

Installation guide for walls

GENERIC INSTALLATION GUIDE (WALLS)

01 EXCAVATION

Check the location of existing structures and utilities before the excavation work starts.

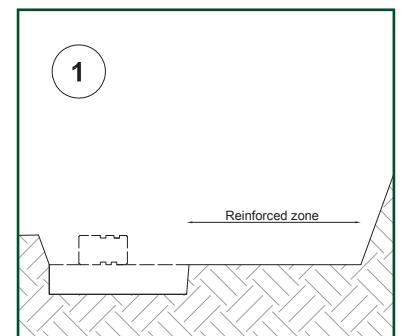
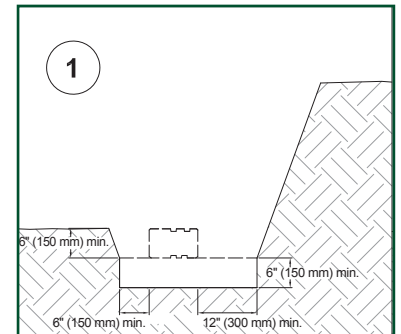
Dig out a trench, the depth of which should be calculated according to the thickness of the leveling pad and the burial of the wall.

Plan for a thickness of at least 150 mm (6 inches) for the leveling pad and consider that at least 10% of the height of the wall should be buried in the ground. In all cases, the wall must be buried no less than 150 mm (6 inches) deep.

Width of the trench: allow for a space of at least 150 mm (6 inches) at the front of the wall and 300 mm (12 inches) at the back for drainage fill. Compact and level the excavation base.

FOR GEOGRID-REINFORCED RETAINING WALLS:

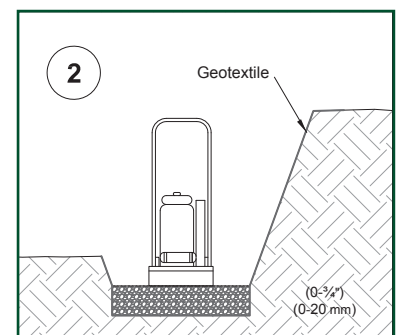
The excavation must also take account of the geogrid length.



02 PREPARATION OF THE BASE AND FOUNDATION

Cover the base and back of the trench with a geotextile. Extend the geotextile towards the back of the excavation and eventually above the drainage fill once it is in place close to the top of the wall.

Next, spread the 0-20 mm (0-3/4 inch) stone in the trench and compact using a vibratory plate (jumping jack) or vibrating plate, ensuring that the surface is level. The compacted leveling pad must be at least 150 mm (6 inches) thick.

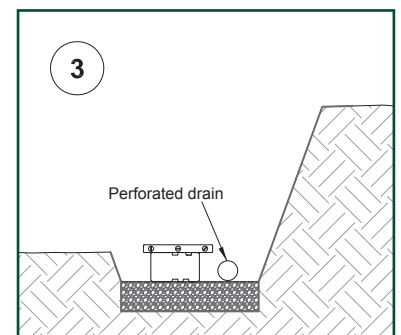


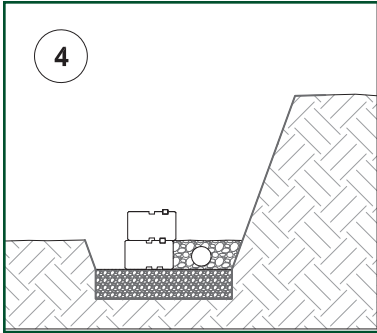
03 BUILDING THE FIRST COURSE

Place the first course of same-height blocks on the compacted leveling pad according to the predetermined layout. Check the alignment and leveling in all directions and make sure that all the blocks are fully in contact with the leveling pad and properly supported.

Place the exposed surfaces of the blocks side by side. There must be no space between the exposed faces of adjacent blocks.

At the back of the wall and on the compacted leveling pad, lay a 100 mm (4 inch) diameter perforated drain. Connect this drain to the existing drainage system so that it clears the water accumulated behind the wall.





