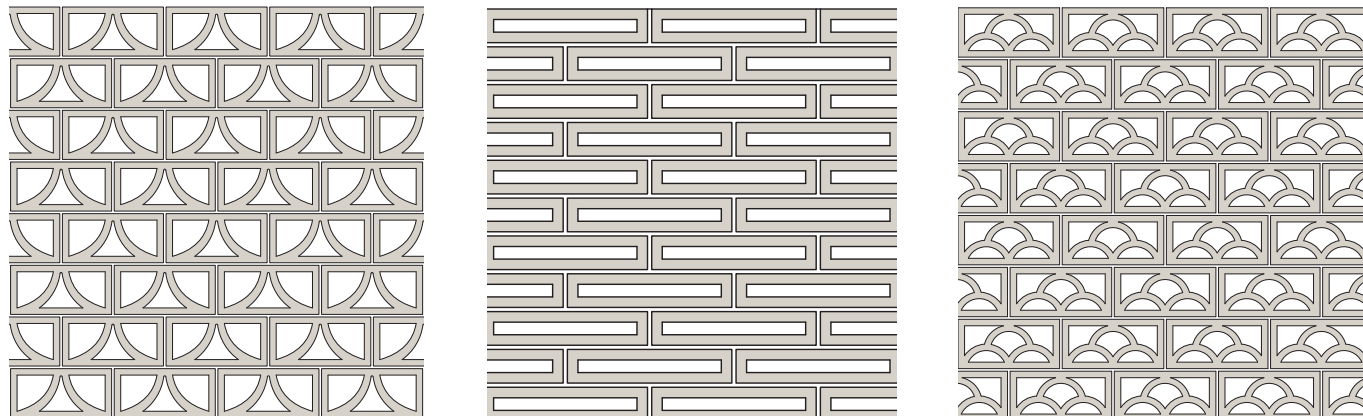
Breeze Block Patterns

Horizontal or Vertical Stack Bond

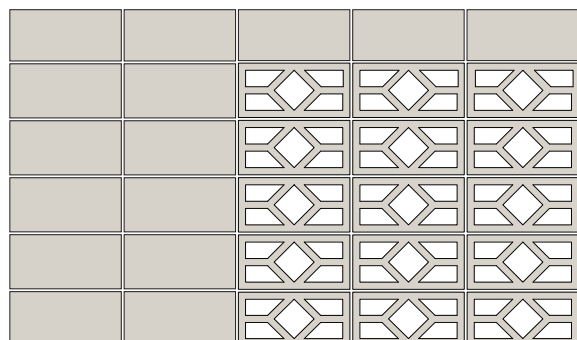


For more information about vertical block arrangements please contact Brickworks Building Products.

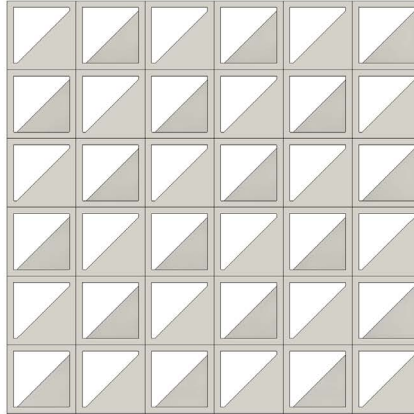
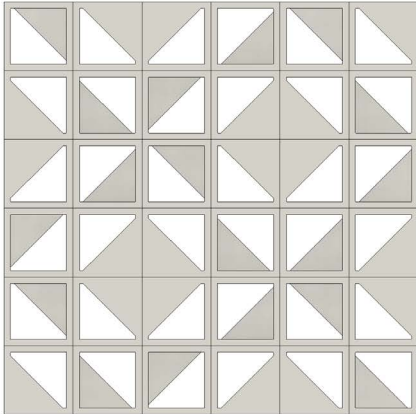
Stretcher Bond



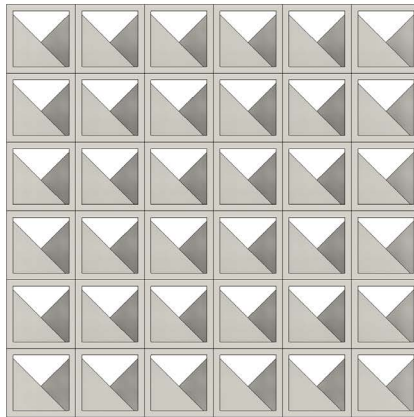
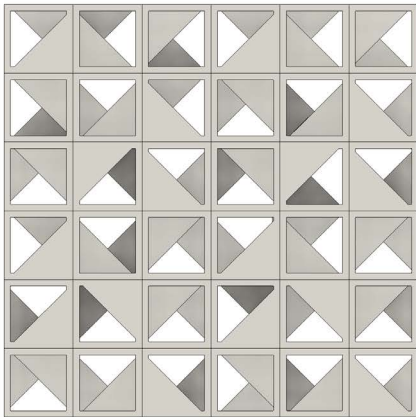
Embedded within Standard Blocks as a Decorative Screen



Single Skin



Double Skin





Construction of Stack Bonded Breeze Blocks



Construction of Stack Bonded Breeze Blocks

Contemporary style created in concrete. The Breeze Block collection is the perfect solution for those seeking a distinctive walling option that offers a unique aesthetic and ventilation. Breeze Blocks are most commonly laid in a stack bond pattern to create bold vertical vectors making it an ideal choice for non-structural veneers or architectural shade screens.

Stack bonded masonry walls have a significantly reduced load bearing capacity in comparison to traditional stretcher bonded masonry. The continuous alignment of mortar joints means vertical loads through head joints are not distributed into adjacent masonry units but concentrated down the vertical columns instead. The lack of load distribution greatly reduces flexural strength and capacity to resist lateral loads.

When designing unreinforced stack bonded masonry to Section 7.4.3 of AS 3700:2018, the perpend spacing factor is set to zero resulting in zero capacity for horizontal bending moments. This means that when stack bonded masonry walls are constructed without joint reinforcement and are horizontally spanning, crack propagation along the vertical joints is likely see Figure 1.

As such, it is not recommended to design horizontally spanning unreinforced stack bonded masonry walls without top and bottom restraints.

However, the differences in flexural strength between stack and stretcher bond masonry can be mitigated through considerations in the wall design methodology detailed within this manual.

Provided reinforcing requirements are met, the structural capacity of stack bonded masonry can be comparable to stretcher bonding for most loading conditions.

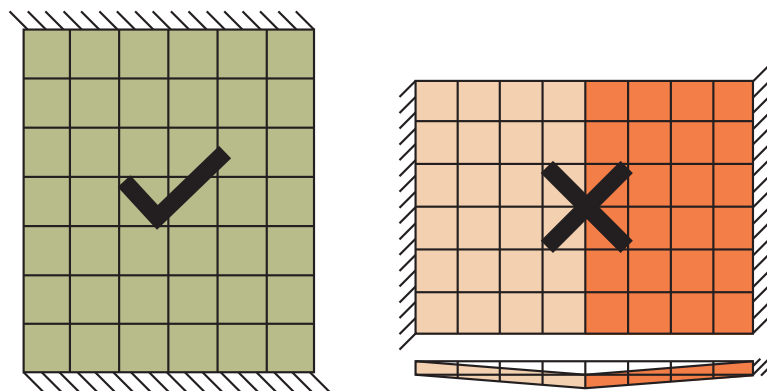


Figure 1: Vertically Spanning (left) and Horizontally Spanning (right)

6.1. Design Requirements of Stack Bonded Masonry

The design and structural adequacy of the GB Masonry Breeze Block range has been assessed by Rickard Engineering. These design charts and tables are intended as general guidance for building designers and may not be applicable for all installations and does not replace the services of professional engineers on specific projects. Information is provided in tabular and graphic form so that designers may explore different structural solutions suited to their application.

All designs and construction should be in accordance with all relevant Australian Codes of Practice and Standards which include but may not be limited to:

- AS 1170.0:2002 Structural design actions - Part 0: General Principles
- AS 1170.1:2002 Structural design actions - Part 1: Permanent, imposed and other actions

- AS 1170.2:2011 Structural design actions - Part 2: Wind actions
- AS 3600:2018: Concrete Structures
- AS 3700: 2018: Masonry Structures
- AS 4100:2020: Steel Structures

AS3700:2018 contains the following provisions relevant to the design requirements of stack bonded masonry:

- The design requirements under AS 3700:2018 Clause 4.12 shall take precedence over the requirements of Clause 8.6, Item (a) and (b)
- Unreinforced masonry for compression, shear and vertical bending, complying with sections 7.3, 7.5 and 7.4.2 accordingly
- Reinforced masonry for horizontal and two-way bending in accordance with section 8.6, provided that the detailing requirements elaborated within this manual has been followed

6.2. Detailing Requirements for Reinforcement

AS3700 clause 4.12.1 states masonry units laid in a stack bond pattern shall be reinforced using anchored bed joint reinforcement with an area not less than $0.00035 \times$ the gross vertical cross-sectional area of the wall. The reinforcement specifications shall comply with Clauses 5.9.3, 5.9.5 and Section 11.8 of AS 3700:2018 which requires reinforcement to be continuous between supports and placed at:

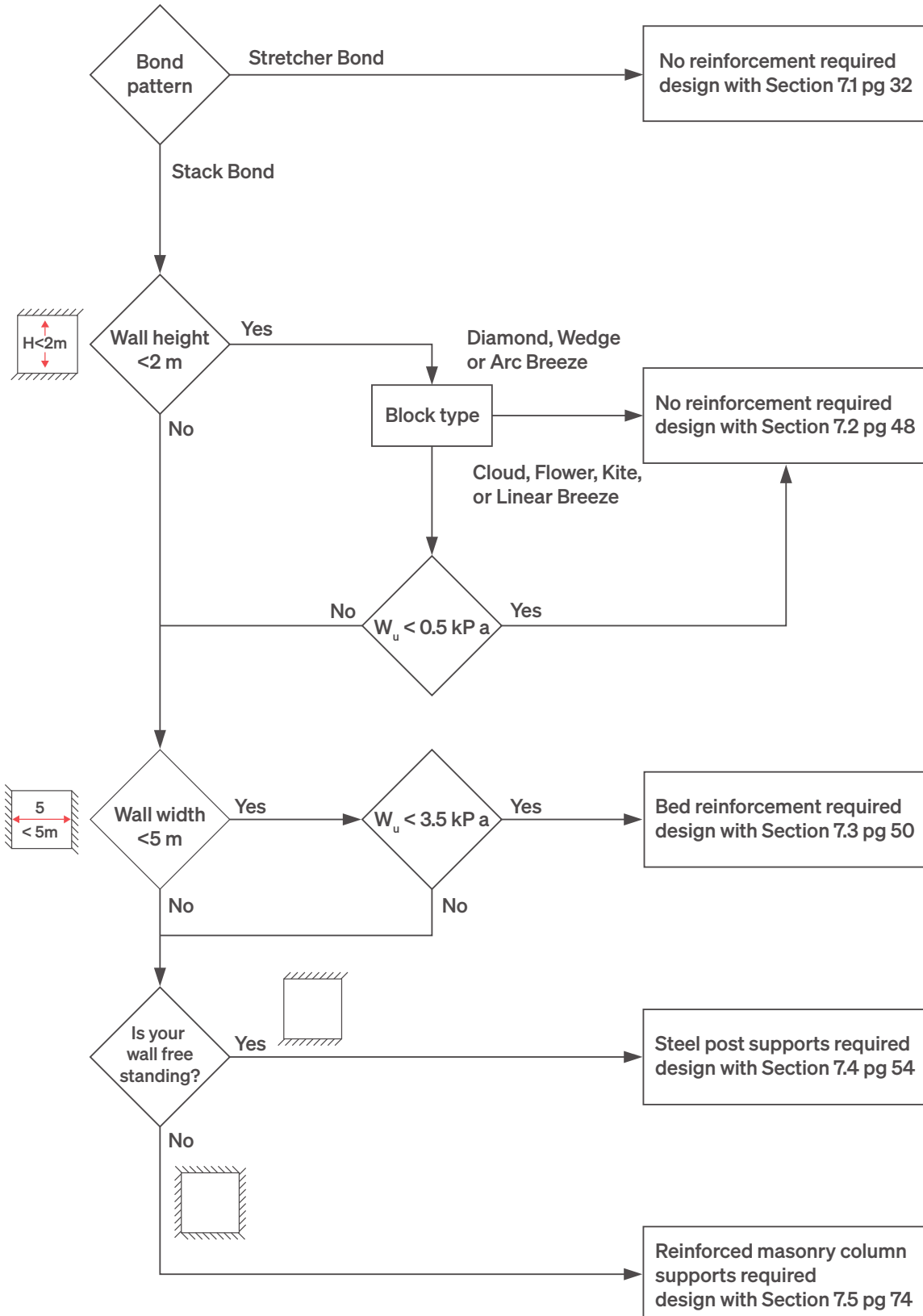
- Vertically spaced centres not exceeding six times the thickness of the stack bonded leaf
- The first bed joint above or below an unrestrained horizontal edge of the masonry
- At least one bed joint within 300 mm above and below any horizontal lines of lateral support

The above detailing requirements for a stack bonded wall shall take precedence over the reinforcement requirements (for bending) set by sections 8.6 (a) and 8.6 (b).

Decision Diagram



Figure 2: Decision Diagram for Reinforcement of Stack Bonded Breeze Blocks





Design Tables and Charts

7

Design Tables

7.1. Stretcher Bond Walls

The following tables have been developed by Rickard Engineering as a guideline for installation. All elements should be reviewed and approved by project structural engineers to verify specifications and sizes are adequate for the intended design.

Design charts are derived from AS 3700:2018 Clause 7.4.4 for all sides supported (4-sides) and 3-side supported walls. The maximum wall size is 5m x 8m. Wall dimensions must be able to withstand at least $W_u = 0.5 \text{ kPa}$.

7.1.1 Cloud Breeze



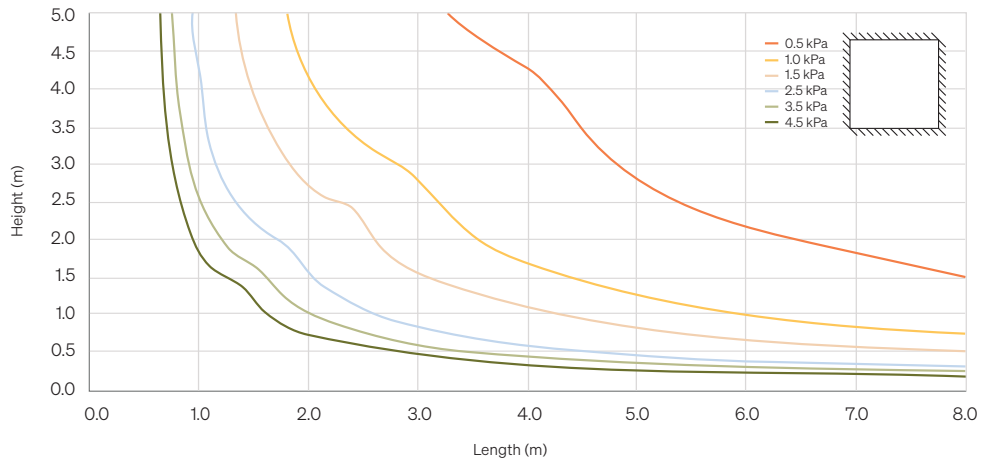
Height (m)	Wall Width (m)								
	0.5 kPa			1.0 kPa			1.5 kPa		
	All Sides Supported	Top Edge Free	Side Edge Free	All Sides Supported	Top Edge Free	Side Edge Free	All Sides Supported	Top Edge Free	Side Edge Free
1.0	8.00	6.40	5.90	6.06	3.54	3.03	4.15	2.58	2.08
1.5	8.00	4.83	4.07	4.33	2.81	2.16	3.05	1.81	1.53
2.0	6.40	4.21	3.20	3.54	2.07	1.77	2.58	1.47	1.29
2.5	5.43	3.27	2.71	3.14	1.79	1.58	2.23	1.32	
3.0	4.83	2.80	2.42	2.81	1.63	1.38	1.81	1.23	
3.5	4.46	2.55	2.23	2.33	1.53		1.60		
4.0	4.21	2.37	2.11	2.07	1.47		1.47		
4.5	3.68	2.26	1.72	1.91	1.41		1.38		
5.0	3.27	2.17	1.42	1.79	1.38		1.32		

Wall Width (m)									
Height (m)	2.5 kPa			3.5 kPa			4.5 kPa		
	All Sides Supported	Top Edge Free	Side Edge Free	All Sides Supported	Top Edge Free	Side Edge Free	All Sides Supported	Top Edge Free	Side Edge Free
1.0	2.63	1.65	1.31	1.97			1.61		
1.5	2.03			1.58			1.22		
2.0	1.65								
2.5	1.32								
3.0									
3.5									
4.0									
4.5									
5.0									

