DESIGNING BREEZE BLOCK WALLS *by Dagostino*

Prepared for: Dagostino Building Blocks
1111 Altamont Ave
Schenectady, NY 12303-2202
+1- 518-374-3116
https://www.dagblock.com/
https://www.breezeblocks.com/

Prepared by: David Biggs, PE, SE
Biggs Consulting Engineering, USA

Breeze Blocks are specialty concrete masonry screen wall units that are used in a wide variety of applications. Primarily, they are decorative, functional, and non-loadbearing. The structural design and detailing of Breeze Block are based on Tech Note TEK 03-16A, *Concrete Masonry Screen Walls*, of the Concrete Masonry and Hardscape Association (CMHA) as well as TMS 402-2016, *Building Code Requirements for Masonry Structures*. This document highlights some of the key aspects of designing and constructing walls using Breeze Block units from Dagostino Building Blocks.

Breeze Blocks were born in the mid-century modern era but meet all the material criteria for the 21st century. The concrete adheres to the strict quality and durability standards of ASTM C-90, *Standard Specifications for Loadbearing Concrete Masonry Units*. Dagostino Breeze Block units exceed ASTM C90 standards and include integral water repellent.

The mortar, grout, and reinforcement used in constructing Breeze Block walls meet the same quality standards specified for reinforced concrete masonry. The mortar meets ASTM C270, *Standard Specification for Mortar for Unit Masonry*, and the grout meets ASTM C476, *Standard Specification for Grout for Masonry.*

Here are basic principles to design and detail Breeze Block walls prescriptively.

- The units available from Dagostino Building Blocks are either 4 inches or 8 inches thick and 8 inches or 12 inches high. Dimensions are nominal; actual are 3/8 inches less.
- The units must be laid fully in mortar (head and bed joints) <u>with no open spaces between the units</u>.
- The minimum thickness of any part of the unit is ¾ inches.

- The walls may be either:
    a. Interior partitions supported by their edges or supplemental framing.
    b. Free-standing walls with their foundations or a supplemental framing system.
    c. Infill panels within a supporting frame.
- As with any CMU wall, control (movement) joints should be incorporated into the walls to mitigate shrinkage and thermal cracking.
- The walls must support themselves against wind and seismic loadings.
- These walls are not intended to be either loadbearing or shear walls. The perimeter of the Breeze Block walls needs isolation joints so that the movement of the supporting frame does not impart stress onto the wall panel. Perimeter anchors are essential.
- Type S Portland cement/lime (PC/L) mortar or mortar cement mortar is recommended for its higher bond strength. Mortar with masonry cement is not recommended. Integral water repellant compatible with the units should be used.

<u>Design Alternatives – Support Conditions</u>

- Interior partitions supported laterally by their edges or supplemental framing:

Figure 1- Vertically spanning interior wall show in stack bond

- Free-standing wall

Figure 2 – Free-standing exterior wall shown in stack bond

- Infill Panels with a Supporting Frame (courtesy of CMHA TEK 03-16A)