04 BACKFILLING

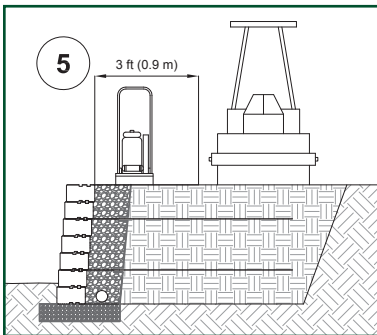
Backfill at the rear of the wall and the space between the back of the blocks with 20 mm (¾ inch) clean stone. Level and settle the clean stone. Any cavities in the blocks must also be filled with clean stone.

05 SUBSEQUENT COURSES

Clean the top of each block before laying the next course. Depending on the type of block, install the connectors on the extremity of each block.

Lay the subsequent courses, backfilling at the rear of the wall every 200 mm (8 inches) maximum, using the same method outlined in step 4.

Make sure the subsequent courses are laid such that the vertical seams are aligned with the blocks below.



FOR GEOGRID-REINFORCED RETAINING WALLS:

Where geogrids are to be used, cover the clean stone with a geotextile. Position the geogrid according to the type, level and appropriate length. Position the geogrid according to the main reinforcement direction perpendicular to the wall. The geogrid must be continuous all along its embedment length. Splicing of the geogrid in the main reinforcement direction is not permitted. The geogrid must be installed horizontally over the compacted backfill and the previous course of blocks. Position the connectors on the geogrid and lay the next course of blocks. Pull on the back of the geogrid and maintain its tension by stakes or pins. Repeat with a new section of geotextile and place the reinforced backfill directly behind the drainage fill. Fill and compact up to the level of the blocks.

Heavy equipment must not be used less than 900 mm (3 feet) behind the blocks. Construction equipment must not drive directly over the geogrid.

Repeat the various installation steps.

06 FINISHING

Position the course of coping stones (if applicable) or the final course of blocks to complete the wall. The coping stones or final course of blocks must be fixed to the subjacent blocks using concrete adhesive and there must be no spaces between the blocks.

NOTE

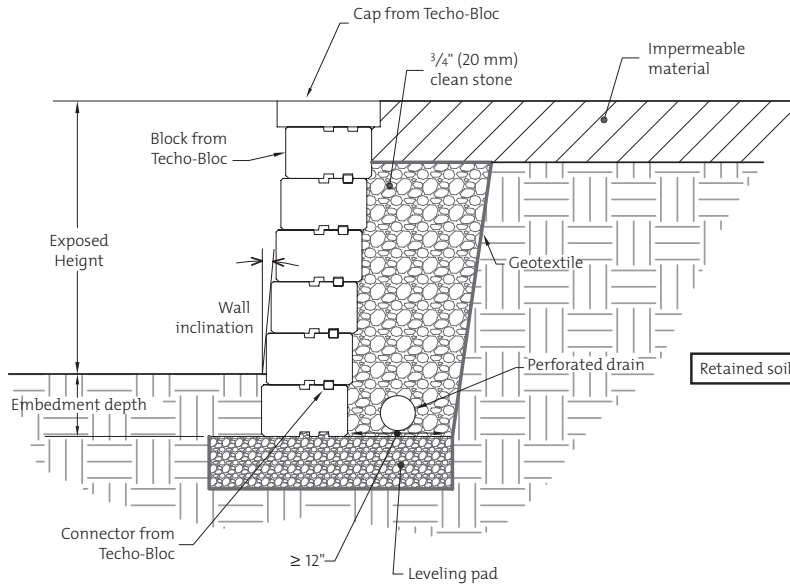
This guide summarizes the installation steps for a gravity wall and geogrid reinforced wall. These instructions generally conform to industry standards and NCMA (National Concrete Masonry Association) directives. However, the instructions in this guide are for informational purposes only and do not in any way replace the directives, specifications or estimates given by an engineer. For any installation specific to a project, please consult a qualified engineer.