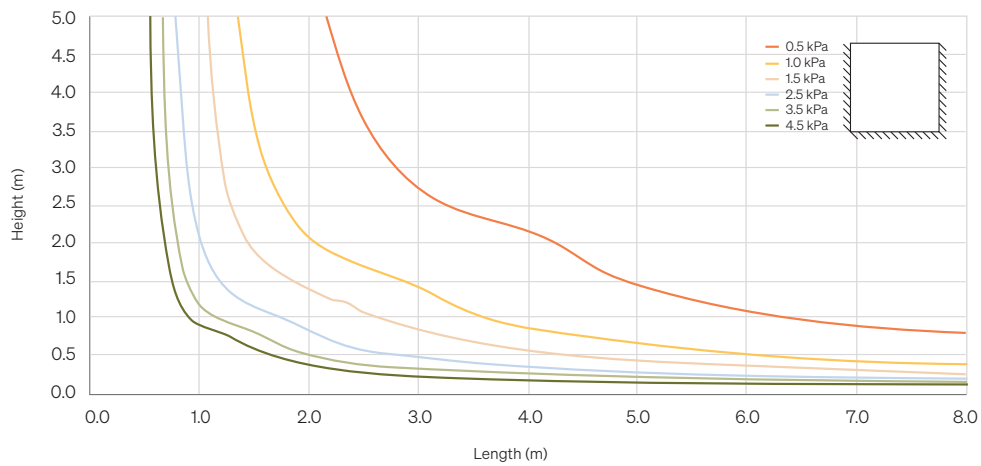
Design Charts

Cloud Breeze

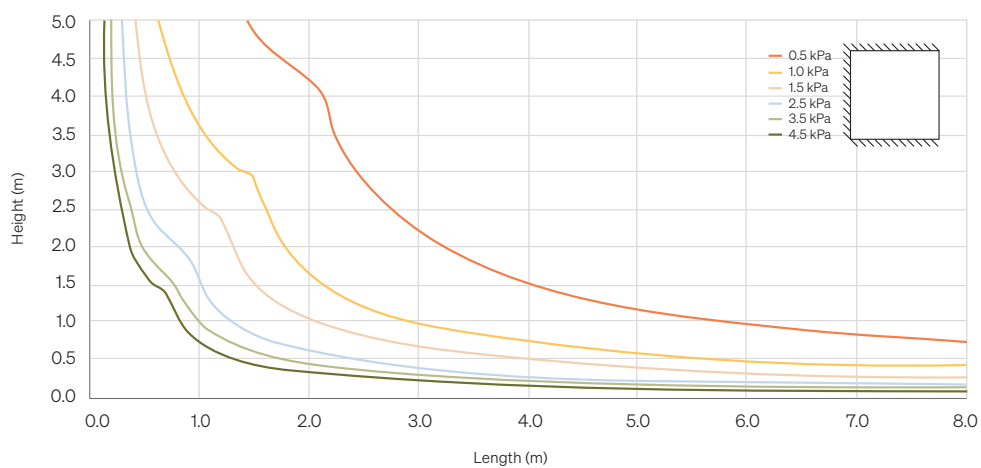
All Sides Supported - No Edges Free



3 Sides Supported - Top Edge Free



3 Sides Supported - Side Edge Free





Design Tables

7.1.2 Linear Breeze



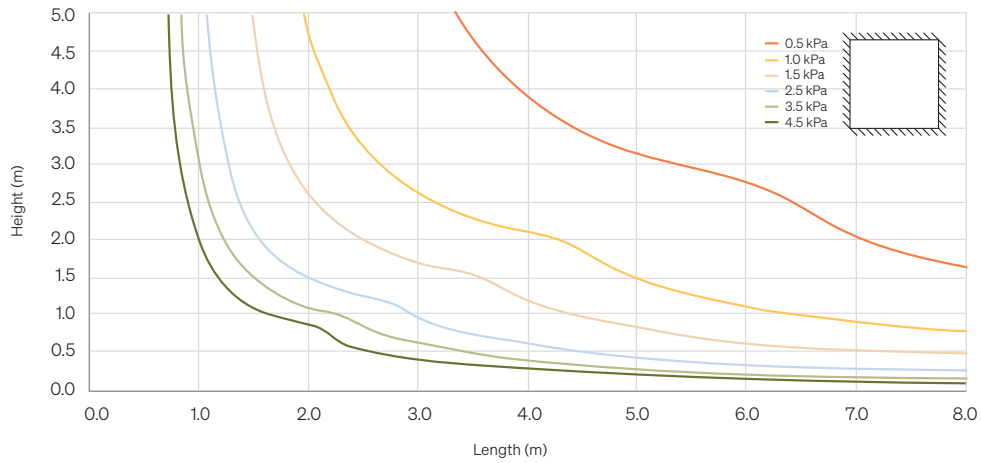
Height (m)	Wall Width (m)								
	0.5 kPa			1.0 kPa			1.5 kPa		
	All Sides Supported	Top Edge Free	Side Edge Free	All Sides Supported	Top Edge Free	Side Edge Free	All Sides Supported	Top Edge Free	Side Edge Free
1.0	8.00	7.16	6.03	6.40	4.16	3.20	4.52	2.57	2.26
1.5	8.00	5.34	4.33	4.89	2.63	2.45	3.64	1.87	1.82
2.0	7.16	3.91	3.58	4.16	2.19	2.05	2.57	1.62	
2.5	6.40	3.33	3.20	3.09	1.97	1.36	2.11	1.49	
3.0	5.34	3.00	2.54	2.63	1.84		1.87	1.40	
3.5	4.42	2.79	1.95	2.37	1.76		1.72	1.35	
4.0	3.91	2.65	1.62	2.19	1.70		1.62	1.31	
4.5	3.57	2.54	1.40	2.07	1.65		1.54	1.28	
5.0	3.33	2.46	1.23	1.97	1.60		1.49	1.27	

Height (m)	Wall Width (m)								
	2.5 kPa			3.5 kPa			4.5 kPa		
	All Sides Supported	Top Edge Free	Side Edge Free	All Sides Supported	Top Edge Free	Side Edge Free	All Sides Supported	Top Edge Free	Side Edge Free
1.0	3.01	1.60	1.51	2.35	1.21		1.77		
1.5	2.06	1.27		1.48					
2.0	1.60			1.21					
2.5	1.39								
3.0	1.27								
3.5									
4.0									
4.5									
5.0									

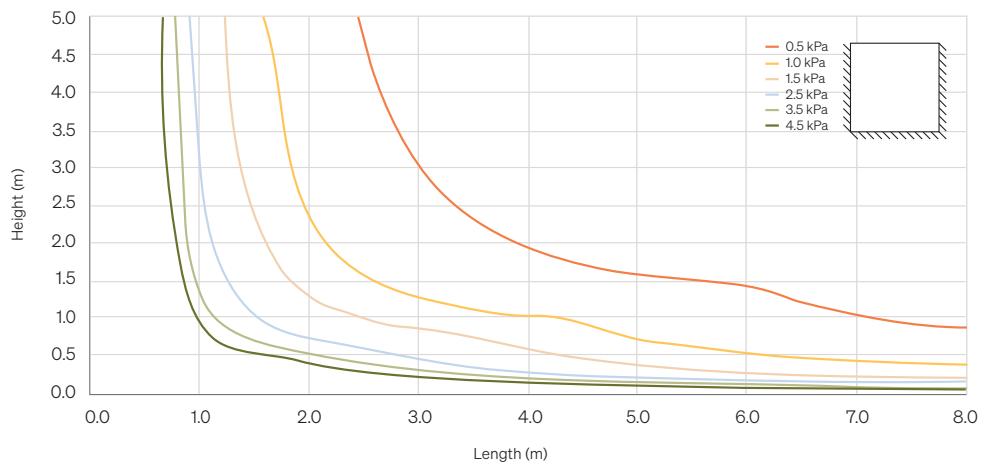
Design Charts

Linear Breeze

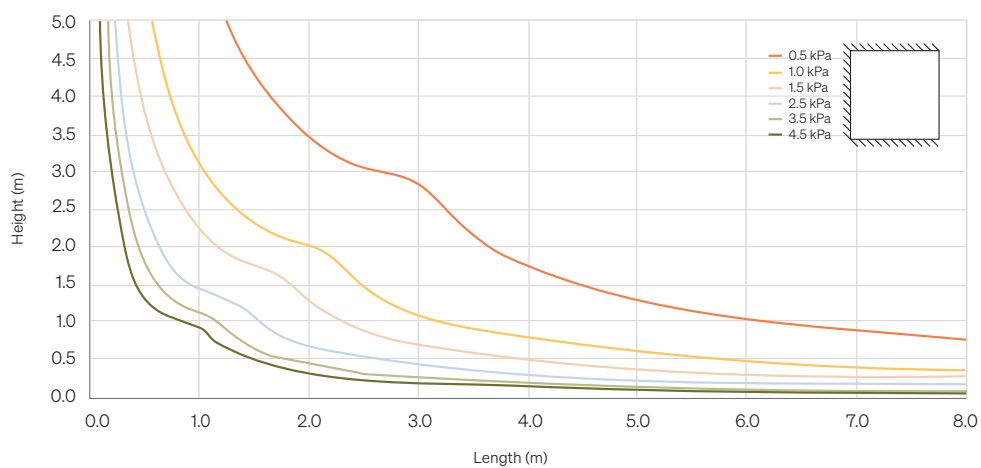
All Sides Supported - No Edges Free



3 Sides Supported - Top Edge Free



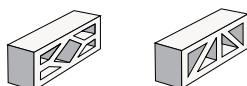
3 Sides Supported - Side Edge Free





Design Tables

7.1.3 Diamond and Wedge Breeze



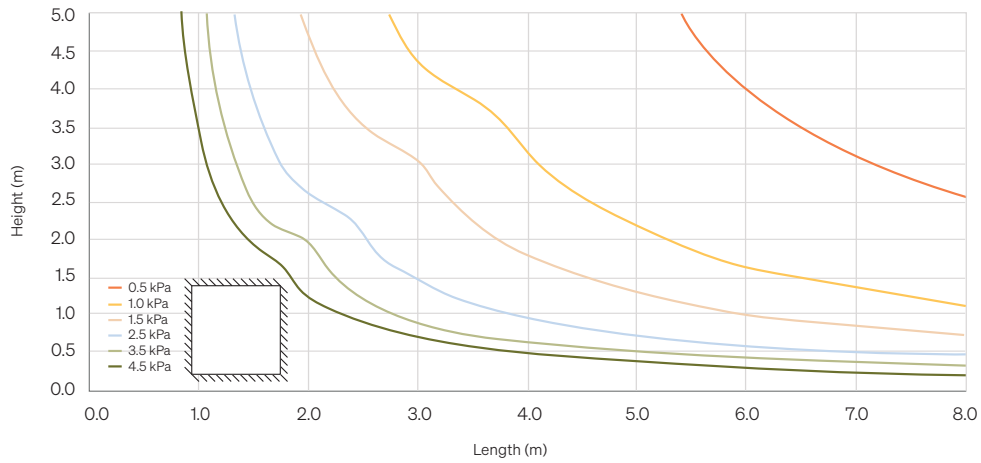
Height (m)	Wall Width (m)								
	0.5 kPa			1.0 kPa			1.5 kPa		
	All Sides Supported	Top Edge Free	Side Edge Free	All Sides Supported	Top Edge Free	Side Edge Free	All Sides Supported	Top Edge Free	Side Edge Free
1.0	8.00	8.00	8.00	8.00	5.33	4.82	6.54	3.78	3.27
1.5	8.00	7.22	6.46	6.71	4.12	3.35	4.64	3.05	2.32
2.0	8.00	6.01	4.99	5.33	3.39	2.66	3.78	2.25	1.89
2.5	8.00	5.41	4.15	4.57	2.72	2.28	3.33	1.95	1.66
3.0	7.22	4.48	3.61	4.12	2.40	2.06	3.05	1.78	1.52
3.5	6.51	3.88	3.25	3.84	2.22	1.92	2.55	1.68	
4.0	6.01	3.53	3.00	3.39	2.10	1.59	2.25	1.59	
4.5	5.66	3.30	2.83	2.97	2.00	1.28	2.07	1.54	
5.0	5.41	3.13	2.71	2.72	1.95		1.95	1.49	

Height (m)	Wall Width (m)								
	2.5 kPa			3.5 kPa			4.5 kPa		
	All Sides Supported	Top Edge Free	Side Edge Free	All Sides Supported	Top Edge Free	Side Edge Free	All Sides Supported	Top Edge Free	Side Edge Free
1.0	4.06	2.54	2.03	2.99	1.99	1.50	2.40	1.48	1.20
1.5	2.99	1.79	1.50	2.28	1.34		1.90		
2.0	2.54	1.47	1.27	1.99			1.48		
2.5	2.18	1.33		1.53			1.22		
3.0	1.79	1.25		1.34					
3.5	1.59			1.22					
4.0	1.47								
4.5	1.39								
5.0	1.33								

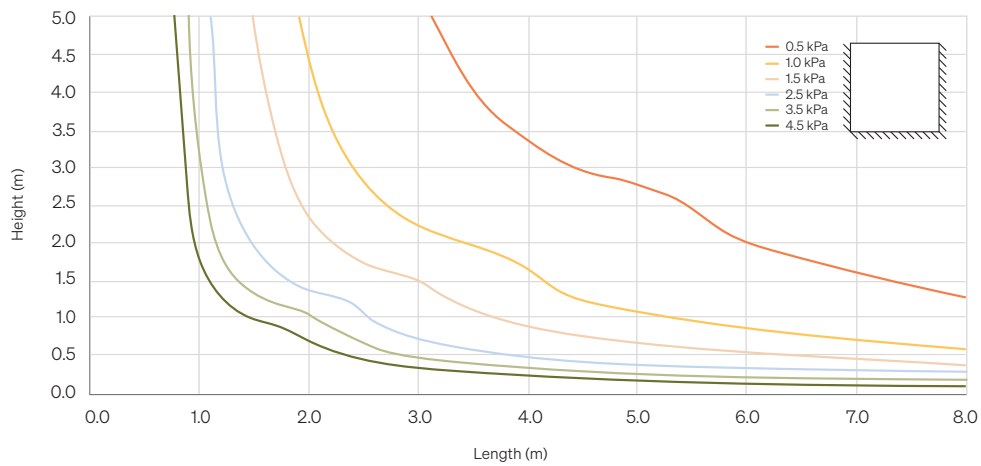
Design Charts

Diamond and Wedge Breeze

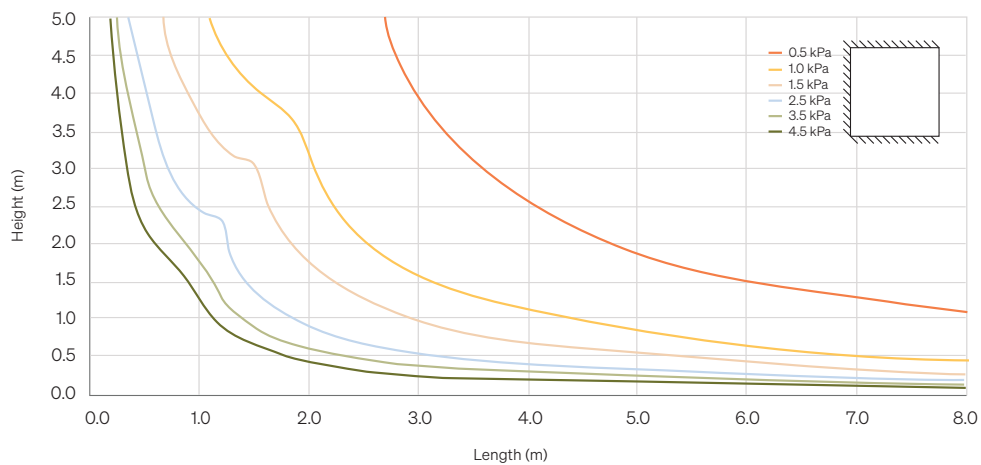
All Sides Supported - No Edges Free



3 Sides Supported - Top Edge Free



3 Sides Supported - Side Edge Free





Design Tables

7.1.4 Arc Breeze

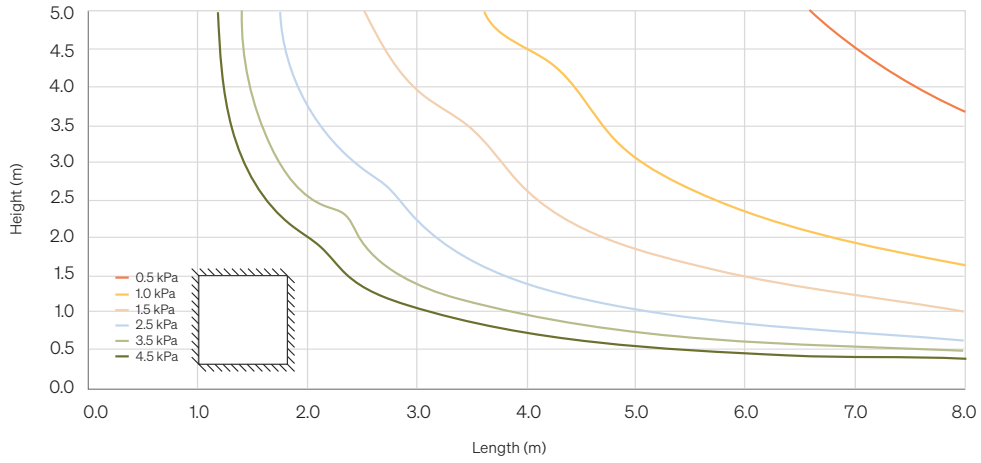


Height (m)	Wall Width (m)								
	0.5 kPa			1.0 kPa			1.5 kPa		
	All Sides Supported	Top Edge Free	Side Edge Free	All Sides Supported	Top Edge Free	Side Edge Free	All Sides Supported	Top Edge Free	Side Edge Free
1.0	8.00	8.00	8.00	8.00	6.76	6.25	8.00	4.73	4.22
1.5	8.00	8.00	8.00	8.00	5.07	4.31	5.91	3.72	2.96
2.0	8.00	7.44	6.42	6.76	4.38	3.38	4.73	2.97	2.37
2.5	8.00	6.56	5.29	5.71	3.57	2.86	4.09	2.50	2.05
3.0	8.00	6.05	4.57	5.07	3.12	2.54	3.72	2.27	1.87
3.5	8.00	5.11	4.07	4.66	2.86	2.33	3.43	2.14	1.68
4.0	7.44	4.58	3.72	4.38	2.69	2.18	2.97	2.04	1.30
4.5	6.94	4.25	3.47	3.99	2.57	1.89	2.69	1.97	
5.0	6.56	4.02	3.28	3.57	2.49	1.54	2.50	1.92	