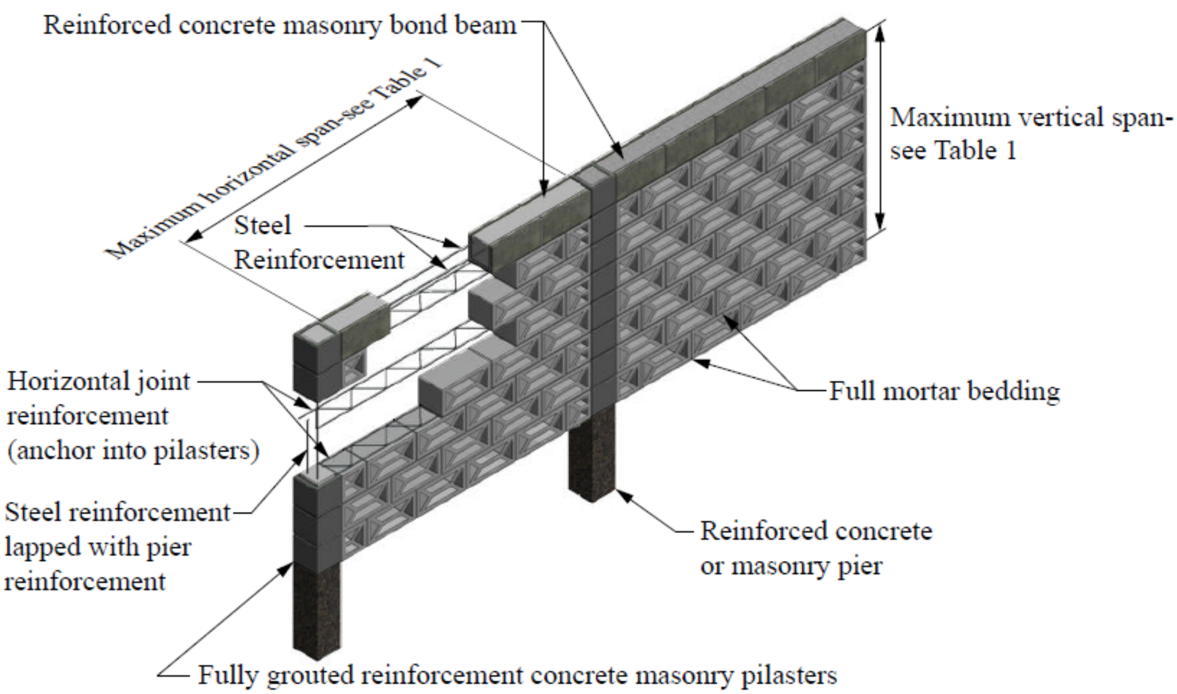


Figure 3 – Infill with reinforced masonry frame shown in running bond

Figure 4-Exterior Infill panel with supporting concrete frame shown in stack bond

Design

Breeze Block walls are always to be designed and detailed as non-loadbearing as follows. Supplemental framing, connections, and other accessories must be engineered.

- The walls are engineered as unreinforced such that the wall's strength is dependent on the bond strength of the mortar to the units.

  For example, the maximum stress in tension that can be achieved in the mortar is 106 psi (Table 8.2.4.2, TMS 402). Therefore, the maximum compressive stress due to flexure, f_b, is also 106 psi. Add to this the compressive stress due to the dead load of the wall, using an unrealistic value of 30 ft of 8" high Breeze Block at 66 psf from Appendix A, which results in 1,980 lbs/lineal ft of the wall and translates to f_a = 21 psi over the bedded wall surface.

  From TMS 402, the combined compressive stresses must be $f_a/F_a + f_b/F_b < 1$ where F_a = 1/4 f'_m times a factor dependent on h/r. For simplicity, we'll conservatively assume $F_a = 0.18\, f'_m$; $F_b = 1/3\, f'_m$. Since the units meet ASTM C90, the f'_m would always exceed 1,750 psi (Table 2, TMS 602). This gives $f_a/F_a + f_b/F_b$ = 21/315 + 106/583 = 0.07 + 0.18 = 0.25 which is much less than 1.0 and gives a safety factor of at least 4 at the bedded surface. Through the body of the units, this safety factor will be less but CMHA does not evaluate stress there.

This exercise explains why f'_m is not even mentioned for compression when we discuss Breeze Blocks. It also demonstrates that the controlling factor for these walls is tension in the mortar and not compression of the units. Thus, the tables you will see later are all derived based on the mortar, not the units. We are more concerned that the units meet a unit strength of 2,000 psi per ASTM C90 for material durability.

- The walls can span either vertically or horizontally between supports or cantilever off the foundation.

  Tables 4V, 4H, 8V, and 8H are based on Table 1a of CMHA TEK 03-16A, CONCRETE MASONRY SCREEN WALLS using mortars containing Portland cement/lime or mortar cement because these mortars develop the highest bond strength as listed in Table 8.2.4.2 of TMS 402 using Allowable Stress Design (ASD) procedures.

  Unreinforced walls can be designed with horizontal joint reinforcement (HJR). However, the HJR is <u>not</u> to strengthen the wall.

  a. There are conditions where HJR is prescriptively mandatory including:
     - For walls laid in stack bond (not laid in running bond).
     - For horizontally spanning walls in specific seismic zones using Tables 1 and 2.
  b. The designer always has the option to use HJR to control cracking per CMHA Tech Note 009-25, Crack Control Strategies for Concrete Masonry Construction. This will extend the length of the wall between control (movement) joints as will be shown in Table 3. In this case, the wall panels are further controlled by their length-to-height ratio.