Typical Wall Cross Sections

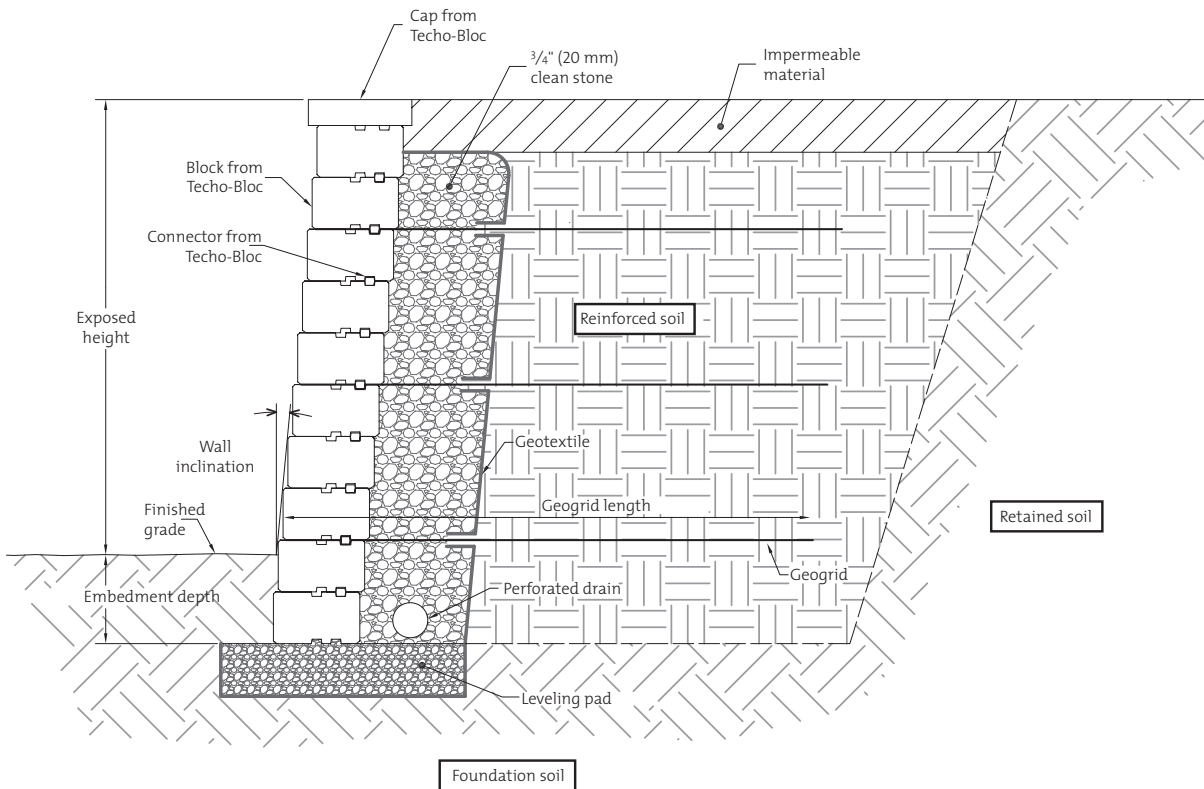


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Typical Cross Section Gravity Wall



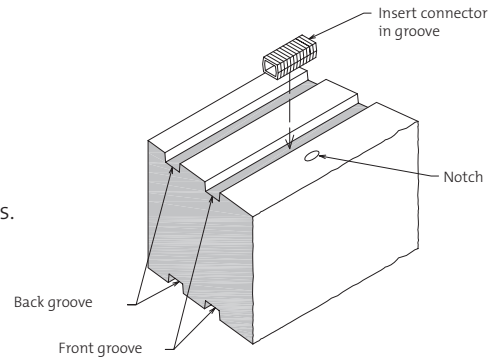
Typical Cross Section Geogrid-reinforced Wall



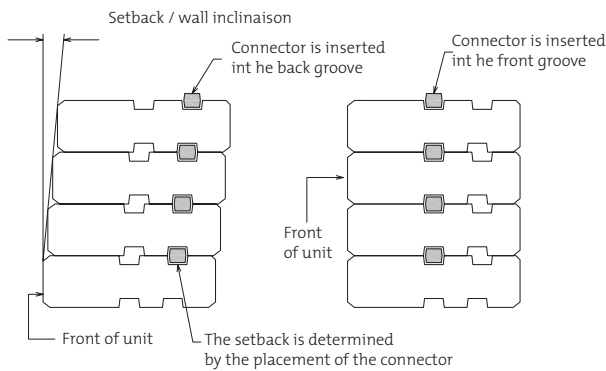
ANCHORING SYSTEM

Techo-Bloc has designed an anchoring system that allows Quarry Stone, Mini-Creta, Creta, Escala, Semma and Suprema blocks to be installed using high-density polyethylene (HDPE) connectors. These devices ensure a mechanical connection between the blocks with the geogrid and ensure that they are aligned during laying.