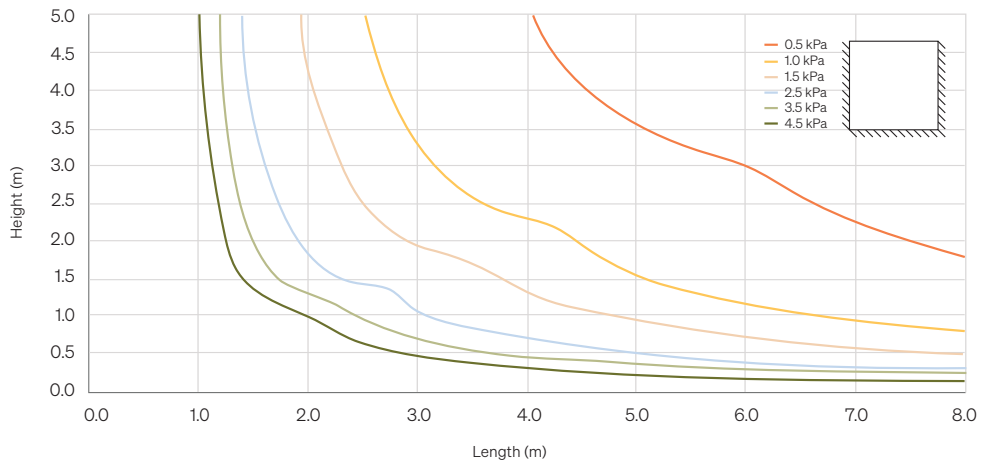
Height (m)	Wall Width (m)								
	2.5 kPa			3.5 kPa			4.5 kPa		
	All Sides Supported	Top Edge Free	Side Edge Free	All Sides Supported	Top Edge Free	Side Edge Free	All Sides Supported	Top Edge Free	Side Edge Free
1.0	5.20	3.11	2.60	3.81	2.41	1.91	3.04	2.01	1.52
1.5	3.75	2.37	1.88	2.82	1.73	1.41	2.30	1.41	
2.0	3.11	1.90	1.56	2.41	1.47	1.20	2.01	1.23	
2.5	2.79	1.70	1.39	2.04	1.35		1.60		
3.0	2.37	1.59		1.73	1.28		1.41		
3.5	2.08	1.52		1.57	1.23		1.30		
4.0	1.90	1.47		1.47			1.23		
4.5	1.79	1.43		1.40					
5.0	1.70	1.41		1.35					

Arc Breeze

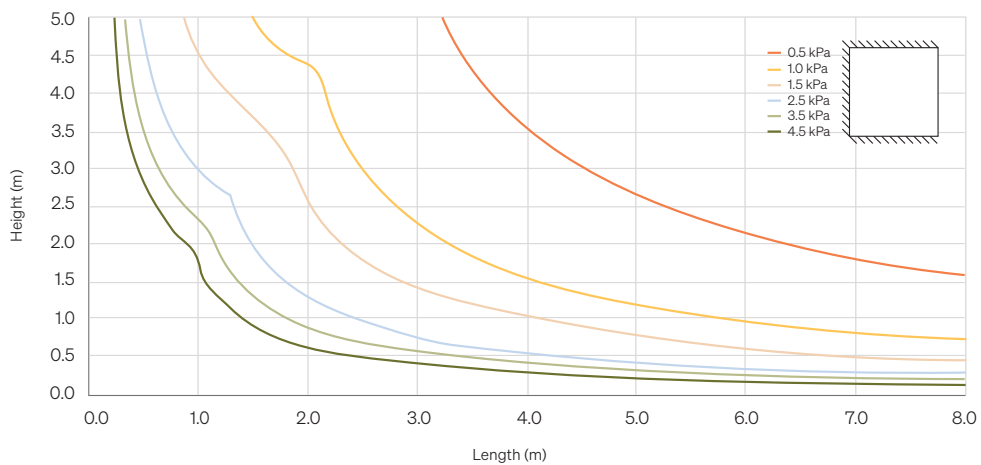
All Sides Supported - No Edges Free



3 Sides Supported - Top Edge Free



3 Sides Supported - Side Edge Free





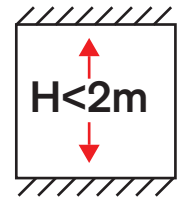
Design Tables

7.2. Walls Less Than 2 Metres High – No Reinforcement

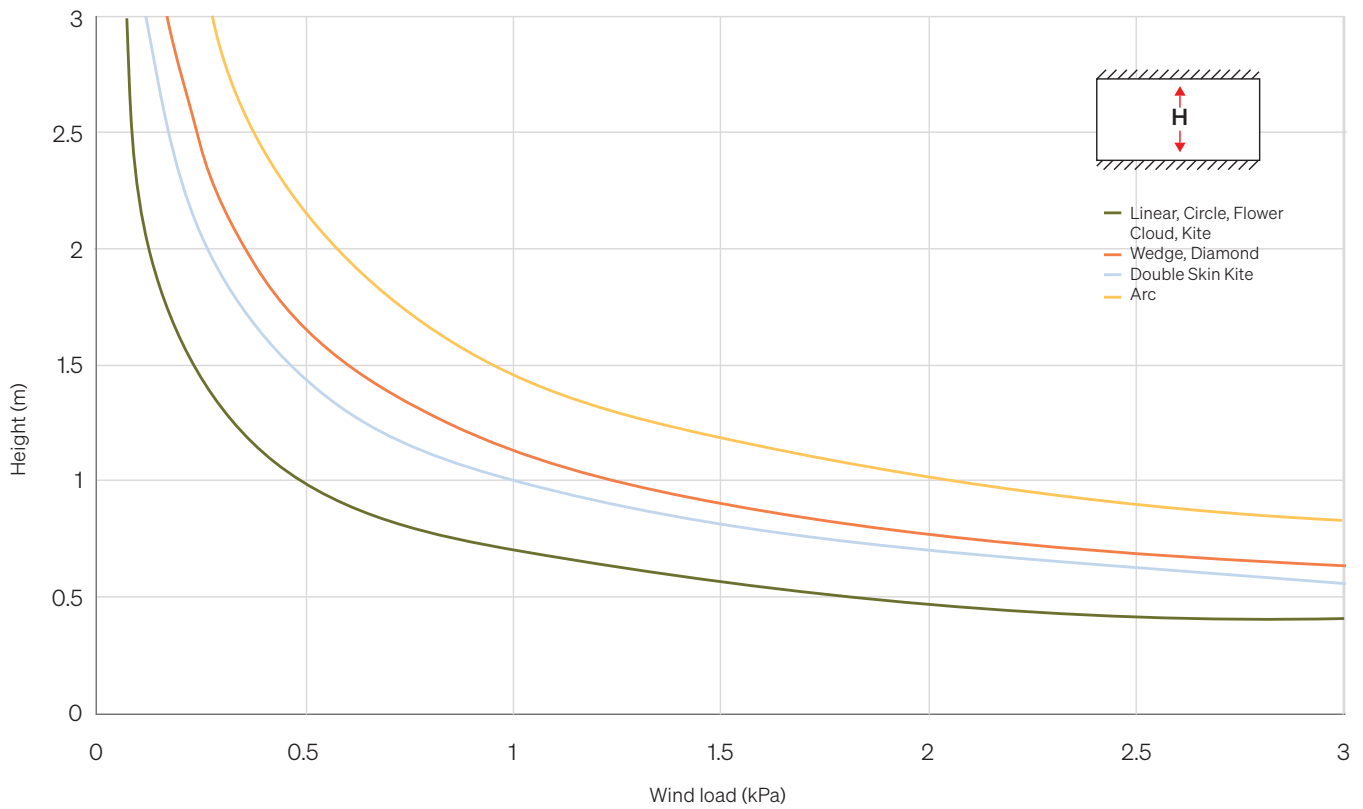
Stack bonded Breeze Block walls with unrestrained sides are limited to heights less than 2 metres. The top and bottom must be constrained and fixed to a structurally adequate member.

Span Table 1: Maximum height (m) for walls with no reinforcement

Wind Load (kPa)	Circle, Flower, Cloud, Linear, Kite	Wedge Diamond	Arc	Double Skin Kite
0.5	1.00	1.68	2.17	1.45
1	0.70	1.15	1.50	1.00
1.5	0.57	0.92	1.19	0.80
2	0.50	0.78	1.04	0.70
2.5	0.43	0.70	0.91	0.62
3	0.40	0.63	0.82	0.57



Span Chart 1: No Reinforcement



Design Tables

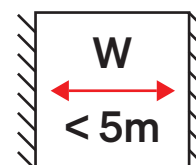
7.3. Walls Less Than 5 Metres Wide - Bed Joint Reinforcement

Horizontal bed joint reinforcement in either ladder or truss style is highly effective in improving the structural capacity of stack bonded masonry walls by distributing lateral and vertical loads across and into adjacent columns. Bed joint reinforcement is also effective at mitigating the risk of crack formation caused by wall movements or at points of weaknesses.

The capacities of stack bonded masonry with bed joint reinforcement specified in Section 7.3.1 are detailed with Ancon AMR 5mm masonry reinforcement however reinforcement with equivalent specifications as per Table 4 can be used.

Table 4: Breeze Block Bed Joint Reinforcement Specification Table

Material	Grade 304/316
Length	2700 mm
Width	60 mm/100 mm/150 mm
Yield strength	500 MPa
Wire diameter	5 mm
Cross wire spacings	450 mm centres
Cross section per wire	19.63
Area	39.26 mm ²



7.3.1 Detailing Requirements

Stack bonded masonry with bed joint reinforcement is restricted to walls less than 5 metres wide and must be constrained and fixed on both sides by an adequate structural member such as a concrete, block or steel column. The capacity of supporting members adjacent to the Breeze Block walls as well as the connection details should be designed or checked by a qualified structural engineer.

When designing horizontally reinforced Breeze Block walls for wind loads, the wall size is limited in width only and unrestricted in height. However, the height is

governed by the capacity of the structural members. Other factors, such as the self weight of the wall and the size of the surrounding supports should be checked and the project engineer should ensure that the capacity of the columns are adequate for the height of the wall.

Reinforcement must be laid at every course and sufficiently embedded in mortar. The reinforcement must not bridge across movement joints.

When lapping pieces, a minimum of 225 mm with at least one cross wire is required. Laps can be achieved by either stacking lengths or positioning the ends

side by side. The position of laps should also be staggered throughout the masonry panel.

Edge connection to the structural columns is required to transfer the lateral load and can be done using wall ties in the bed joints.

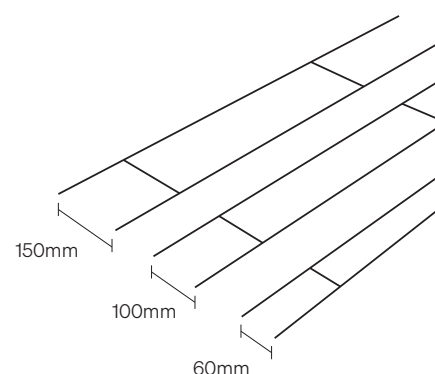
7.3.2. Applicable Widths

Standard AMR is available in widths 60 mm, 100 mm, 150 mm with other widths available to order. The applicable reinforcement should be 30 – 50 mm less than the width of the block.

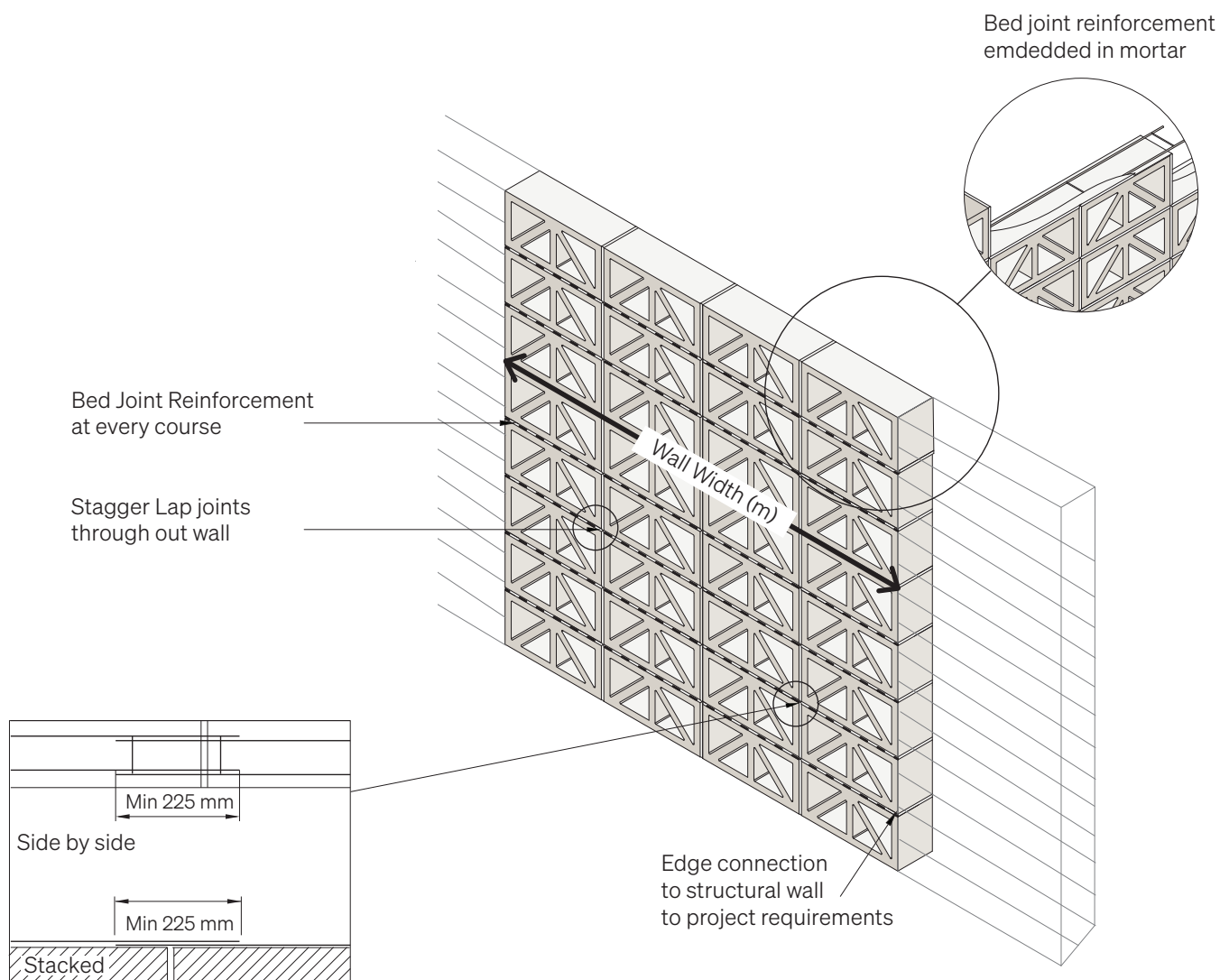
Corners are formed by cutting the inner wire and bending the outer wire

Table 5: Ancon AMR Applicable Widths

	Block Width	AMR width
Circle, Flower, Linear, Cloud, Kite	90 mm	60 mm
Diamond, Wedge	120 mm	60 mm
Arc	140 mm	100 mm
Double Skin Kite	180 mm	150 mm



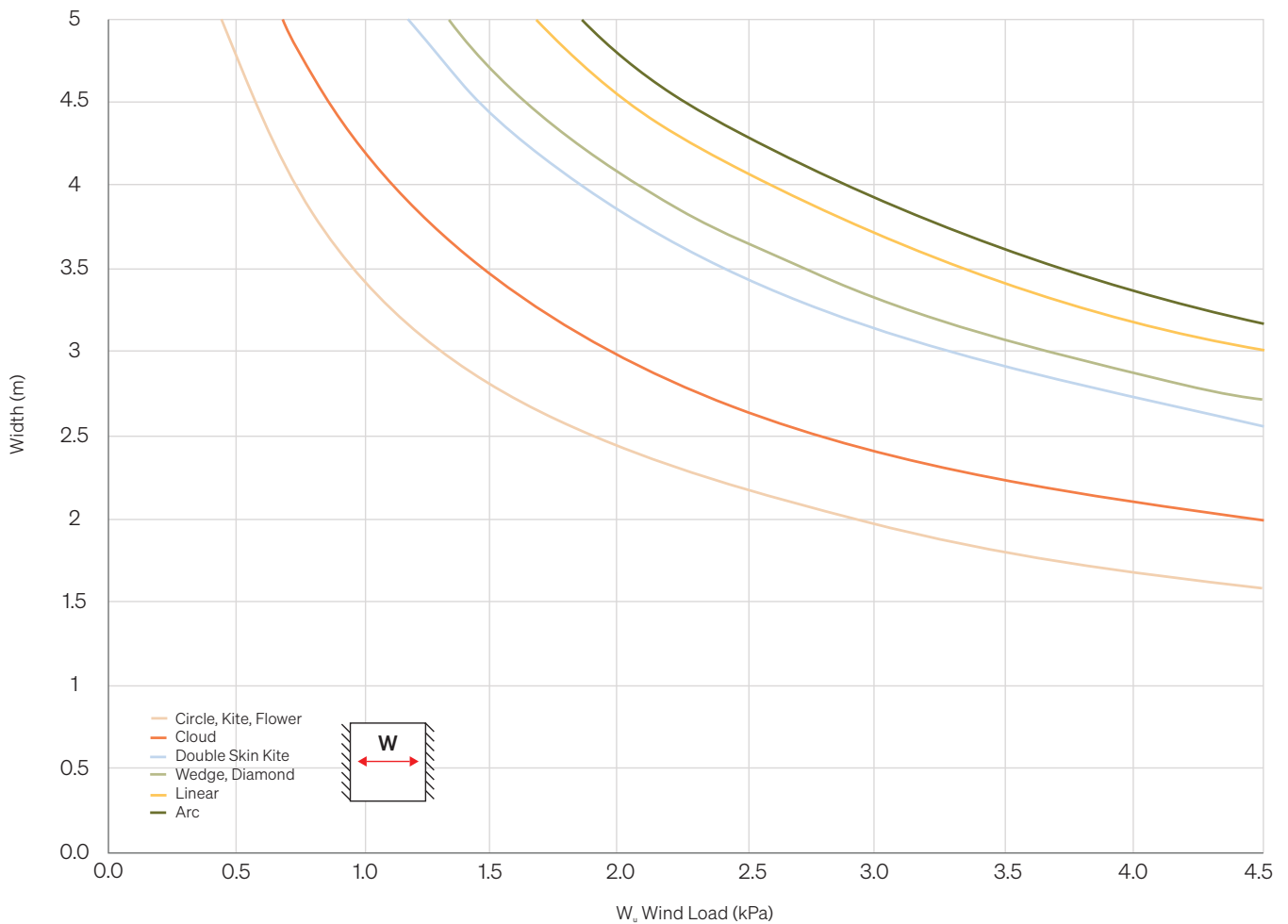
Design Tables



Span Table 2: Bed Reinforcement

Wind Load (kPa)	Maximum Wall Width (m)					
	Circle, Kite, Flower	Cloud	Double Skin Kite	Linear	Wedge, Diamond	Arc
0.5	4.8	5.0	5.0	5.0	5.0	5.0
1	3.4	4.2	5.0	5.0	5.0	5.0
1.5	2.7	3.4	4.4	5.0	4.7	5.0
2	2.4	2.9	3.8	4.5	4.0	4.8
2.5	2.1	2.6	3.4	4.0	3.6	4.2
3	1.9	2.4	3.1	3.7	3.3	3.9
3.5	1.8	2.2	2.9	3.4	3.0	3.6
4	1.7	2.1	2.7	3.2	2.8	3.3
4.5	1.6	1.9	2.5	3.0	2.7	3.2