- The following **Design Procedure** is proposed:

1. Choose either a 4-inch or 8-inch-thick Breeze Block.
2. Determine the ultimate wind velocity, wind load (using Component and Cladding values converted to ASD values), seismic load (converted to ASD values), and the Risk Category for the building and the Seismic Design Category (SDC) for the site using the Building Code (state or local code most often based on the International Building Code) or the Residential Code (state or local code most often based on the International Residential Code) as appropriate.

   Seismic loads are dependent on the weight of the installed wall. Appendix A gives the approximate installed weight of each configuration of Dagostino Breeze Block.

Tables 4V, 4H, 8V, and 8H are based on the larger of the ASD load values obtained from the wind and seismic loads.

3. Select the support conditions (spanning vertically or horizontally between supports, free-standing, or as infill spanning vertically or horizontally between supports). See Tables 1 and 2 for permitted support conditions for seismic design.
4. For walls spanning vertically between supports and infills:
   a. Determine the maximum allowable vertical height from Tables 4V or 8V as appropriate.
   b. Determine whether HJR is mandatory.
      - Is the wall laid in stack bond?
      - Does the seismic SDC require HJR per Table 2?
   c. Determine the maximum horizontal length.
      - If HJR is not required, use the lesser of 1.5 times the height, and 10'-0" (from Table 3).
      - If HJR is required or used, use the lesser of 2.5 times the height and 25'-4" (from Table 3).
5. For free-standing vertical walls:
   a. Determine the maximum allowable vertical height by calculating 25% from Tables 4V or 8V as appropriate.
   b. Using 4b. and 4c. above, determine the maximum horizontal length.
6. For walls spanning horizontally between supports and infills:
   a. Determine whether HJR is mandatory from 4b. above.
   b. Determine the maximum allowable horizontal length.
      - If HJR is not required, use the lesser of the values from Tables 4H or 8H as appropriate, and 10'-0".
      - If HJR is required or used, use the lesser of the values from Tables 4H or 8H as appropriate, and 25'-4".
   c. Check the vertical height. Use a proportion of the horizontal length.
      - If HJR is not required, the horizontal length must be less than 1.5 times the height.
      - If HJR is required or used, the horizontal length must be less than 2.5 times the height.

- Unreinforced walls can be braced by supplemental framing as shown in Figure 5, which is taken from CMHA TEK 03-16A. Exterior bracing can be used behind the walls.

The design of the supplemental framing for these systems requires engineering expertise.