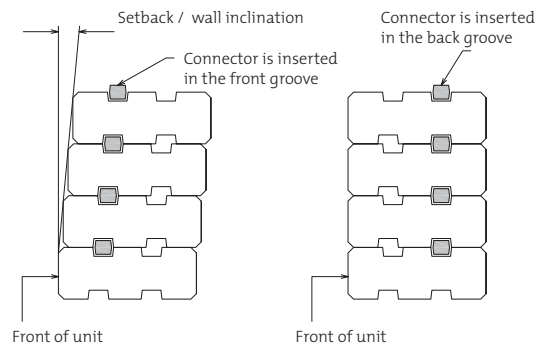
The top of each block is identified by a notch near its front. There are two grooves on the top and underside of each block. The connectors are inserted into these grooves. Before fitting the connectors, check whether the blocks are to be installed with a setback or vertically. If the connector is fitted into the front groove, the wall will be vertical. If the connector is fitted into the back groove, the wall will be recessed and at an angle. When using the Semma units, the positioning of the connector is reversed. When the connector is placed in the front groove, the wall will be at an angle, and if it is in the back groove, the wall will be vertical.



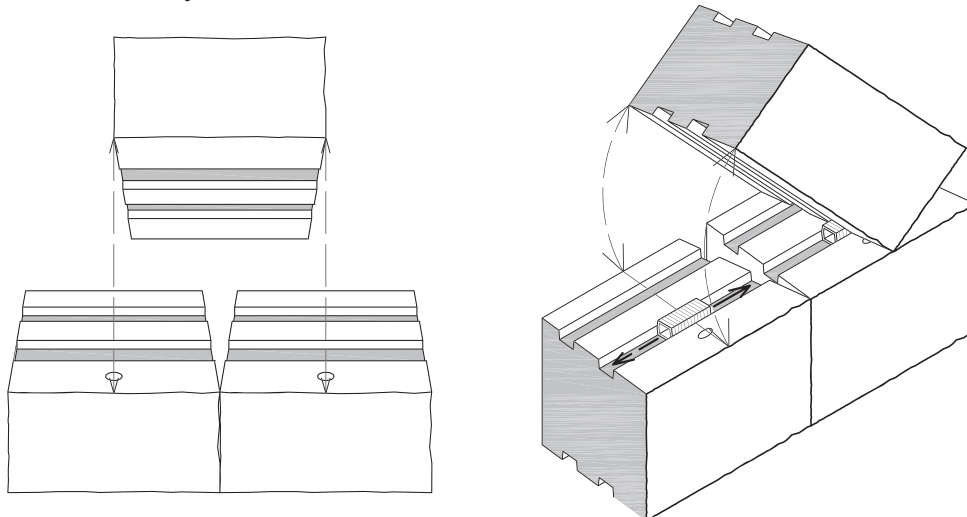
Quarry Stone, Mini-Creta, Creta, Escala and Suprema



Semma

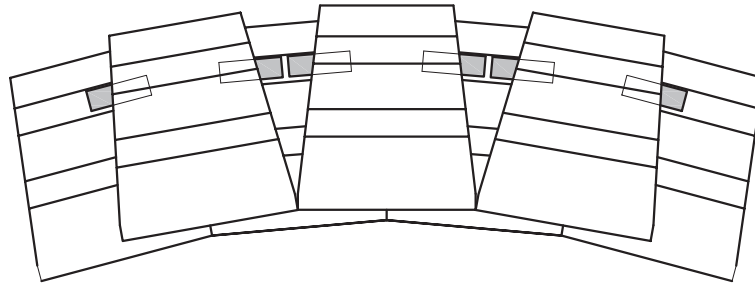


Place one block on top of two other blocks. Lift up the end of the block to insert the connector into the predetermined groove. Then lift the other end of the block to insert a second connector into the same groove. These connectors must remain partially visible in order to fit into the adjacent blocks.