Span Chart 2: Horizontal Bed Joint Reinforcement



Design

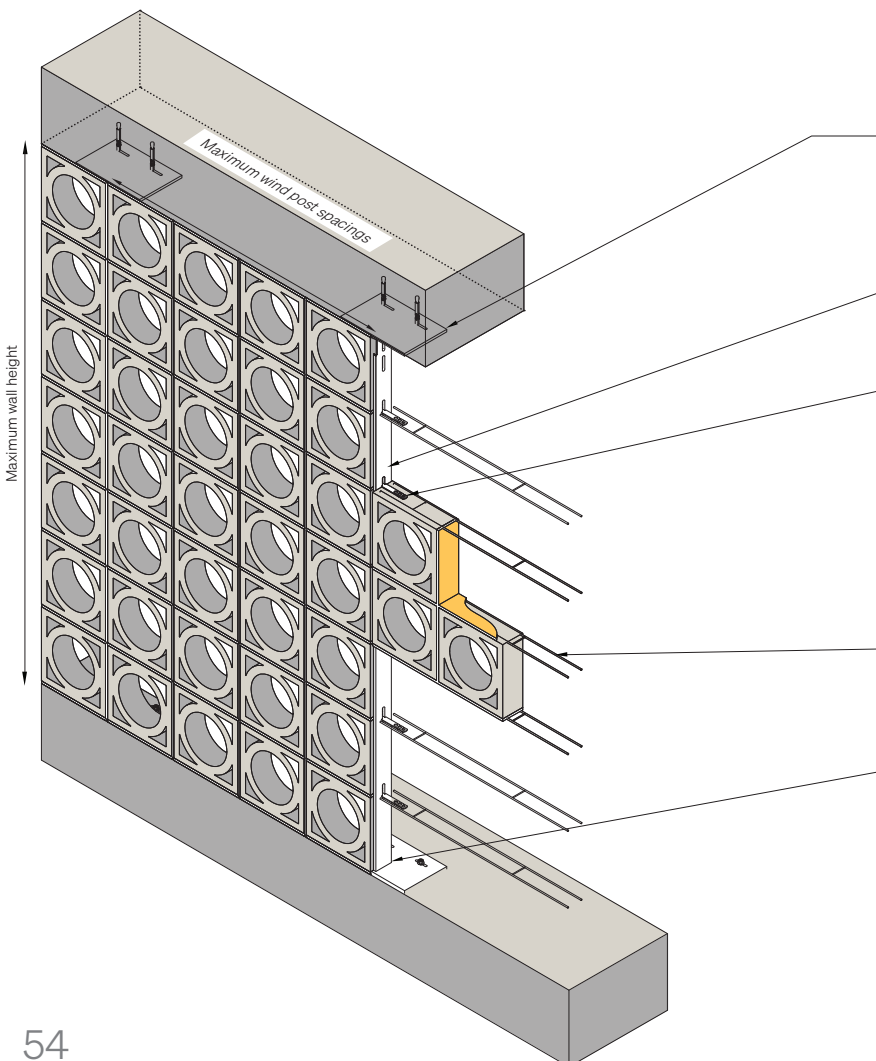
7.4. Walls Wider than 5m – Wind Post Supports

Wind posts provide lateral stability to masonry panels from destabilising horizontal forces that typically originate from wind pressure. They are commonly made of steel sections with prefabricated slots to accommodate wall ties and are designed to span vertically between floors.

For the reinforcement of Breeze Block walls where both sides are 'fair faced', flat plates or spine posts are the most applicable wind post shape as they are installed fully embedded within the wall. The spans provided in this section are calculated with 10mm ANCON WP4 wind posts however thicker wind posts are available on request if higher wall capacities are required.

For further information on specific applications, please get in contact with the Ancon Technical Services. Alternatively, custom steel supports designed by a qualified structural engineer can also be used.

Components



1. Top Connection

The top connection of the wind post/top cleat connection will have a vertical slot/ to permit movement of the frame. Block work may need to be notched locally to accommodate fixings.

2. Wind Post

Steel posts span vertically across the wall height and are fixed top and bottom. The spacings are determined by wall size and wind loads.

3. Wall Ties

Ancon SNS wall ties are used across the posts in the inner blockwork and installed at every block course. A debonding sleeve can be supplied for use where there is vertical movement joint Ancon AMR 5mm bed joint reinforcement.

4. Bed Joint Reinforcement

5mm bed joint reinforcement should be laid at every course and spans between wind posts.

5. Bottom Connection

A bottom plate is fixed to the base substrate before the wind post is welded in place.

Wind Post Design and Fixings

Ancon WP4 wind posts are designed as simply supported beams with loads uniformly distributed over its vertical length.

The top connection allows for shrinkage or vertical movement of the frame to take place. The type of fixing will depend on the nature of the frame. Expansion bolts are normally supplied

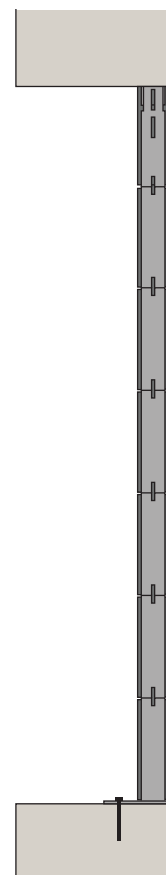
for concrete frames and set screws will be supplied for steel frames. Please note, it is the responsibility of the Engineer to design an adequate structure to support all wall components and any detailed connections.

The depth of a WP4 post is limited by the width of the masonry and is ideally 20mm less than the wall width. Post

thickness can be increased to the thickness of the increase load capacity. Wind posts over 3 m will require welded joints between lengths. Posts are available in Grades 304 and 316 steel.

Table 6: Applicable Post Sizes for Block Types

Block	Length	Height	Thickness	Post Size
Circle	290	290	90	75×10
Flower	290	290	90	
Kite	290	290	90	
Cloud	390	190	90	75×10
Linear	390	80	95	
Diamond	390	190	140	120×10
Wedge	390	190	140	
Arc	390	190	180	120×10
Double Skin Kite	290	290	180	



Connection Details

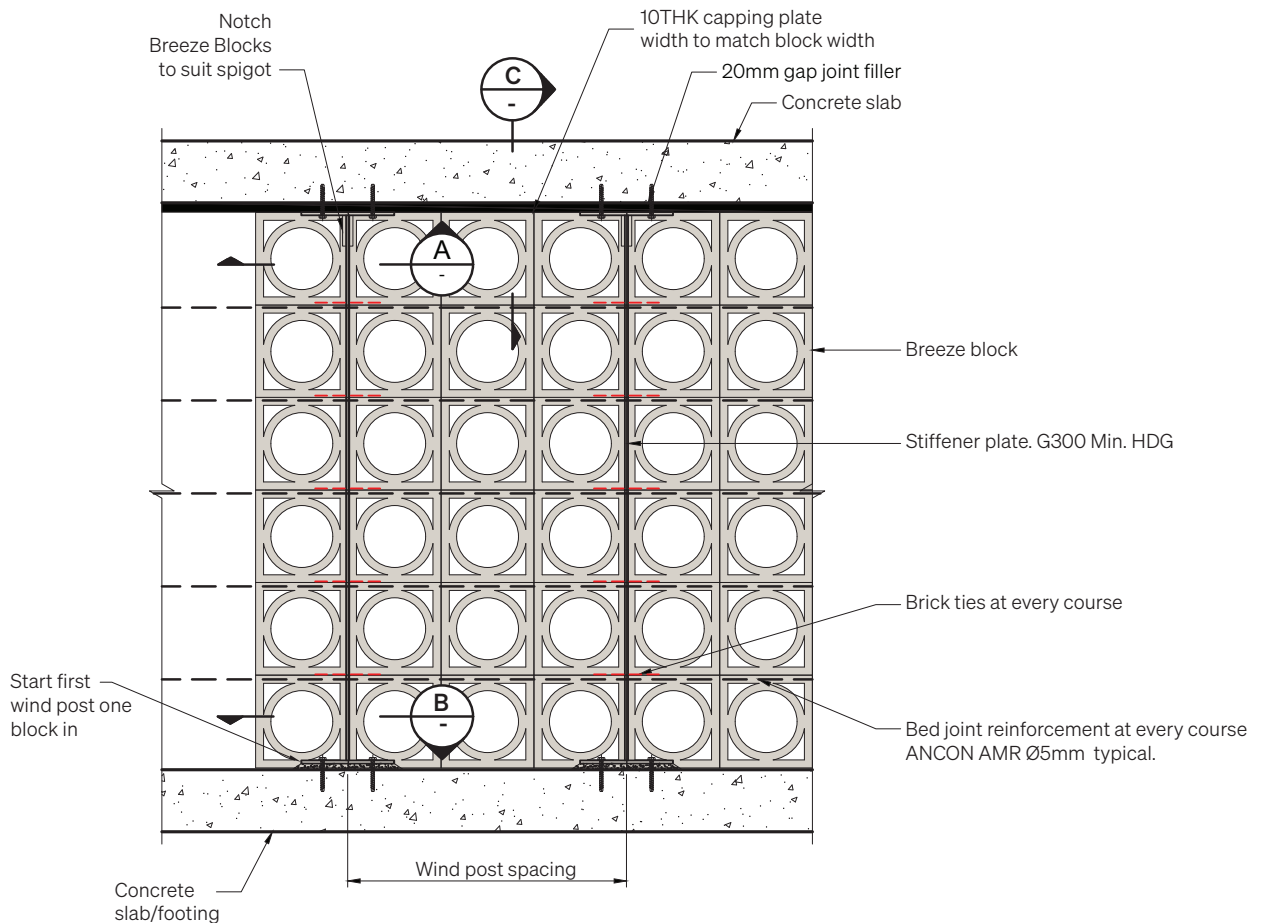
The choice of fixing and position is dependent on the length of wind post and the type of structure it will be fixed to. Typical top and bottom

connection details are provided below but are often designed to suit project specifications.

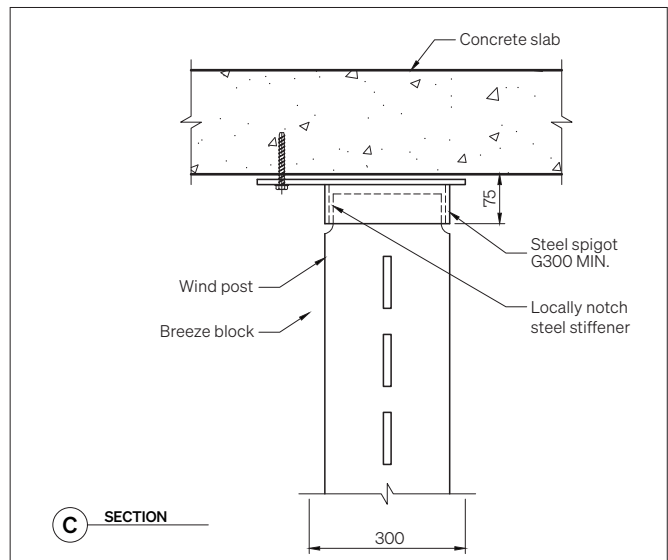
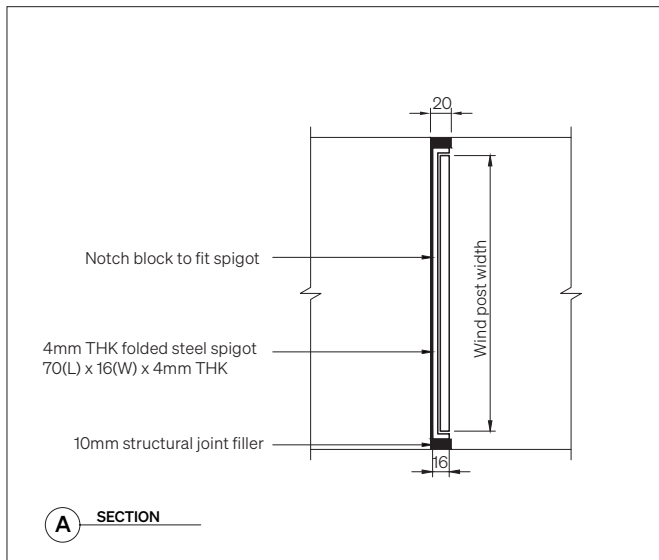
For further options, please get in contact with Ancon Technical Services.