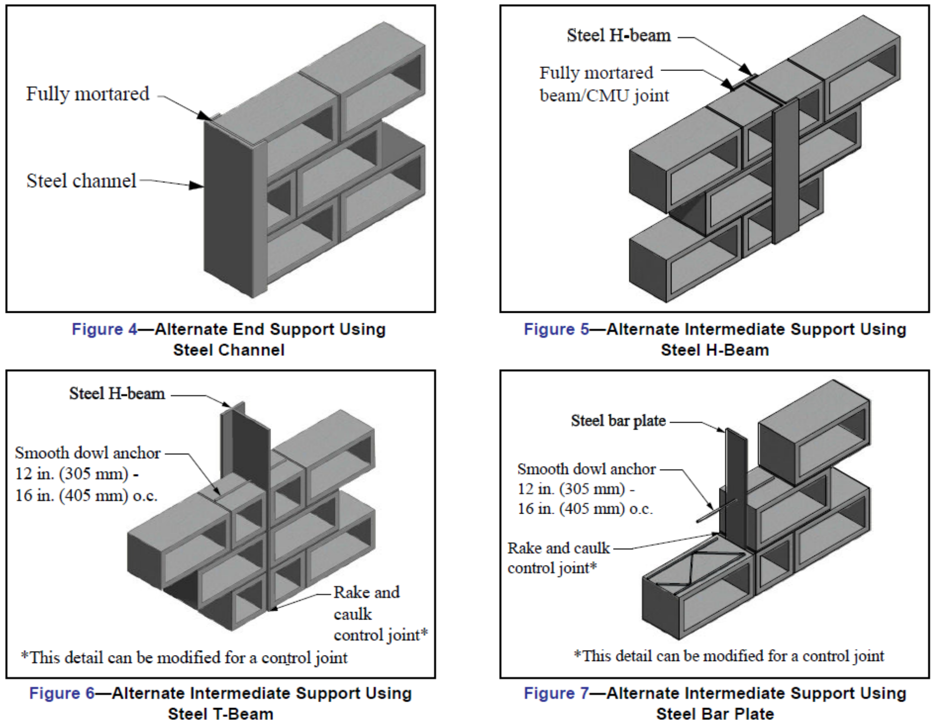


Figure 5 – courtesy of CMHA TEK 03-16A

- Wind and Seismic Considerations

  Seismic requirements are determined using the Building Code for commercial projects. For residential projects, either the Residential Code or the Building Code may be used. Both codes provide the means to obtain the wind velocity (ASD values), which leads to the wind loads using the Component and Cladding values. Both codes also provide the means to obtain the ASD seismic loads and the SDC for the site.

  In general:

  - SDCs A and B apply to low seismic zones and do not require any minimum reinforcement unless the wall is laid in other than a running bond (usually stack bond). Therefore, either vertically or horizontally spanning walls can be used in these seismic zones (see Table 1).
  - SDCs C and D require a minimum amount of reinforcement in the direction of the selected span. The reinforcement of a horizontally spanning wall can be satisfied by HJR.
  - The reinforcement for a vertical spanning wall cannot be satisfied without using bar reinforcement, but the head joints are not thick enough. Therefore,

only horizontally spanning walls can be used in these seismic zones (see Table 1).

- SCDs E and F apply to the highest seismic zones and require a minimum amount of horizontal and vertical reinforcement that cannot be accommodated by the joints of the Breeze Block. Therefore, Breeze Block is not intended for these high seismic zones (see Table 1).

Table 1 – Wall Support Conditions Based on Building Code

Wall Span	Seismic Design Category (SDC)					
	A	B	C	D	E	F
Horizontally	P1	P1	P2	P2	NP2	NP2
Vertically	P1	P1	NP1	NP1	NP2	NP2

P1: Permitted without any HJR if the units are laid in running bond.

P2: Required with HJR

NP1: Not possible because vertical reinforcement is required.

NP2: Not possible because HJR is required, and vertical reinforcement is required.

Table 2 – Wall Support Conditions Based on Residential Code

Wall Span	Seismic Design Category (SDC)						
	A	B	C	D_0	D_1	D_2	E
Horizontally	P1	P1	P2	P2	P2	NP2	NP2
Vertically	P1	P1	NP1	NP1	NP2	NP2	NP2

P1: Permitted without any HJR

P2: Required with HJR

NP1: Not possible because vertical reinforcement is required.

NP2: Not possible because HJR is required, and vertical reinforcement is required.

Table 3 – Panel Size Length Based on Crack Control

Maximum Length of Panel[A]			
4-inch Breeze Block and 8-inch Breeze Block			
	Maximum Length of Panel		Maximum Length to Height Ratio of Panel
No HJR[B]	10’-0”		1.5
HJR	W1.7 (9 ga.)	W12.8 (3/16”)	
8” on center	25’-4”	25’-4”	2.5
12” on center	25’-4”	25’-4”	2.5
16” on center	25’-4”	25’-4”	2.5
24” on center	Not allowed	25’-4”	2.5

A. Panel length based on CMHA TEK Note 009-25 using Engineered criteria.

B. This only applies to walls laid in running bond; HJR is mandatory for walls not laid in running bond.

C. Although CMHA does not provide data for walls without HJR, this value is recommended as 10’-0” unless local practice varies.

Construction

Breeze Block walls are constructed similarly to standard CMU walls as specified by TMS 602, Specifications for Masonry Structures. All bed and head joints should be fully mortared with no open spaces between the units. Joints are typically 3/8 inches thick which can accommodate up to M2.8 (3/16”) HJR.

Horizontal joint reinforcement for exterior walls or in a high-humidity atmosphere should be hot-dipped galvanized for corrosion protection.

Soft (isolation) joints are required at the perimeter of the walls to prevent absorbing loads from the frame and at supplemental framing.

Type S PC/L mortar or mortar cement mortar is recommended for exterior applications or to achieve the maximum height or length of the panel. Exterior walls should have integral water-repellent in the mortar that is compatible with the units.