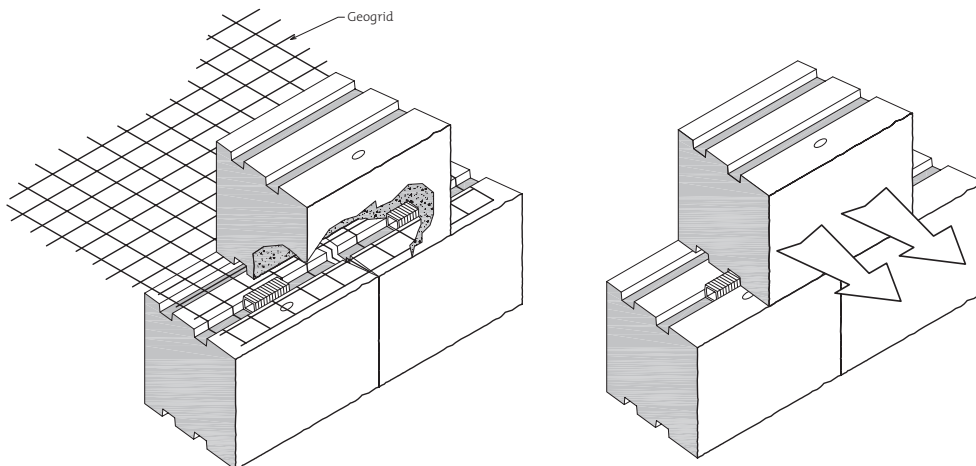


Typical Wall Cross Sections

However, when creating internal curves and the connectors are in the back groove, you must fit two connectors on each block as illustrated.



When using a geogrid, it must be laid before the connectors are fitted. The connectors will therefore be placed above the geogrid. After positioning it, move the block forward until it touches the connectors and locks the system.



Repeat the installation steps for the adjacent blocks.

INSTALLATION PATTERNS: QUARRY STONE

Techo-Bloc has developed installation patterns that can be used as part of your projects when building Quarry Stone walls. These patterns will help give your walls a more natural finish and are also a useful tool in helping to estimate the quantity of blocks needed for each project.

MODULES

The Quarry Stone system is comprised of blocks known as modules. These modules come in two heights: 100 mm ($3\frac{15}{16}$ inches) and 200 mm ($7\frac{7}{8}$ inches). The 100 mm high modules are called Quarry Stone 100 and the 200 mm modules are called Quarry Stone 200.

QUARRY STONE 100

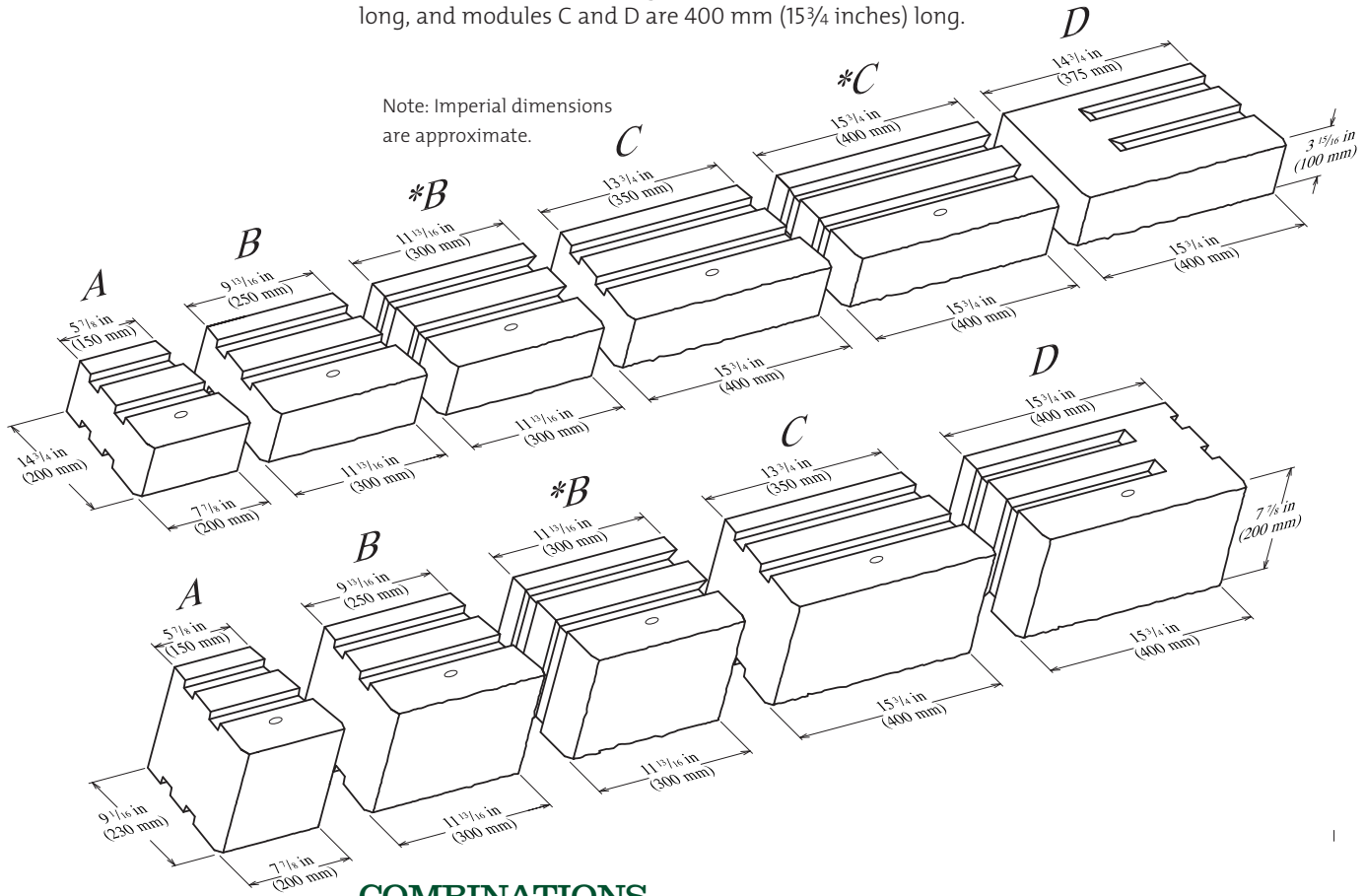
Quarry Stone 100 modules are divided into three lengths. Modules "A" are 200 mm ($7\frac{7}{8}$ inches) long, modules B are 300 mm ($11\frac{13}{16}$ inches) long, and modules C and D are 400 mm ($15\frac{3}{4}$ inches) long.