Option 1: 10mm joint with offset plate wind system

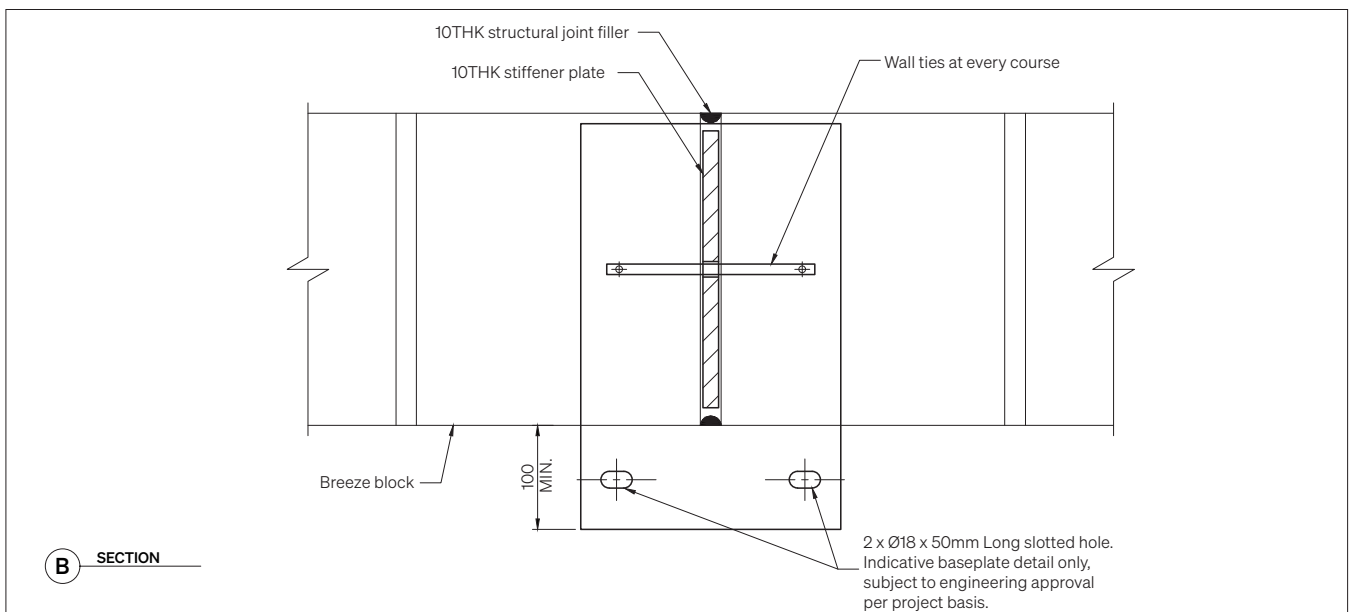
Elevation



Top Connection



Bottom Connection

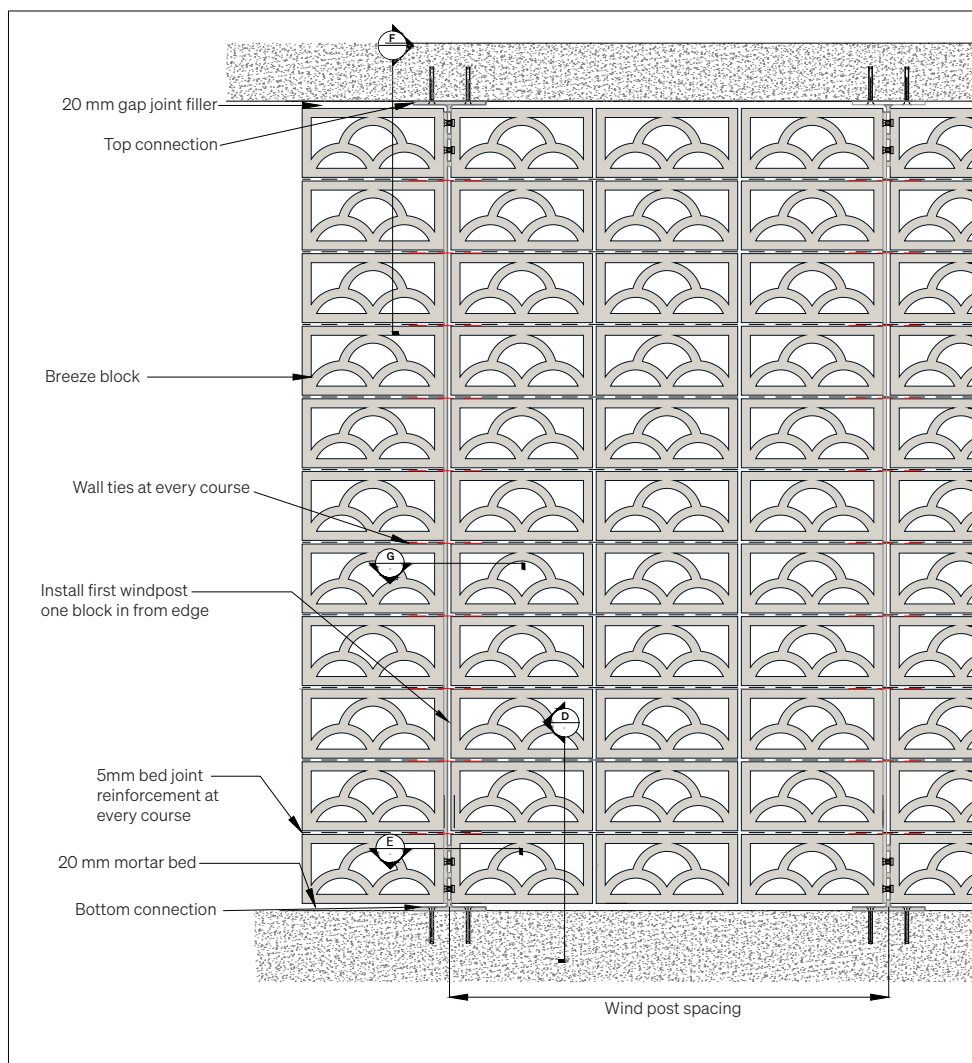


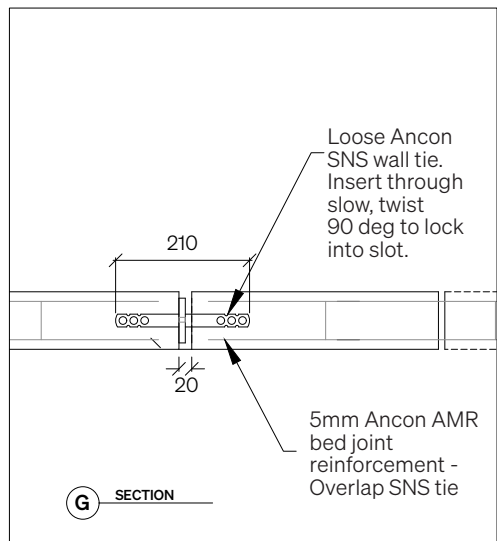
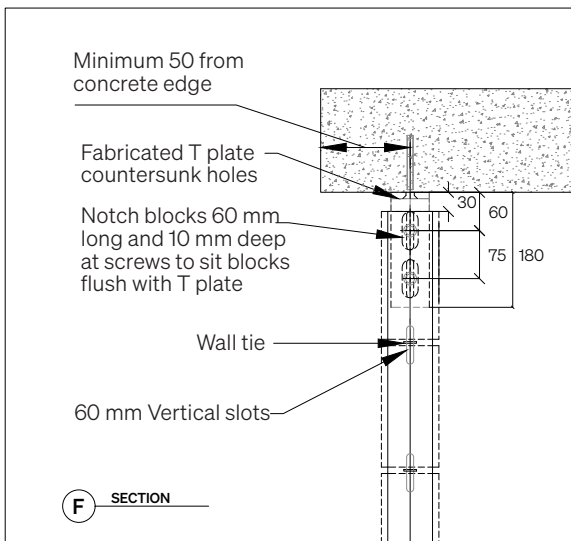
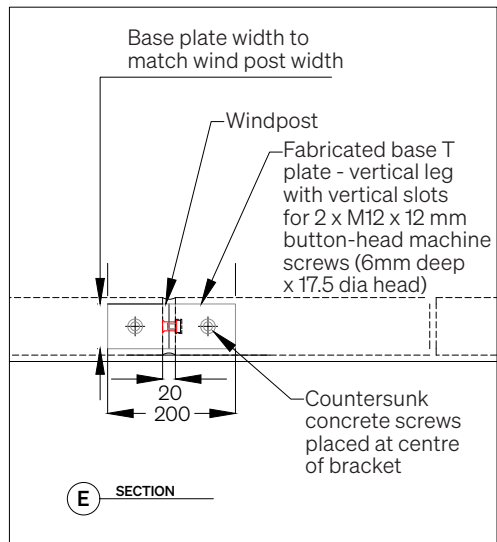
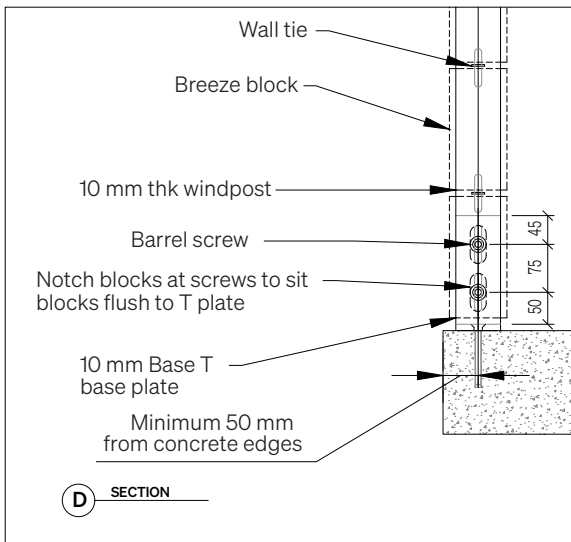
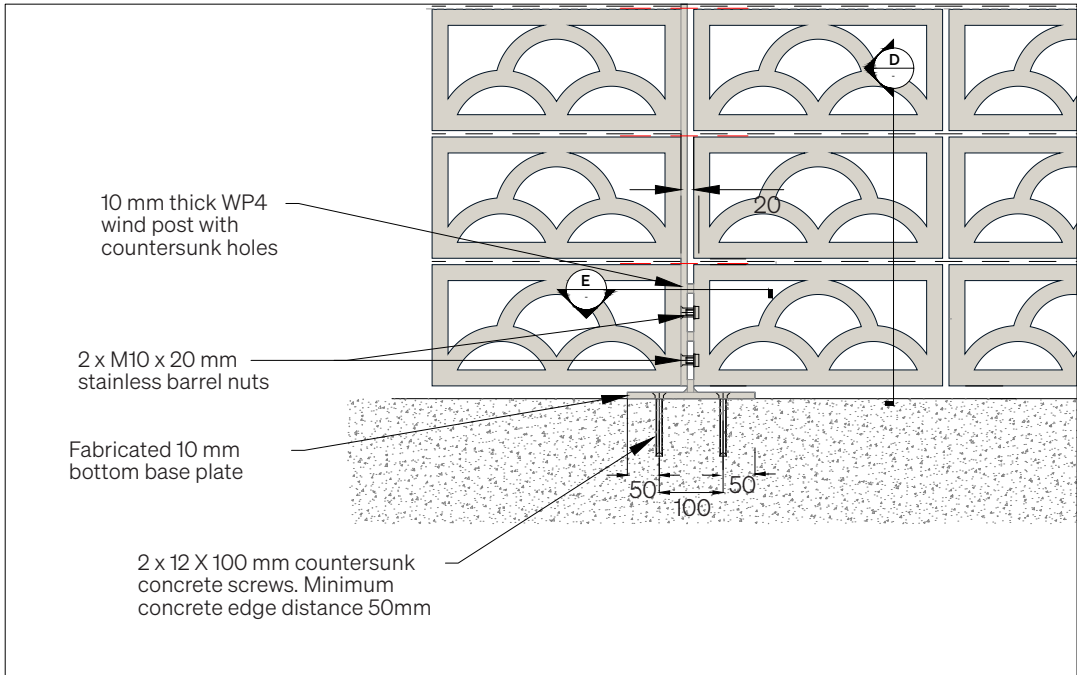
Connection Details

Option 2: ANCON 20mm joint with concealed connections

Designs assume minimum 30 MPa concrete. Manufactured from GRADE 304 stainless

steel. Install Ancon products in accordance with Ancon installation guides.





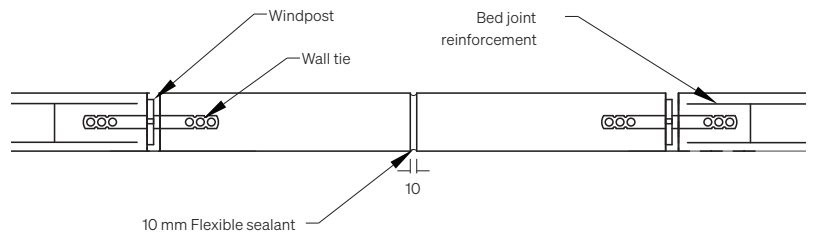
Connection Details

7.4.1. Control Joints

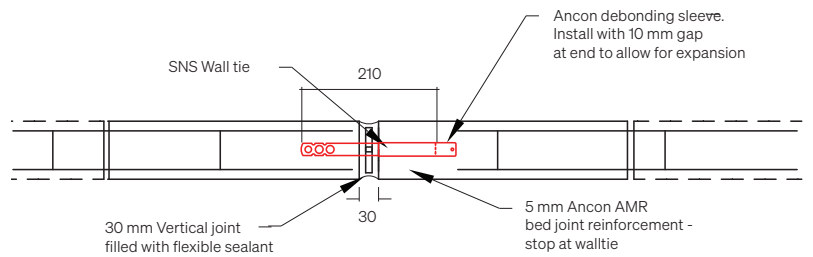
Vertical control joints are to be installed at spacings no greater than 6 metres. Blocks adjacent to vertical expansion joints are considered a free edge and thus require additional detailing to maintain structural adequacy. Free edges can be supported by installing additional wind posts adjacent to the vertical control joint or installing wall ties with debonding sleeves.

Debonding sleeves are installed as normal onto one side of the ANCON SNS wall ties. The tie will restrain the masonry against lateral wind loads but the sleeve will allow the masonry to expand or contract. Debonding sleeves should be installed with a 10mm gap at the end to allow for expansion of the masonry.

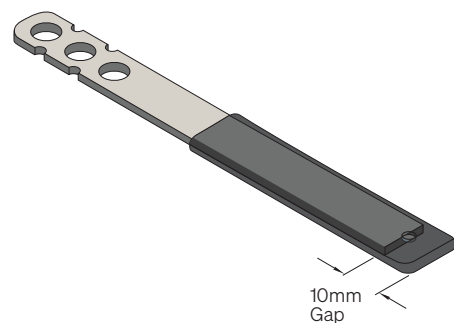
Wind Posts One Block Adjacent to the Control Joint



Debonding Sleeves



SNS Wall Tie with Debonding Sleeve Connection

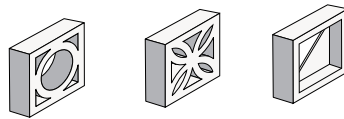




Span Tables and Charts

7.4.2. Wind Post Design Circle, Flower and Kite Breeze Blocks

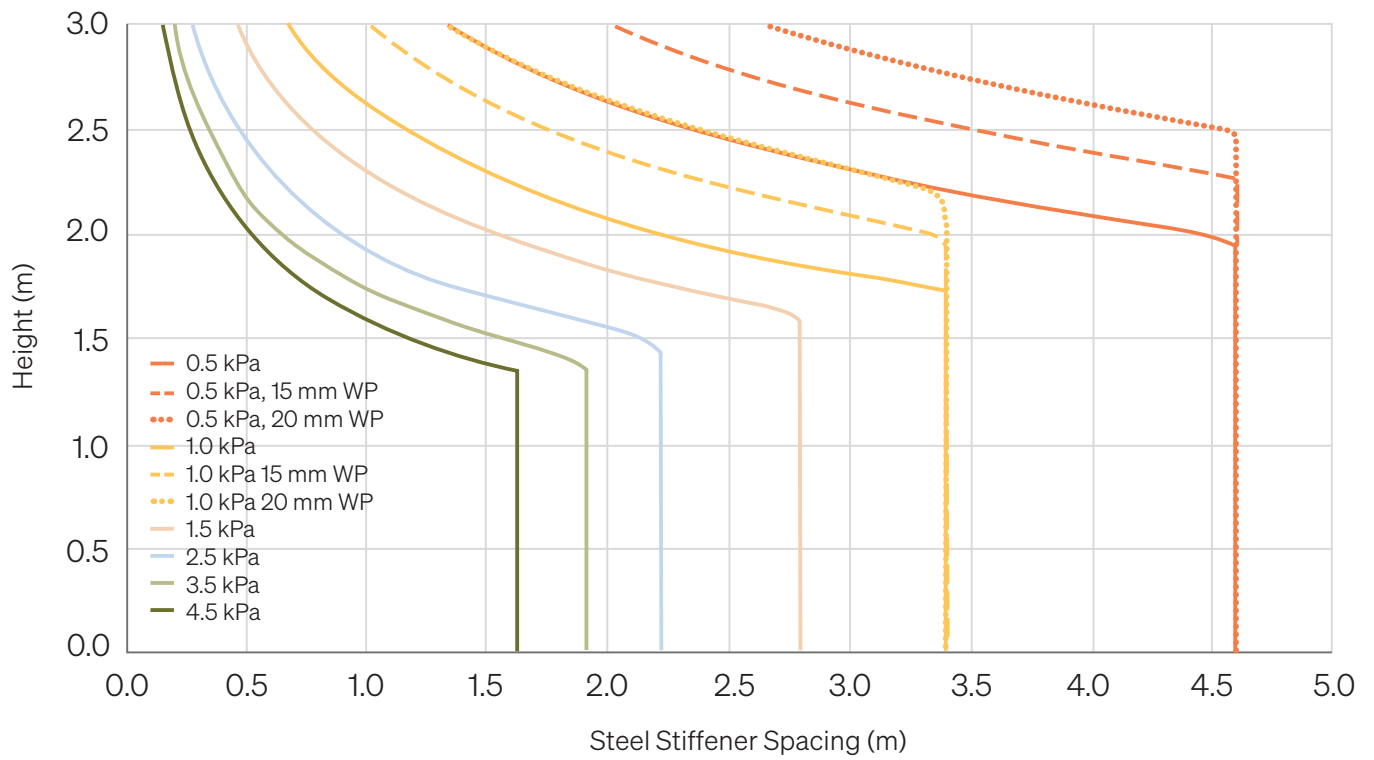
Span Table 3 - Circle, Flower and Kite Breeze



Maximum post spacings for Circle, Flower and Kite Breeze

Wind Post thickness (mm)	10	15	20	10	15	20	10	10	10	10
	0.5 kPa			1.0 kPa			1.5 kPa	2.5 kPa	3.5 kPa	4.5 kPa
Height (m)										
0.8	4.60	4.60	4.60	3.40	3.40	3.40	2.80	2.20	1.90	1.60
1.0	4.60	4.60	4.60	3.40	3.40	3.40	2.80	2.20	1.90	1.60
1.2	4.60	4.60	4.60	3.40	3.40	3.40	2.80	2.20	1.90	1.60
1.4	4.60	4.60	4.60	3.40	3.40	3.40	2.80	2.20	1.85	1.44
1.6	4.60	4.60	4.60	3.40	3.40	3.40	2.80	1.73	1.24	
1.8	4.60	4.60	4.60	3.04	3.40	3.40	2.03	1.22		
2.0	4.44	4.60	4.60	2.22	3.33	3.40	1.48			
2.2	3.33	4.60	4.60	1.67	2.50	3.33				
2.4	2.57	3.85	4.60	1.28	1.93	2.57				
2.6	2.02	3.03	4.04		1.51	2.02				
2.8	1.62	2.43	3.23		1.21	1.62				
3.0	1.31	1.97	2.63			1.31				

Span Chart 3: Maximum Post Spacings: Circle, Flower and Single Skin Kite Breeze



Span Tables and Charts

7.4.3. Wind Post Wall Design for Cloud Breeze Blocks

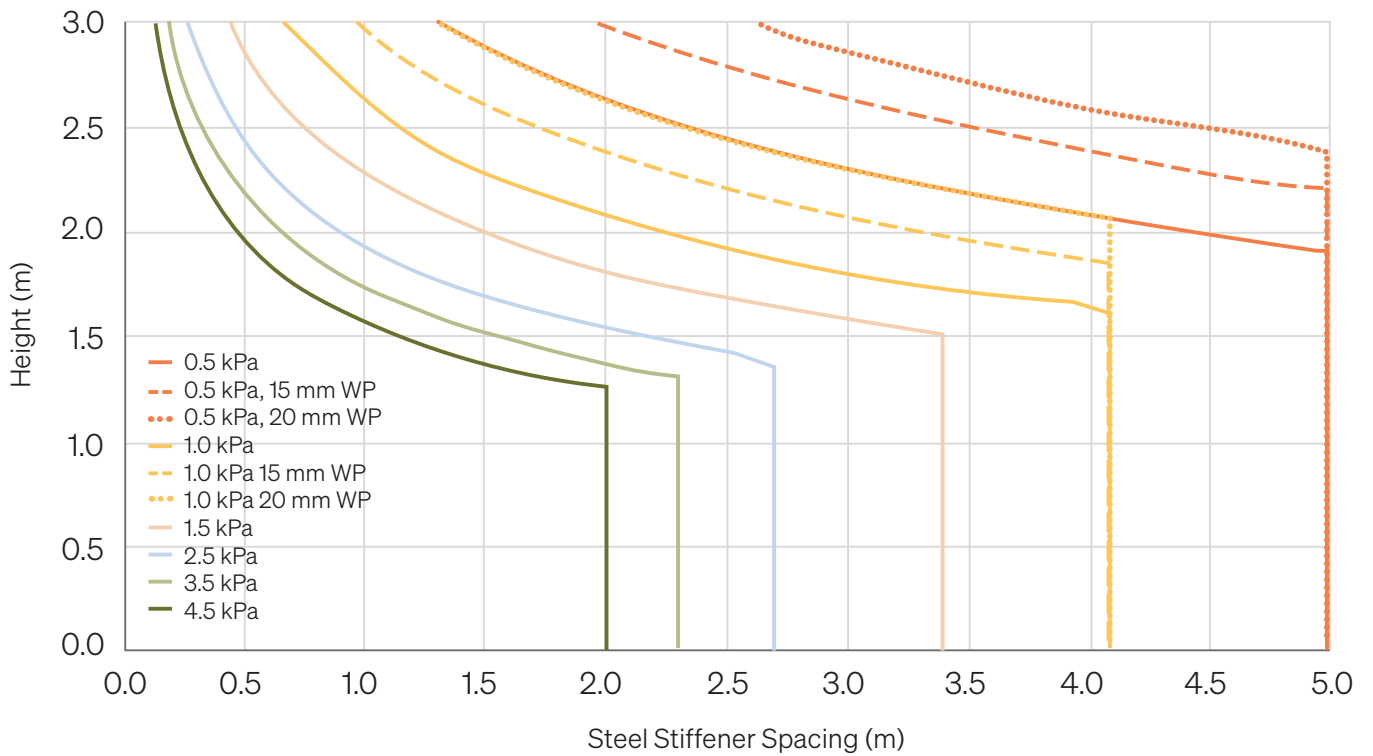
Span Table 4 - Cloud Breeze



Maximum post spacings for Cloud Breeze

Wind Post thickness (mm)	10	15	20	10	15	20	10	10	10	10
	0.5 kPa			1.0 kPa			1.5 kPa	2.5 kPa	3.5 kPa	4.5 kPa
Height (m)										
0.8	5.00	5.00	5.00	4.10	4.10	4.10	3.40	2.70	2.30	2.00
1.0	5.00	5.00	5.00	4.10	4.10	4.10	3.40	2.70	2.30	2.00
1.2	5.00	5.00	5.00	4.10	4.10	4.10	3.40	2.70	2.30	2.00
1.4	5.00	5.00	5.00	4.10	4.10	4.10	3.40	2.59	1.85	1.44
1.6	5.00	5.00	5.00	4.10	4.10	4.10	2.89	1.73	1.24	
1.8	5.00	5.00	5.00	3.04	4.10	4.10	2.03	1.22		
2.0	4.44	5.00	5.00	2.22	3.33	4.10	1.48			
2.2	3.33	5.00	5.00	1.67	2.50	3.33				
2.4	2.57	3.85	5.00	1.28	1.93	2.57				
2.6	2.02	3.03	4.04		1.51	2.02				
2.8	1.62	2.43	3.23		1.21	1.62				
3.0	1.31	1.97	2.63			1.31				

Span Chart 4: Maximum Post Spacings: Cloud Breeze



Span charts for Cloud Breeze are designed with maximum wall tie spacing 200 mm centres or with blocks laid flat horizontally.