The walls should be supported on fully grouted CMU or concrete bases.

Table 4V - 4-inch Breeze Block Spanning Vertical

4-inch Breeze Block Spanning Vertically Between Supports		
Allowable Stress Design – Maximum Vertically Spanning Wall Height [A, D]		
Maximum Combined Allowable Stress Level [C] Out-of-Plane Load Acting on Simple Span Wall	Portland Cement/Lime or Mortar Cement [B]	
	Mortar Type	
	S	N
5 psf	13'-4"	11'-8"
10 psf	9'-4"	8'-0"
15 psf	8'-0"	6'-8"
20 psf	6'-8"	5'-4"
25 psf	6'-0"	4'-8"
30 psf	5'-4"	4'-8"
35 psf	5'-4"	4'-0"
40 psf	4'-8"	4'-0"
45 psf	4'-8"	4'-0"
50 psf	4'-0"	3'-4"

A. These heights are based on Table 1a of CMHA TEK 03-16A, CONCRETE MASONRY SCREEN WALLS using Portland Cement/Lime or Mortar Cement.
B. If Masonry Cement or Air Entrained PC/Lime mortar is used, the heights must be reduced using CMHA TEK 03-16A.
C. If Strength Design is used, refer to Table 1b in CMHA TEK 03-16A.
D. Interpolate between given loads.

Table 4H - 4-inch Breeze Block Spanning Horizontal

4-inch Breeze Block Spanning Horizontally Between Supports		
Allowable Stress Design – Maximum Horizontally Spanning Wall Length [A, D, E]		
Maximum Combined Allowable Stress Level [C] Out-of-Plane Load Acting on Simple Span Wall	Portland Cement/Lime or Mortar Cement [B]	
	Mortar Type	
	S	N
5 psf	18'-8"	16'-8"
10 psf	13'-4"	11'-4"
15 psf	10'-8"	9'-4"
20 psf	9'-4"	8'-0"
25 psf	8'-8"	7'-4"
30 psf	8'-0"	6'-8"
35 psf	7'-4"	6'-0"
40 psf	6'-8"	5'-4"
45 psf	6'-0"	5'-4"
50 psf	6'-0"	4'-8"

A. These lengths are based on Table 1a of CMHA TEK 03-16A, CONCRETE MASONRY SCREEN WALLS using Portland Cement/Lime or Mortar Cement.
B. If Masonry Cement or Air Entrained PC/Lime mortar is used, the lengths must be reduced using CMHA TEK 03-16A.
C. If Strength Design is used, refer to Table 1b in CMHA TEK 03-16A.
D. These lengths must be compared to the maximum allowable for crack control from Table 3.
E. Interpolate between given loads.

Table 8V - 8-inch Breeze Block Spanning Vertical

8-inch Breeze Block Spanning Vertically Between Supports		
Allowable Stress Design – Maximum Vertically Spanning Wall Height [A, D]		
Maximum Combined Allowable Stress Level [C] Out-of-Plane Load Acting on Simple Span Wall	Portland Cement/Lime or Mortar Cement [B]	
	Mortar Type	
	S	N
5 psf	28'-8"	24'-8"
10 psf	19'-4"	17'-4"
15 psf	16'-8"	14'-0"
20 psf	14'-0"	12'-0"
25 psf	12'-8"	10'-8"
30 psf	11'-4"	10'-0"
35 psf	10'-8"	8'-8"
40 psf	9'-8"	8'-0"
45 psf	9'-8"	8'-0"
50 psf	8'-8"	7'-4"

A. These heights are based on Table 1a of CMHA TEK 03-16A, CONCRETE MASONRY SCREEN WALLS using Portland Cement/Lime or Mortar Cement.
B. If Masonry Cement or Air Entrained PC/Lime mortar is used, the heights must be reduced using CMHA TEK 03-16A.
C. If Strength Design is used, refer to Table 1b in CMHA TEK 03-16A.
D. Interpolate between given loads.