Installation guide for walls

QUARRY STONE 200

Quarry Stone 200 modules are divided into three lengths. Modules “A” are 200 mm (7⁷/₈ inches) long, modules B are 300 mm (11¹³/₁₆ inches) long, and modules C and D are 400 mm (15³/₄ inches) long.

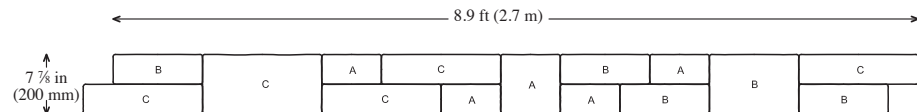
Note: Imperial dimensions are approximate.



COMBINATIONS

The designs of these patterns are largely based on three models: the 1-row model, 2-row model and 3-row model. Each model contains different examples of module combinations. The same combination example can be used several times or combined with other combination examples. Depending on the height of the wall or whether a geogrid is used, combination examples with different models can be used for the same wall. (Note: only modules A, B and C have been used to illustrate the different length modules).

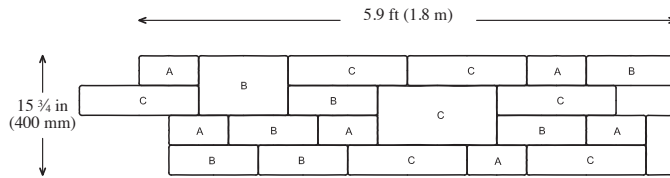
Pattern – 1-row model 66.7% Quarry Stone 100 mm – 33.3% Quarry Stone 200 mm



Number of blocks required

		MODULE LENGTH (mm)		
Quarry Stone		200 (A)	300 (B)	400 (C)
66.7%	QUARRY STONE 100	4	4	4
33.3%	QUARRY STONE 200	1	1	1