Span Tables and Charts

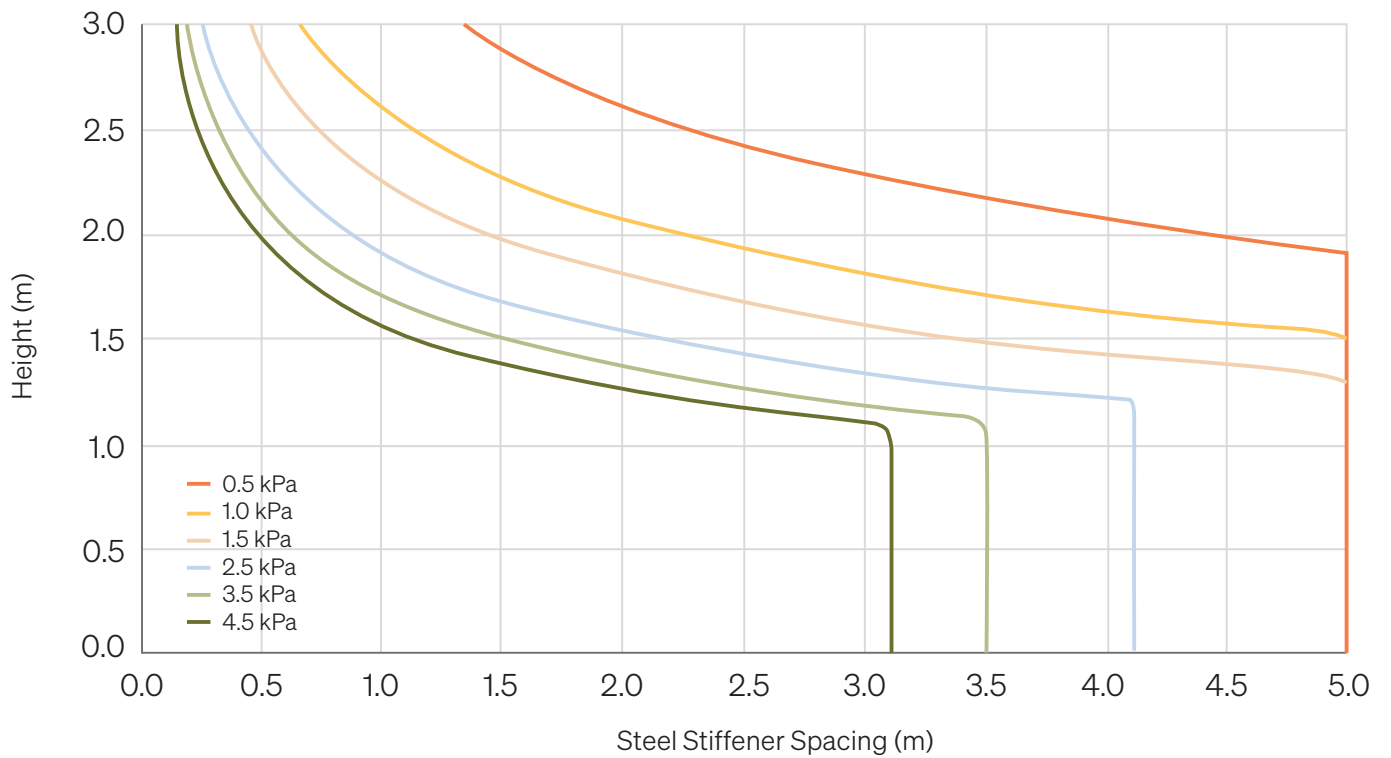
7.4.4. Wind Post Wall Design for Linear Breeze Blocks

Span Table 5 - Linear Breeze



Post Size 75 × 10	Maximum post spacings for Linear Breeze					
	0.5 kPa	1.0 kPa	1.5 kPa	2.5 kPa	3.5 kPa	4.5 kPa
Height (m)						
0.8	5.00	5.00	5.00	4.10	3.50	3.10
1.0	5.00	5.00	5.00	4.10	3.50	3.10
1.2	5.00	5.00	5.00	4.10	2.93	2.28
1.4	5.00	5.00	4.31	2.59	1.85	1.44
1.6	5.00	4.33	2.89	1.73	1.24	
1.8	5.00	3.04	2.03	1.22		
2.0	4.44	2.22	1.48			
2.2	3.33	1.67				
2.4	2.57	1.28				
2.6	2.02					
2.8	1.62					
3.0	1.31					

Span Chart 5: Maximum Post Spacings: Linear Breeze

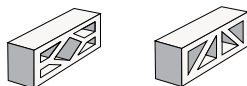


Span charts for Linear Breeze are designed with maximum wall tie spacing 240 mm centres or with blocks laid flat horizontally

Span Tables and Charts

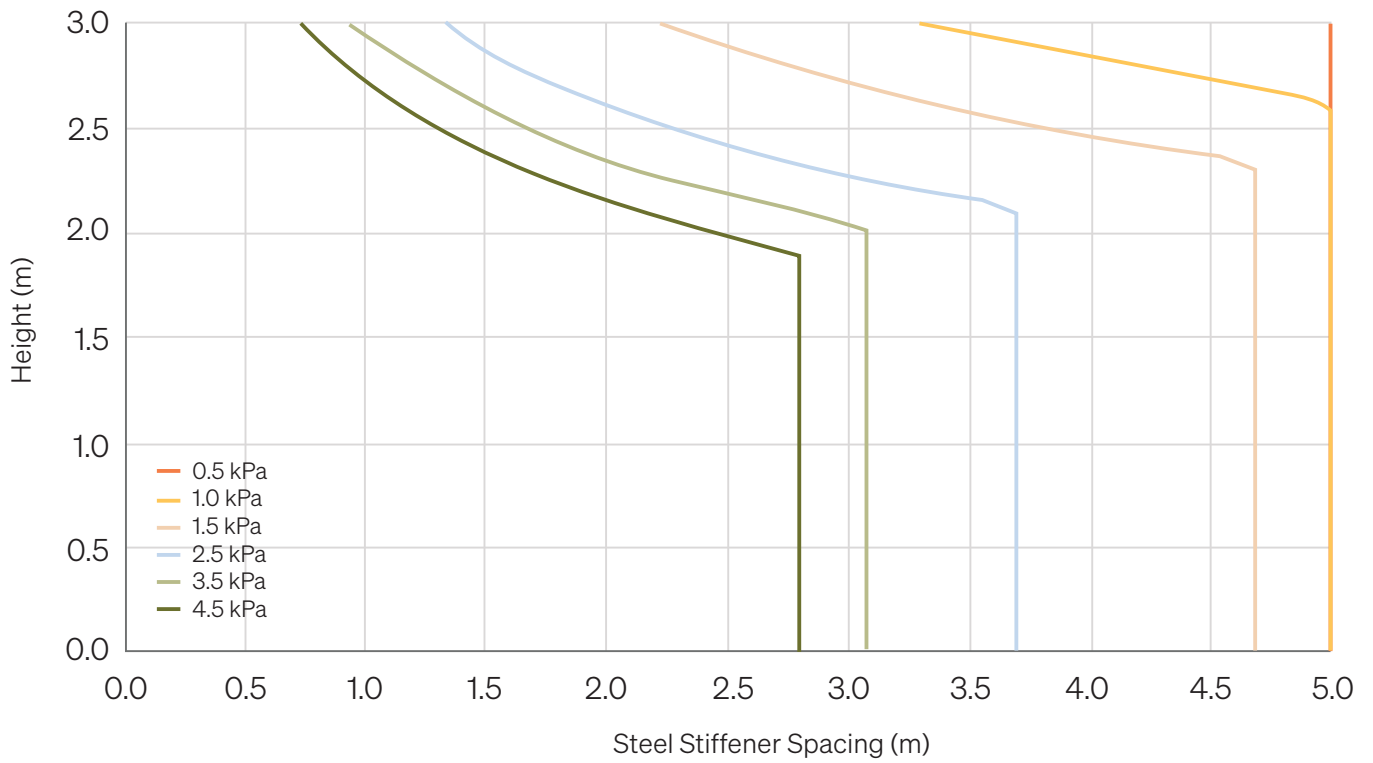
7.4.5. Wind Post Wall Design for Diamond and Wedge Breeze Blocks

Span Table 6 - Diamond and Wedge Breeze



Post Size 120 x 10	Maximum post spacings for Diamond and Wedge Breeze					
	0.5 kPa	1.0 kPa	1.5 kPa	2.5 kPa	3.5 kPa	4.5 kPa
Height (m)						
0.8	5.00	5.00	5.00	4.10	3.50	3.10
1.0	5.00	5.00	5.00	4.10	3.50	3.10
1.2	5.00	5.00	5.00	4.10	2.93	2.28
1.4	5.00	5.00	4.31	2.59	1.85	1.44
1.6	5.00	4.33	2.89	1.73	1.24	
1.8	5.00	3.04	2.03	1.22		
2.0	4.44	2.22	1.48			
2.2	3.33	1.67				
2.4	2.57	1.28				
2.6	2.02					
2.8	1.62					
3.0	1.31					

Span Chart 6: Maximum Post Spacings: Diamond and Wedge Breeze



Span charts for Diamond and Wedge Breeze are designed with maximum wall tie spacing 200 mm centres or with blocks laid flat horizontally

Span Tables and Charts

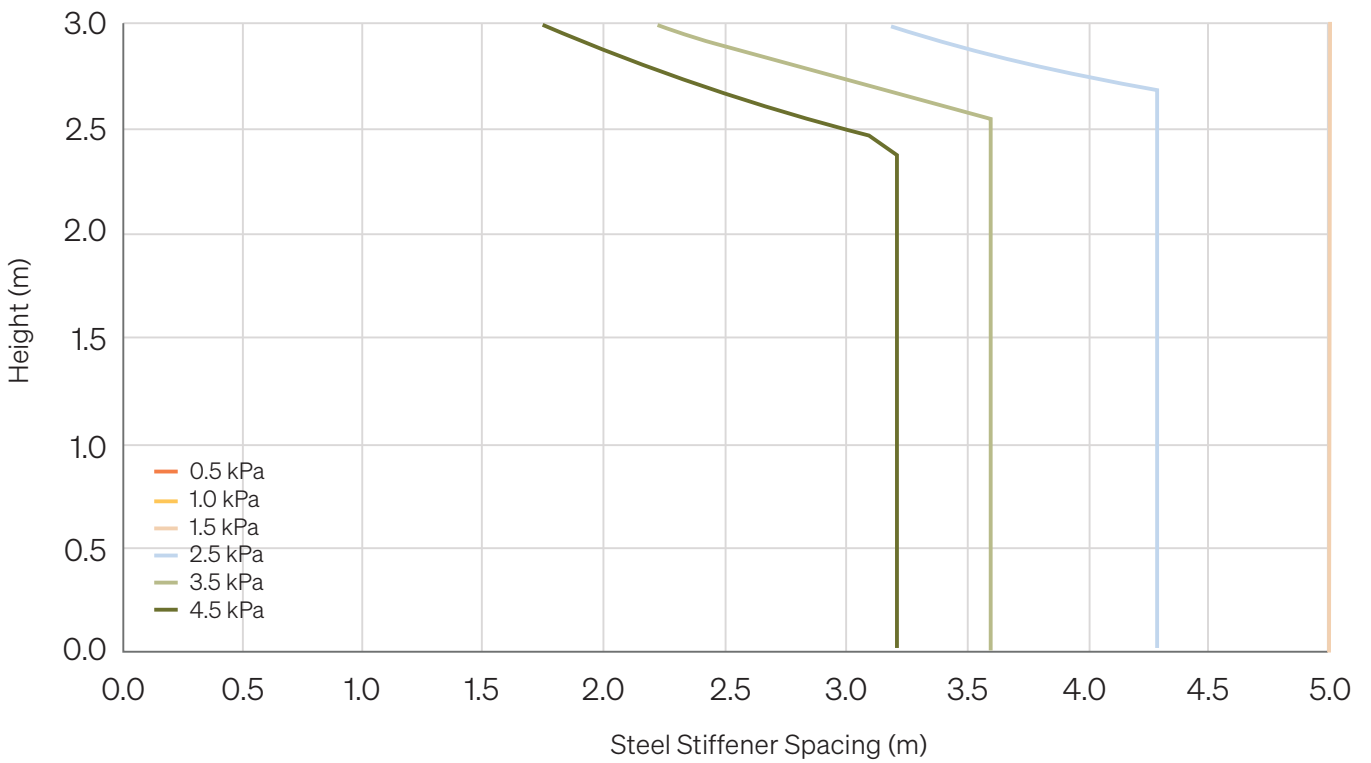
7.4.6. Wind Post Wall Design for Arc Breeze Blocks

Span Table 7 - Arc Breeze



Post Size 160 x 10	Maximum post spacings for Arc Breeze					
	0.5 kPa	1.0 kPa	1.5 kPa	2.5 kPa	3.5 kPa	4.5 kPa
Height (m)						
0.8	5.00	5.00	5.00	4.30	3.60	3.20
1.0	5.00	5.00	5.00	4.30	3.60	3.20
1.2	5.00	5.00	5.00	4.30	3.60	3.20
1.4	5.00	5.00	5.00	4.30	3.60	3.20
1.6	5.00	5.00	5.00	4.30	3.60	3.20
1.8	5.00	5.00	5.00	4.30	3.60	3.20
2.0	5.00	5.00	5.00	4.30	3.60	3.20
2.2	5.00	5.00	5.00	4.30	3.60	3.20
2.4	5.00	5.00	5.00	4.30	3.60	3.20
2.6	5.00	5.00	5.00	4.30	3.45	2.68
2.8	5.00	5.00	5.00	3.86	2.76	2.15
3.0	5.00	5.00	5.00	3.14	2.24	1.74

Span Chart 7: Maximum Post Spacings: Arc Breeze

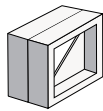


Span charts for Arc Breeze are designed with maximum wall tie spacing 200 mm centres or with blocks laid flat horizontally

Span Tables and Charts

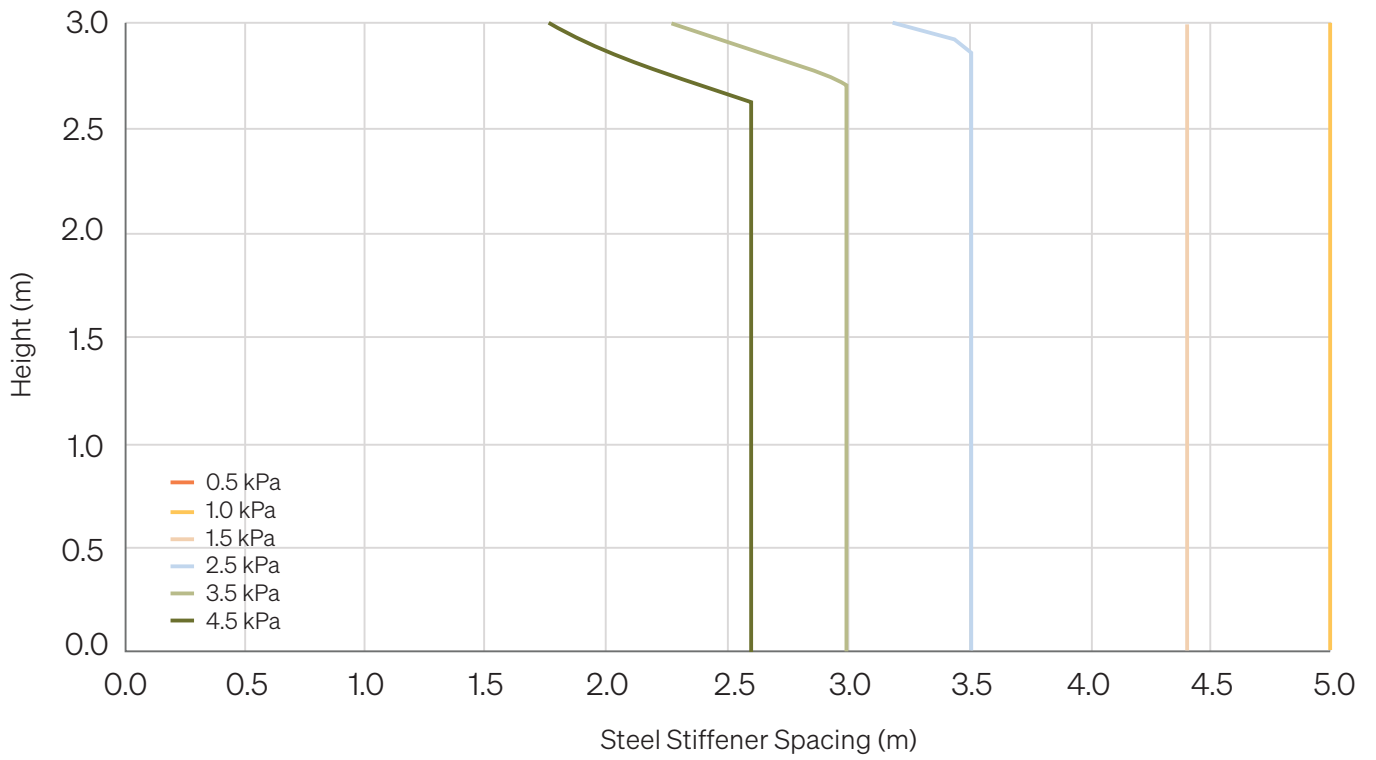
7.4.7 Wind Post Wall Design for Double Skin Kite Breeze Block

Span Table 8 - Double Skin Kite Breeze



Post Size 160 x 10	Maximum post spacings for Double Skin Kite Breeze					
	0.5 kPa	1.0 kPa	1.5 kPa	2.5 kPa	3.5 kPa	4.5 kPa
Height (m)						
0.8	5.00	5.00	4.40	3.50	3.00	2.60
1.0	5.00	5.00	4.40	3.50	3.00	2.60
1.2	5.00	5.00	4.40	3.50	3.00	2.60
1.4	5.00	5.00	4.40	3.50	3.00	2.60
1.6	5.00	5.00	4.40	3.50	3.00	2.60
1.8	5.00	5.00	4.40	3.50	3.00	2.60
2.0	5.00	5.00	4.40	3.50	3.00	2.60
2.2	5.00	5.00	4.40	3.50	3.00	2.60
2.4	5.00	5.00	4.40	3.50	3.00	2.60
2.6	5.00	5.00	4.40	3.50	2.83	2.20
2.8	5.00	5.00	4.40	3.17	2.26	1.76
3.0	5.00	5.00	4.29	2.58	1.84	1.43

Span Chart 8: Maximum Post Spacings: Double Skin Kite Breeze



Design Tables

7.5. Walls wider than 5m - Design Tables for Reinforced Blockwork Column

The flexural strength of stack bonded Breeze Block walls can be improved with lateral support from adjacent reinforced concrete columns. The combination of grout filling the hollow cores of concrete blocks together with embedded steel reinforcement improves its structural performance to capacities similar to precast concrete walls.