Table 8H - 8-inch Breeze Block Spanning Horizontal

8-inch Breeze Block Spanning Horizontally Between Supports		
Allowable Stress Design – Maximum Horizontally Spanning Wall Length [A, D, E]		
Maximum Combined Allowable Stress Level [C] Out-of-Plane Load Acting on Simple Span Wall	Portland Cement/Lime or Mortar Cement [B]	
	Mortar Type	
	S	N
5 psf	40'-0"	34'-8"
10 psf	28'-8"	24'-8"
15 psf	22'-8"	20'-0"
20 psf	19'-4"	17'-4"
25 psf	17'-8"	15'-4"
30 psf	16'-8"	14'-0"
35 psf	15'-4"	12'-8"
40 psf	14'-0"	12'-0"
45 psf	13'-4"	11'-4"
50 psf	12'-8"	10'-8"

A. These lengths are based on Table 1a of CMHA TEK 03-16A, CONCRETE MASONRY SCREEN WALLS using Portland Cement/Lime or Mortar Cement.
B. If Masonry Cement or Air Entrained PC/Lime mortar is used, the lengths must be reduced using CMHA TEK 03-16A.
C. If Strength Design is used, refer to Table 1b in CMHA TEK 03-16A.
D. These lengths must be compared to the maximum allowable for crack control from Table 3.
E. Interpolate between given loads.

Example 1

This example will be for a residential property and will follow the Design Procedure previously outlined while using the Residential Code. (Note: For residential projects, either the Residential code or the Building Code could also be used). The mean roof height is 30’-0” or less. The proposed Breeze Block walls are to be 14 feet tall. The site is in central Ohio.

1. *Choose either a 4-inch or 8-inch-thick Breeze Block*: For this example, assume the architect requested 8-inch units that are 8 x 8 x 16 to be laid in running bond.

2. *Determine the ultimate wind velocity, wind load (using Component and Cladding values converted to ASD values), seismic load (converted to ASD values), and Seismic Design Category (SDC) for the site using the Residential Code.*

   For this example, the project is in a region where the ultimate wind velocity is 115 mph (from Figure R301.2(5)A of the 2019 Ohio Residential Code). Furthermore, the site used is wind exposure B.

   The Component and Cladding values are based on the Wall Zones shown in Figure R301.2(8) and the pressures of Table R301.2(2) using the ultimate wind speed. The effective area = 14 x 14/3 = 65 sf from footnote a. of Table R301.2(2). Interpolating with the wall area, this gives ASD wall wind pressures of +12.6 and -13.7 psf in wind zone 4 and +12.6 and -15.5 psf in wind zone 5. Therefore, for the design example, use the 15.5 psf suction load on the wall as the ASD design load.

   For the selected site, Figure R301.2(2) gives a site SDC B where the Soil Site Class is D. From R301.2.2 Seismic Provisions, no design loads are required per the Residential Code, and no special provisions are required for the construction of walls in SDC A and B.

   Load Summary: The controlling design load is 15.5 psf based on wind pressure.

3. *Select the support conditions (spanning vertically or horizontally between supports, free-standing, or as infill spanning vertically or horizontally between supports). See Tables 1 and 2 for permitted support conditions for seismic design.*

   For this example, architectural design favors vertically spanning walls.

4. *For walls spanning vertically between supports and infills:*

   a. *Determine the maximum allowable vertical height from Tables 4V or 8V as appropriate.*

Table 8V with Type S mortar and 15.5 psf (ASD) interpolates to a maximum vertical height of 16.4 ft. This is greater than the desired design height of 14 feet, making it acceptable.

- *Determine whether HJR is required*.

  No, since the wall is not laid in stack bond, and SDC B does not require HJR for vertically spanning walls per Table 2. Therefore, the HJR is only needed if the designer chooses to use it for crack control and to extend the spacing between control joints.

- *Determine the maximum horizontal length*. Evaluate with and without HJR.

  Without HJR, the maximum horizontal length from Table 3 is the lesser of 14 x 1.5 = 21'-0", and 10'-0".

  With M 1.7 (9 ga) HJR, the maximum horizontal length from Table 3 is the lesser of 14 x 2.5 = 35'-0, and 25'-4".

  The normal preference is to extend the spacing of the control joints by using HJR.

Summary: The wall can be constructed in running bond 14'-0" high with 8" Breeze Block units spanning vertically. To extend the spacing of the control joints to 25'-4", use M1.7 HJR at 16" on center. The top and bottom of the wall must be anchored to resist a minimum of 15.5 psf (ASD) x 14/2 = 109 lbs./ft.