Typical components of core filled reinforced concrete masonry walls comprise of vertical reinforcement embedded in the cores, horizontal bed joint reinforcement and grout. Grout is a highly workable concrete that can be poured or pumped into the concrete block cores. Correct grout specification as per AS 3700 is critical in

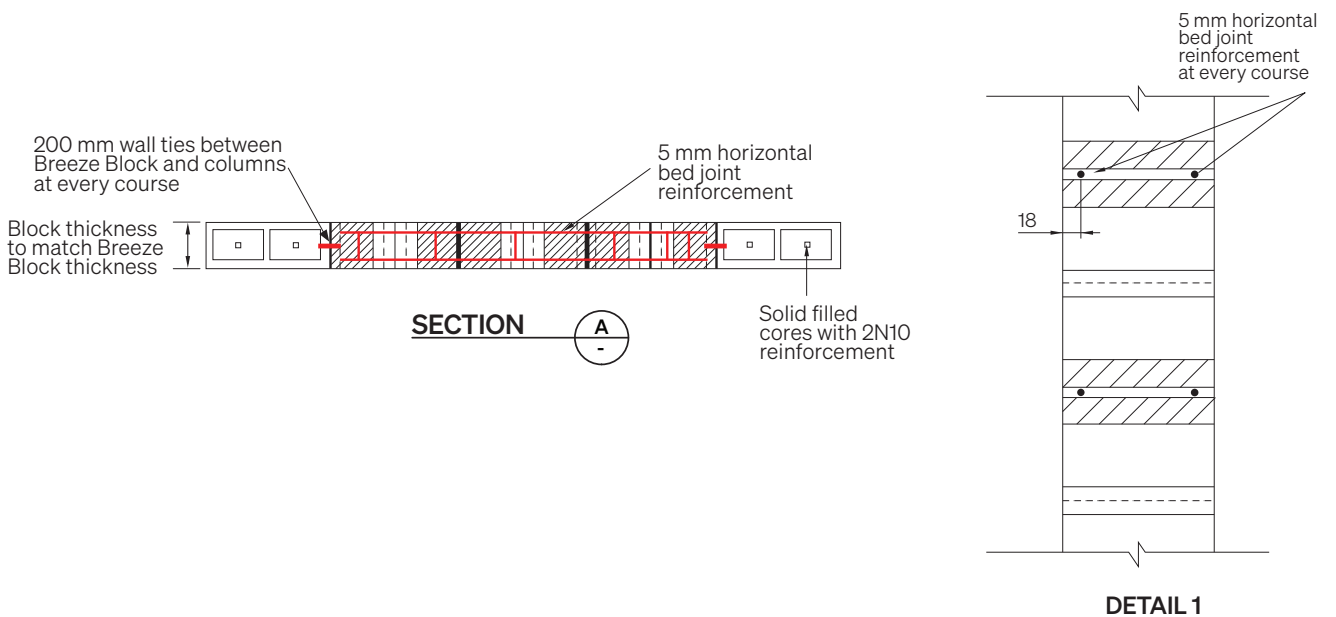
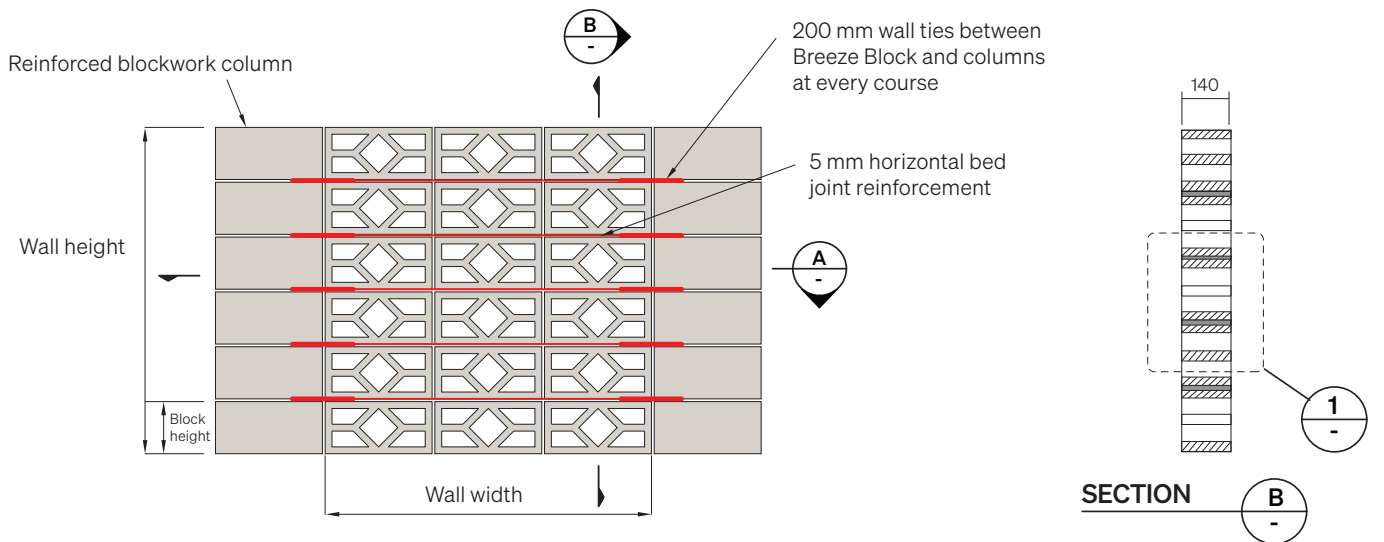
achieving required structural adequacy and should have a pouring consistency which ensures that the cores are completely filled, and the reinforcement completely surrounded without grout segregation.

The following span tables and charts have been developed with the following criteria and components:

- Reinforced blockwork columns and Breeze Blocks must be supported top and bottom and span vertically
- Reinforced at every horizontal mortar joint with 5mm Ancon AMR bed joint reinforcement. Each bar must have at least 18 mm of cover

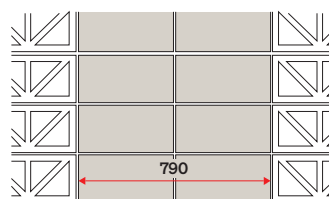
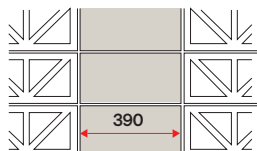
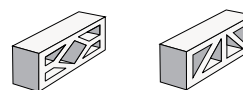
- Each vertical block column is reinforced with two 10 mm steel reinforcement rods running continuously throughout the height of the wall
- Block cores or webs are to be fully filled with 25 MPa non-shrink grout
- 200mm wall ties are required at every course between Breeze Blocks and reinforced concrete columns
- Blockwork columns wider than 2 block widths require 1N12 horizontal bar reinforcement at every course

Connection Details



Design Tables

7.5.1. Reinforced Blockwork Column for Diamond and Wedge Breeze Blocks

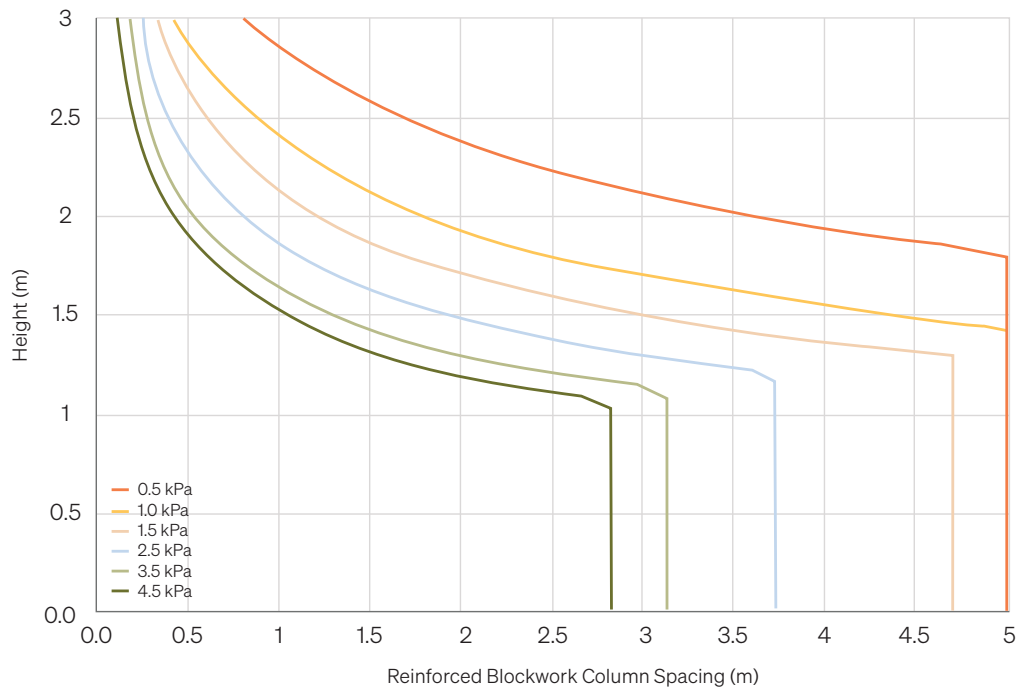


Reinforced Blockwork Column Spacing (m)

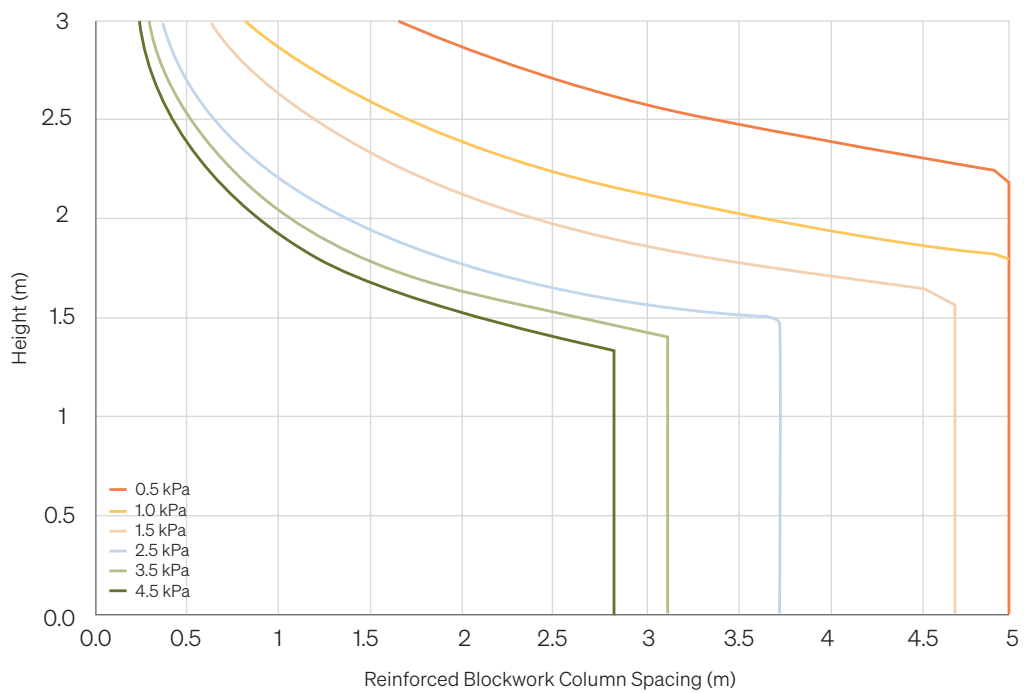
Height	390 mm Wide Column						790 mm Wide Column					
	0.5 kPa	1.0 kPa	1.5 kPa	2.5 kPa	3.5 kPa	4.5 kPa	0.5 kPa	1.0 kPa	1.5 kPa	2.5 kPa	3.5 kPa	4.5 kPa
1.00	5.00	5.00	4.70	3.70	3.10	2.80	5.00	5.00	4.70	3.70	3.10	2.80
1.20	5.00	5.00	4.70	3.67	2.62	2.04	5.00	5.00	4.70	3.70	3.10	2.80
1.40	5.00	5.00	3.80	2.28	1.63	1.27	5.00	5.00	4.70	3.70	3.10	2.54
1.60	5.00	3.76	2.51	1.50			5.00	5.00	4.70	3.01	2.15	1.67
1.80	5.00	2.58	1.72				5.00	5.00	3.44	2.07	1.48	
2.00	3.66	1.83	1.22				5.00	3.66	2.44	1.46		
2.20	2.65	1.33					5.00	2.65	1.77			
2.40	1.95						3.91	1.95	1.30			
2.60	1.45						2.91	1.45				
2.80							2.17					
3.00							1.62					

Span Chart 9: 140mm Thick Reinforced Blockwork Column for Diamond and Wedge

390mm Wide Reinforced Blockwork

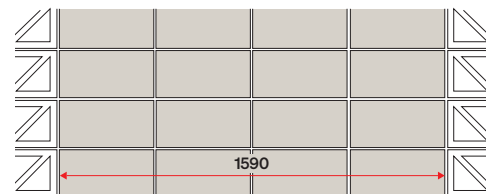
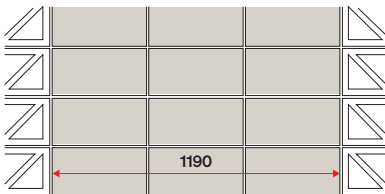
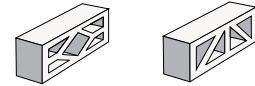


790mm Wide Reinforced Blockwork



Design Tables

7.5.2. Reinforced Blockwork Column for Diamond and Wedge Breeze Blocks



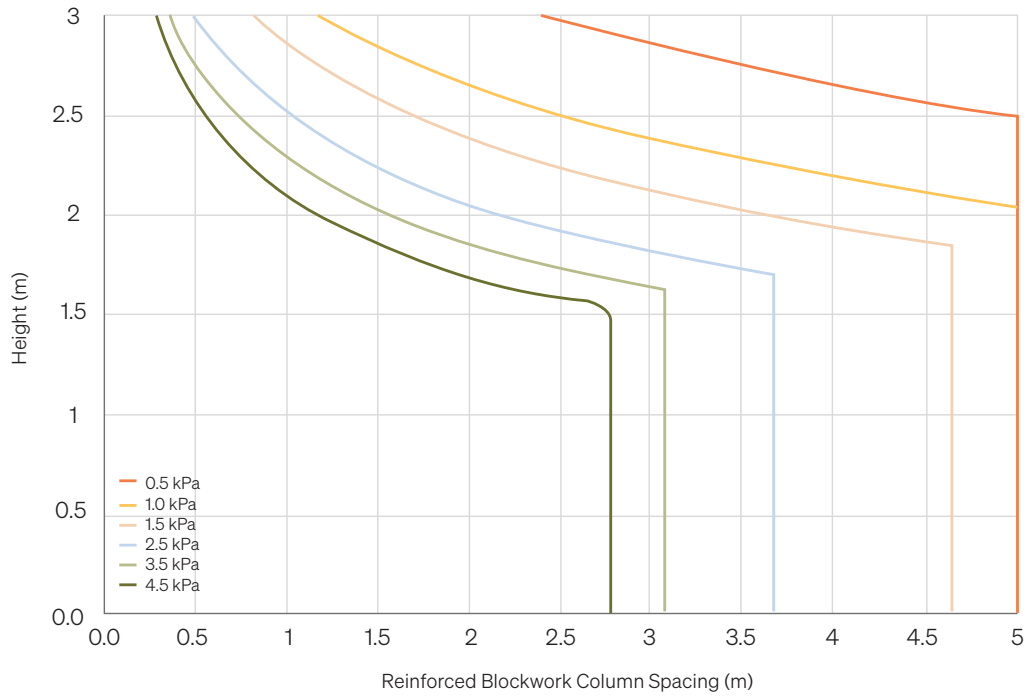
Reinforced Blockwork Column Spacing (m)

Height	Reinforced Block Column Spacing with 1190mm Wide Column*						Reinforced Block Column Spacing with 1590mm Wide Column*					
	0.5 kPa	1.0 kPa	1.5 kPa	2.5 kPa	3.5 kPa	4.5 kPa	0.5 kPa	1.0 kPa	1.5 kPa	2.5 kPa	3.5 kPa	4.5 kPa
1.00	5.00	5.00	4.70	3.70	3.10	2.80	5.00	5.00	4.70	3.70	3.10	2.80
1.20	5.00	5.00	4.70	3.70	3.10	2.80	5.00	5.00	4.70	3.70	3.10	2.80
1.40	5.00	5.00	4.70	3.70	3.10	2.80	5.00	5.00	4.70	3.70	3.10	2.80
1.60	5.00	5.00	4.70	3.70	3.10	2.51	5.00	5.00	4.70	3.70	3.10	2.80
1.80	5.00	5.00	4.70	3.10	2.21	1.72	5.00	5.00	4.70	3.70	2.95	2.30
2.00	5.00	5.00	3.66	2.20	1.57	1.22	5.00	5.00	4.70	2.93	2.09	1.63
2.20	5.00	3.98	2.65	1.59			5.00	5.00	3.54	2.12	1.52	
2.40	5.00	2.93	1.95				5.00	3.91	2.60	1.56		
2.60	4.36	2.18	1.45				5.00	2.91	1.94			
2.80	3.26	1.63					4.34	2.17	1.45			
3.00	2.43	1.21					3.24	1.62				

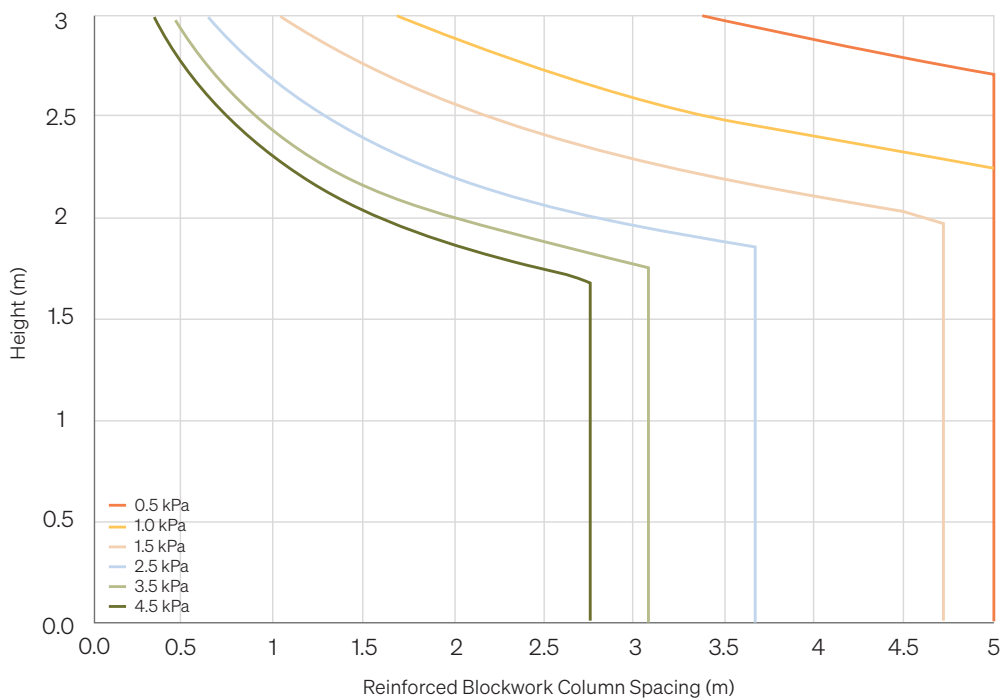
*Blockwork columns wider than 2 block widths require 1N12 horizontal bar reinforcement at every course

Span Chart 10: 140mm Reinforced Blockwork Column for Diamond and Wedge

1190mm Wide Reinforced Blockwork



1590mm Wide Reinforced Blockwork



Design Tables

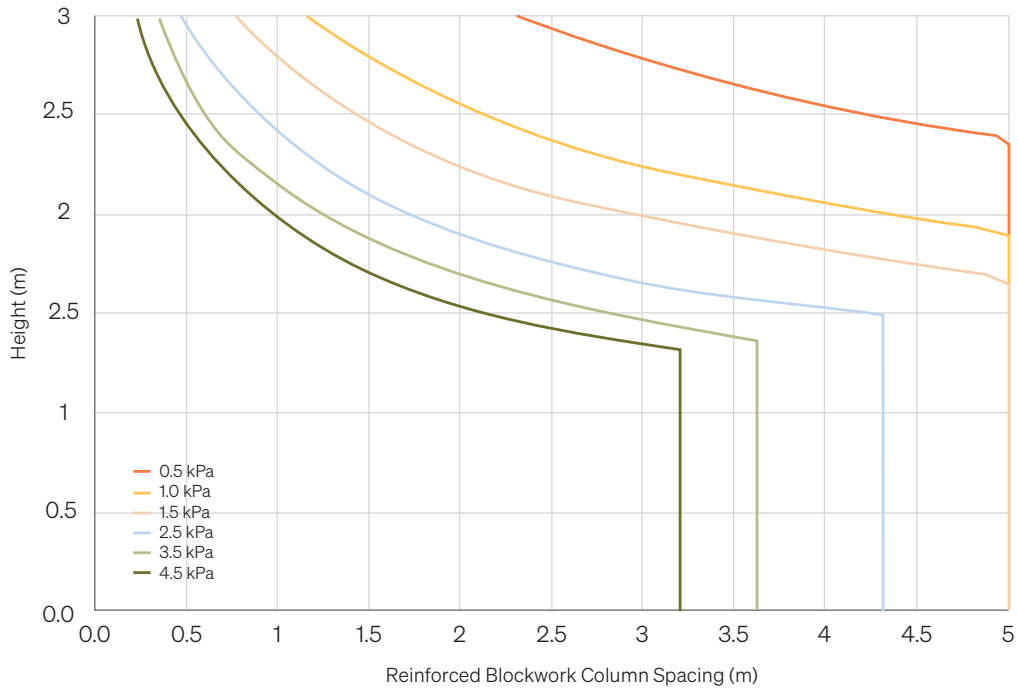
7.5.3. Reinforced Blockwork Column for Arc Breeze Blocks



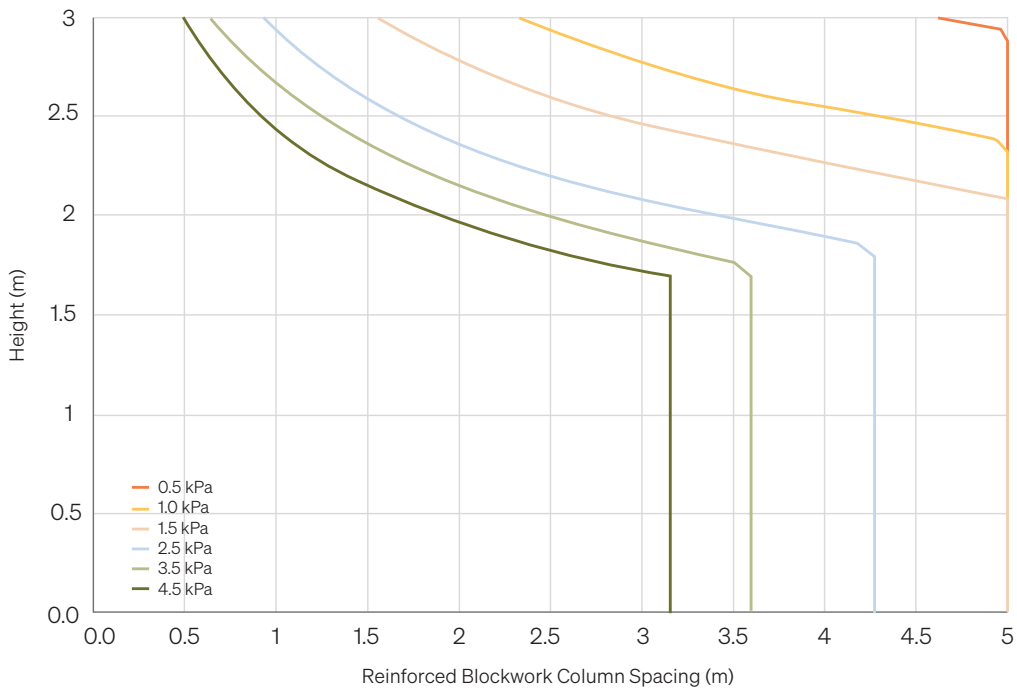
Height	Reinforced Block Column Spacing with 390mm Wide Column						Reinforced Block Column Spacing with 790mm Wide Column					
	0.5 kPa	1.0 kPa	1.5 kPa	2.5 kPa	3.5 kPa	4.5 kPa	0.5 kPa	1.0 kPa	1.5 kPa	2.5 kPa	3.5 kPa	4.5 kPa
1.00	5.00	5.00	5.00	4.30	3.60	3.20	5.00	5.00	5.00	4.30	3.60	3.20
1.20	5.00	5.00	5.00	4.30	3.60	3.20	5.00	5.00	5.00	4.30	3.60	3.20
1.40	5.00	5.00	5.00	4.30	3.60	2.94	5.00	5.00	5.00	4.30	3.60	3.20
1.60	5.00	5.00	5.00	3.52	2.52	1.96	5.00	5.00	5.00	4.30	3.60	3.20
1.80	5.00	5.00	4.08	2.45	1.75	1.36	5.00	5.00	5.00	4.30	3.50	2.72
2.00	5.00	4.41	2.94	1.77	1.26		5.00	5.00	5.00	3.53	2.52	1.96
2.20	5.00	3.27	2.18	1.31			5.00	5.00	4.36	2.61	1.87	1.45
2.40	4.94	2.47	1.65				5.00	4.94	3.30	1.98	1.41	
2.60	3.81	1.90	1.27				5.00	3.81	2.54	1.52		
2.80	2.97	1.48					5.00	2.97	1.98			
3.00	2.34						4.68	2.34	1.56			

Span Chart 11: 180mm Thick Reinforced Blockwork Column for Arc

390mm Wide Reinforced Blockwork



790mm Wide Reinforced Blockwork



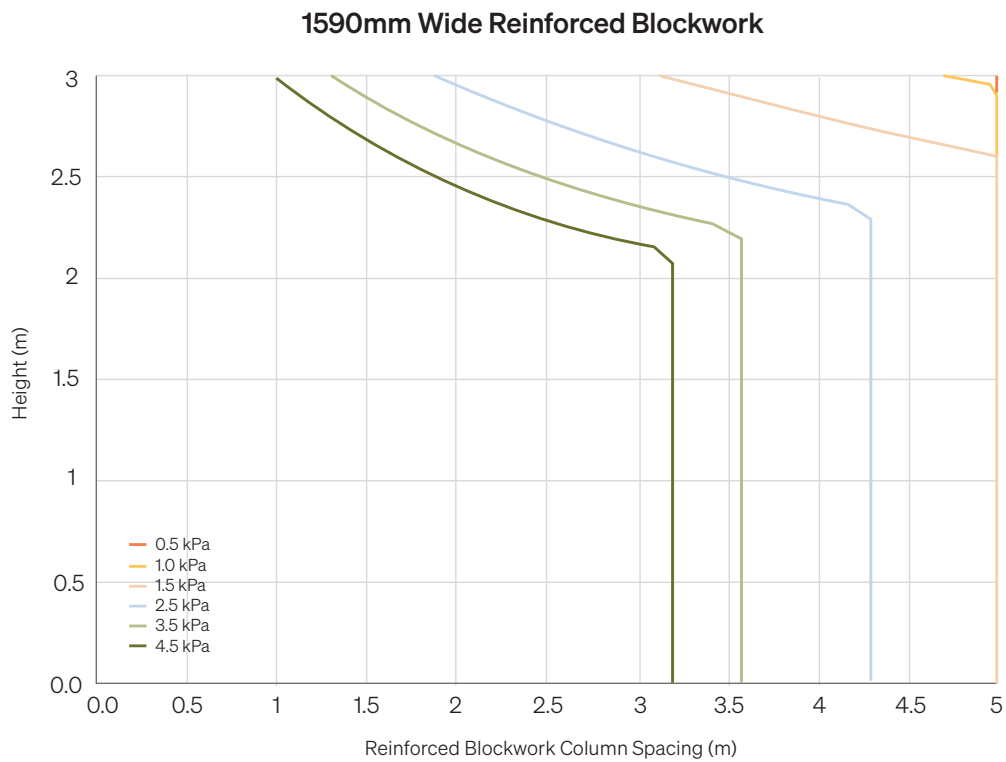
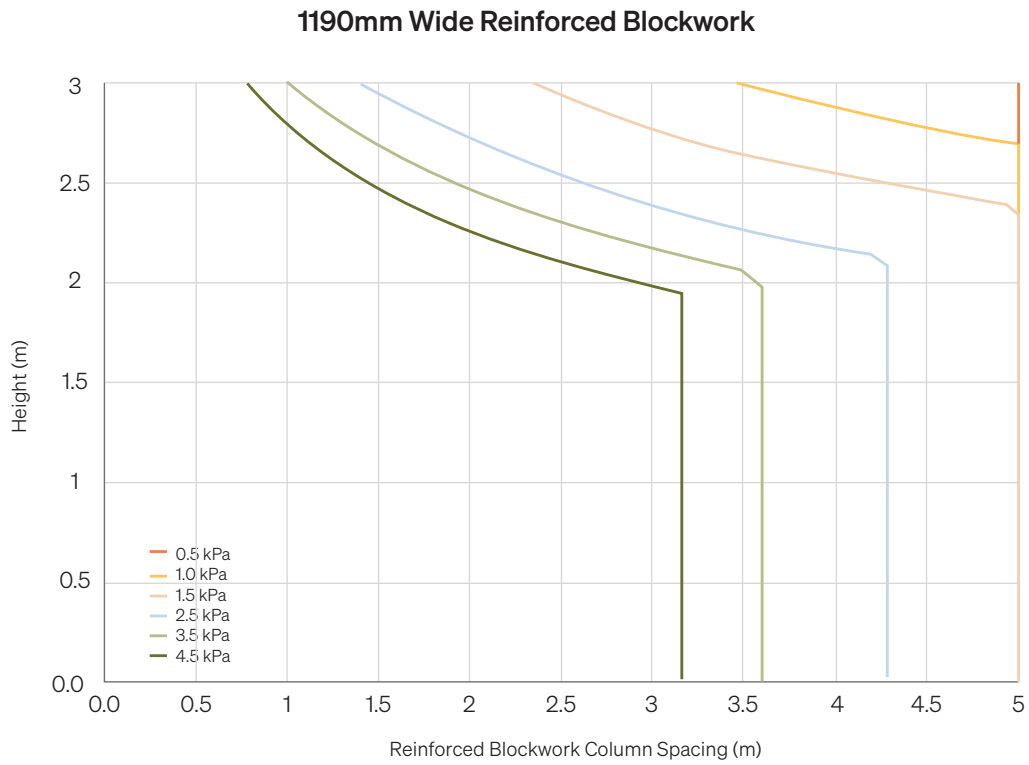
Design Tables

7.54. Reinforced Blockwork Column for Arc Breeze Blocks



Height	Reinforced Block Column Spacing with 1190mm Wide Column						Reinforced Block Column Spacing with 1590 Wide Column					
	0.5 kPa	1.0 kPa	1.5 kPa	2.5 kPa	3.5 kPa	4.5 kPa	0.5 kPa	1.0 kPa	1.5 kPa	2.5 kPa	3.5 kPa	4.5 kPa
1.00	5.00	5.00	5.00	4.30	3.60	3.20	5.00	5.00	5.00	4.30	3.60	3.20
1.20	5.00	5.00	5.00	4.30	3.60	3.20	5.00	5.00	5.00	4.30	3.60	3.20
1.40	5.00	5.00	5.00	4.30	3.60	3.20	5.00	5.00	5.00	4.30	3.60	3.20
1.60	5.00	5.00	5.00	4.30	3.60	3.20	5.00	5.00	5.00	4.30	3.60	3.20
1.80	5.00	5.00	5.00	4.30	3.60	3.20	5.00	5.00	5.00	4.30	3.60	3.20
2.00	5.00	5.00	5.00	4.30	3.60	2.94	5.00	5.00	5.00	4.30	3.60	3.20
2.20	5.00	5.00	5.00	3.92	2.80	2.18	5.00	5.00	5.00	4.30	3.60	2.90
2.40	5.00	5.00	4.94	2.97	2.12	1.65	5.00	5.00	5.00	3.96	2.83	2.20
2.60	5.00	5.00	3.81	2.28	1.63	1.27	5.00	5.00	5.00	3.04	2.17	1.69
2.80	5.00	4.45	2.97	1.78	1.27		5.00	5.00	3.96	2.38	1.70	1.32
3.00	5.00	3.51	2.34	1.40			5.00	4.68	3.12	1.87	1.34	

Span Chart 12: 180mm Reinforced Blockwork Column for Arc Breeze





Appendix

8

Appendix

8.1. Design Parameters

Design Parameters used are provided below to aid further design beyond what is provided in Section 7. Wall designs should always be checked by a qualified structural engineer.

Block Wall Design Parameters							
		Circle/Flower	Diamond/Wedge	Linear	Arc	Kite	Cloud
Wind load (W_d)	kPa		0.5 to 3.0				
Height (H)	m		1.0 to 5.0				
Length (L)	mm		1.0 to 6.0				
Design height (H_d)	mm		500 to 2500				
Design length (L_d)	mm		500 to 3000				
Mortar		10 mm Full Face Bedded, M4 Grade					
Unit Height (h_u)	mm	290	190	80	390	290	190
Unit length (l_u)	mm	290	390	390	390	290	390
Unit depth (D_u)	units/m	90	140	90	140	90	90
Unit mass	mm	9.2	12.5	4.7	14.5	5.8	8.3
Units per m ³	units/m	132.118	96.395	356.125	74.974	132.118	149.948
Unit weight (γ)	kN/m	11.924	11.82	16.42	10.665	7.517	12.209
Minimum shell thickness (t_s)	mm	25	25	25	25	25	25
Minimum Skin Intersections at Critical Section		4	2	2	2	2	3
Critical section ratio		0.345	0.263	0.625	0.263	0.172	0.395
Characteristic flexural tensile strength (f_{mt})	MPa	0.07	0.07	0.07	0.07	0.07	0.07
Characteristic lateral modulus of rupture (f_{lt})	MPa	0.8	0.8	0.8	0.8	0.8	0.8
Capacity reduction factor (ϕ)		0.6	0.6	0.6	0.6	0.6	0.6

Bed Joint Reinforcement and Reinforced Blockwork Column Design Parameters

Bed Joint Reinforcement Diameter (d_b)	mm	5
Tensile reinforcement area (A_{st})	mm ²	6.47
Compressive reinforcement area (A_{sc})	mm ²	6.47
Characteristic reinforcement yield strength (f_{sy})	MPa	500
Maximum compressive strain		0.0035
Cover	mm	18
Characteristic unconfined compressive strength (f'_{uc})	MPa	3
Characteristic compressive strength (f'_m)	MPa	3.15
Core filled blockwork non-shrink Grout		25 MPa 28-days strength
Blockwork column reinforcement diameter	mm	10

Force Equilibrium for reinforced blockwork column design charts:

$$C_s + C_c = T_s$$

$$A_{sc} f_{sy} (d_n - D + d) + 0.85 d_n b (0.85) 1.3 f'_m \left(d_n - \frac{0.85 d_n}{2} \right) = A_{st} f_{sy} (d - d_n)$$

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