Example 2

For a community center project in Salt Lake City, this example will use the Design Procedure previously outlined, using the Building Code as the only option. The mean roof height is 40'-0". The proposed Breeze Block walls are to be 12 feet tall.

1. *Choose either a 4-inch or 8-inch-thick Breeze Block*: For this example, assume the architect requested 8-inch units that are 8 x 8 x 16 to be laid in stack bond.

2. *Determine the ultimate wind velocity, wind load (using Component and Cladding values converted to ASD values), seismic load (converted to ASD values), and Seismic Design Category (SDC) for the site using the Building Code.*

   For this example, the 2021 Utah Building Code is used, and it references ASCE 7-16 for determining the loadings. To aid in the design, the ASCE 7 Hazards Tool (https://ascehazardtool.org/) is quick, convenient, and free.

The sample input is shown in Figure 6 and includes Risk Category III, and Site Soil Class D. The Breeze Block Walls, the loads requested are Wind and Seismic.

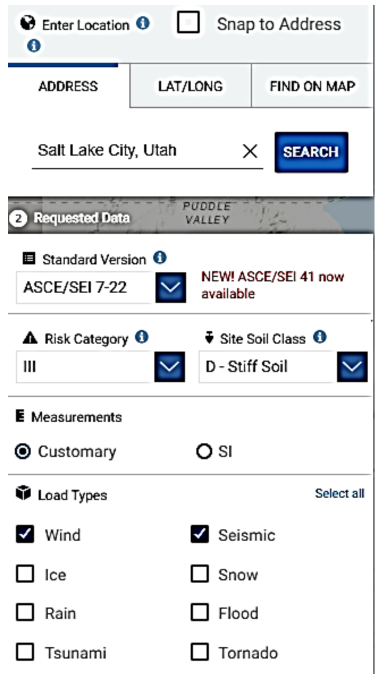
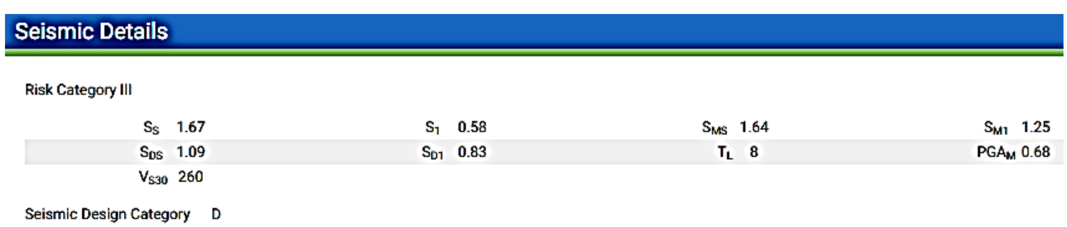


Figure 6 – ASCE 7 Hazards Tool

The output provides:

- Wind: 109 mph (V_{Ultimate}).
- Seismic: The site characteristics are provided, and the SDC obtained is D.



For the wind loads, we go to ASCE 7 – Components and Cladding. There are several methods, but with an urban setting and the given building height, we will use the Part 2 method of Chapter 30 as outlined in Table 30.4-1.

- *Determine wind load parameters*: use Exposure B for the urban setting.
- *Topographic factor, K_{zt} from see Section 26.8 and Fig. 26.8-1*: use K_{zt}=1.0 as a default.
- *Enter figure to determine wind pressures at h = 30 ft, p_{net30}; see Fig. 30.4-1*: use wall zones 4 and 5. The effective wall area = 12’ x 12/3 = 48 sf (use 50 sf). The wind

pressures from the figure are +19.5 and -21.3 psf in wind zone 4 and +19.5 and -24.6 psf in wind zone 5. Use -24.6 (ultimate) wind pressure = p_{net30}.

- *Enter figure to determine the adjustment factor for building height and exposure, λ; see Fig. 30.4-1*: For B exposure and building height = 40'-0", λ = 1.09

- *Determine adjusted wind pressures, p_{net}; see Eq. (30.4-1)*:

$p_{net} = \lambda K_{zt} p_{net30}$ gives $p_{net} = (1.09)(1.0)(24.6) = 26.8$ psf (ultimate)

For Breeze Block, convert to ASD, p = 0.6W = 16.1 psf for wind load.

For the seismic loads, we use ASCE 7, Section 13.5 Architectural Components because Breeze Block walls are not loadbearing or shear walls.

The seismic design force (ultimate) is determined from Eq. 13-1.

$$F_p = \frac{0.4\, a_p S_{DS} W_p\, (1 + 2\, z/h)}{(R_p/I_p)}$$

From Table 13.5-1 for exterior walls, $a_p = 1.0$; $R_p = 2.5$

$S_{DS} = 1.09$ from ASCE Hazards Tool

$I_p = 1.0$ from Section 13.1.3.

Use z/h = 1.0

W_p = Breeze wall weight. Convert this to unit weight w_p using the values in Appendix A. If we use the 8x8x16 Fan units, $w_p = 56$ psf.

F_p then is calculated as $\frac{0.4(1.0)(1.09)(56)(1 + 2)}{(2.5/1.0)} = 29.3$ psf (ultimate)

Fp need not be larger than $1.6 S_{DS} I_p w_p = 97.7$ psf. But it must be at least $0.3 S_{DS} I_p w_p = 18.4$ psf.

Therefore, the ultimate design load is 29.3 psf.

Converting this to ASD, we get $0.7\, F_p = 20.5$ psf (Section 2.4.5) for the seismic load.

<u>Load Summary</u>: The controlling design load is 20.5 psf (ASD) based on the seismic conditions.

3. *Select the support conditions (spanning vertically or horizontally between supports, free-standing, or as infill spanning vertically or horizontally between supports). See Tables 1 and 2 for permitted support conditions for seismic design*.

   For this example, architectural design favors horizontally spanning walls.

4. *For walls spanning horizontally between supports and infills:*

   a. *Determine whether HJR is mandatory*. Yes, it is because the units are laid in stack bond, and per Table 2, HJR is required for horizontally spanning walls in SDC D.

   b. *Determine the maximum allowable horizontal length*.

      - Since HJR is required, M1.1 (9 ga) HJR from Table 3 can be used with the lesser of the value from Table 8H, and 25'-4".
      - For the design load of 20.5 psf, Table 8H with Type S mortar interpolates to 19'-1". Use 18'-8" to maintain 8-inch modularity.

   c. *Check the vertical height. Use a proportion of the horizontal length for crack control*.

      - Since HJR is required, the horizontal length must be less than 2.5 times the height. The desired height is 12'-0" so the maximum length for crack control could be 2.5 (12) = 30'-0". This exceeds the 18'-8" length controlled by seismic design, so the height and length are acceptable.

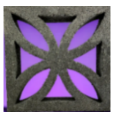
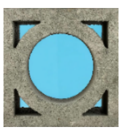
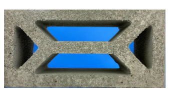
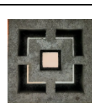
Summary: These calculations indicate that the maximum vertical height Breeze Block wall can be 12'-0" tall in this seismic zone and a maximum of 18'-8" between control joints when using M 1.1 HJR. The length of the horizontally spanning wall is governed by the seismic loads.

Note: This example does not address all the issues related to seismic design; refer to ASCE 7 for information on connections and drift clearances.

Conclusion:

Using the tables provided, the design of the Breeze Block walls is straightforward once the loads are determined. Engineers are familiar with determining loads, and other designers may need assistance. Consult an engineer for the design not included in this document.

Appendix A – Installed Weight of Breeze Block by Dagostino Building Block

Configuration	Style	Name	Size	Weight per block lbs.	Installed Wall Weight (w_p)for design purposes (psf)
	1680	Diamond	4x12x12	21	23
	1680	Diamond	8x12x12	44	48
	2094	Flower	4x12x12	25	27
	2094	Flower	8x12x12	56	60
	1111	Circle	8x12x12	47	51
	1007	Double Y	8x8x16	44	56
	1303	Double X	8x8x16	44	56
	1369	Fan	8x8x16	44	56
	1683	Rectangle	8x8x16	35	46
Coming Soon!	3010	Arch	4x8x8	22	27
	2094	Flower	8x8x8	26	66
	3020	Lens	8x8x8	23	59
	3030	Square-in square	8x8x8	24	61