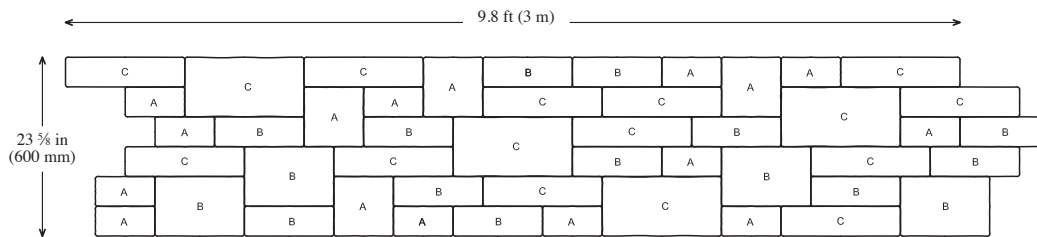
Pattern – 2-row model 75% Quarry Stone 100 mm – 25% Quarry Stone 200 mm



Number of blocks required

		MODULE LENGTH (MM)		
Quarry Stone		200 (A)	300 (B)	400 (C)
75%	QUARRY STONE 100	6	6	6
25%	QUARRY STONE 200	1	1	1

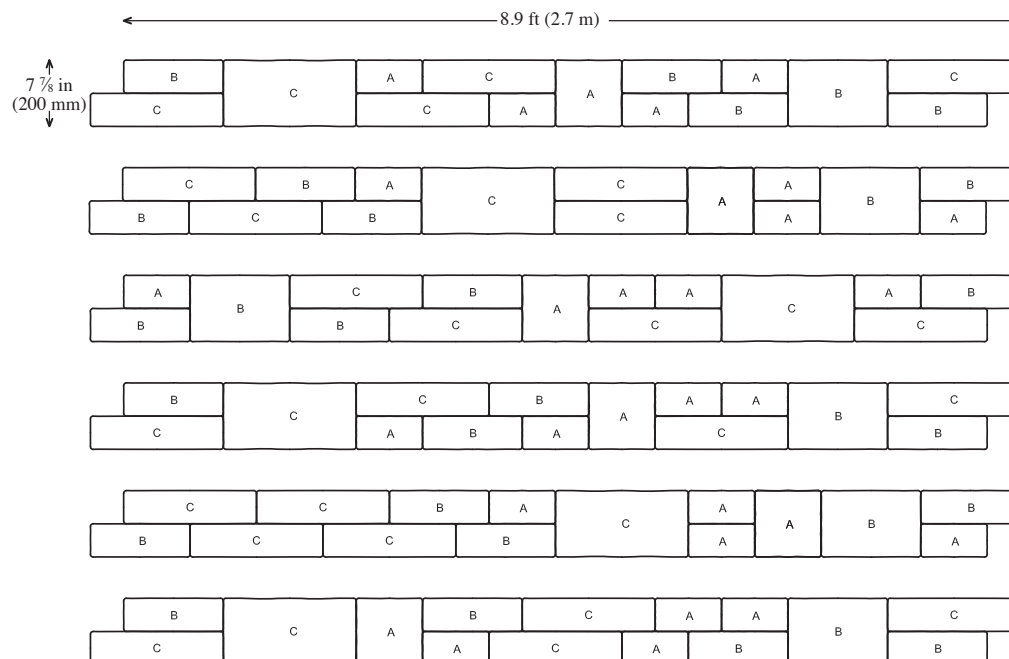
Pattern – 3-row model 60% Quarry Stone 100 mm – 40% Quarry Stone 200 mm



Number of blocks required

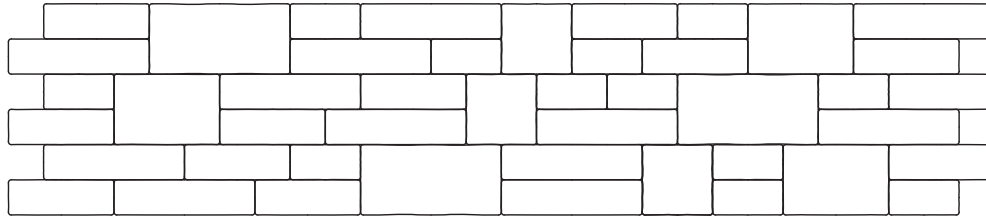
		MODULE LENGTH (MM)		
Quarry Stone		200 (A)	300 (B)	400 (C)
60%	QUARRY STONE 100	12	12	12
40%	QUARRY STONE 200	4	4	4

One-Row model – Combination examples 33.3% Quarry Stone 100 mm – 66.7% Quarry Stone 200 mm



Installation guide for walls

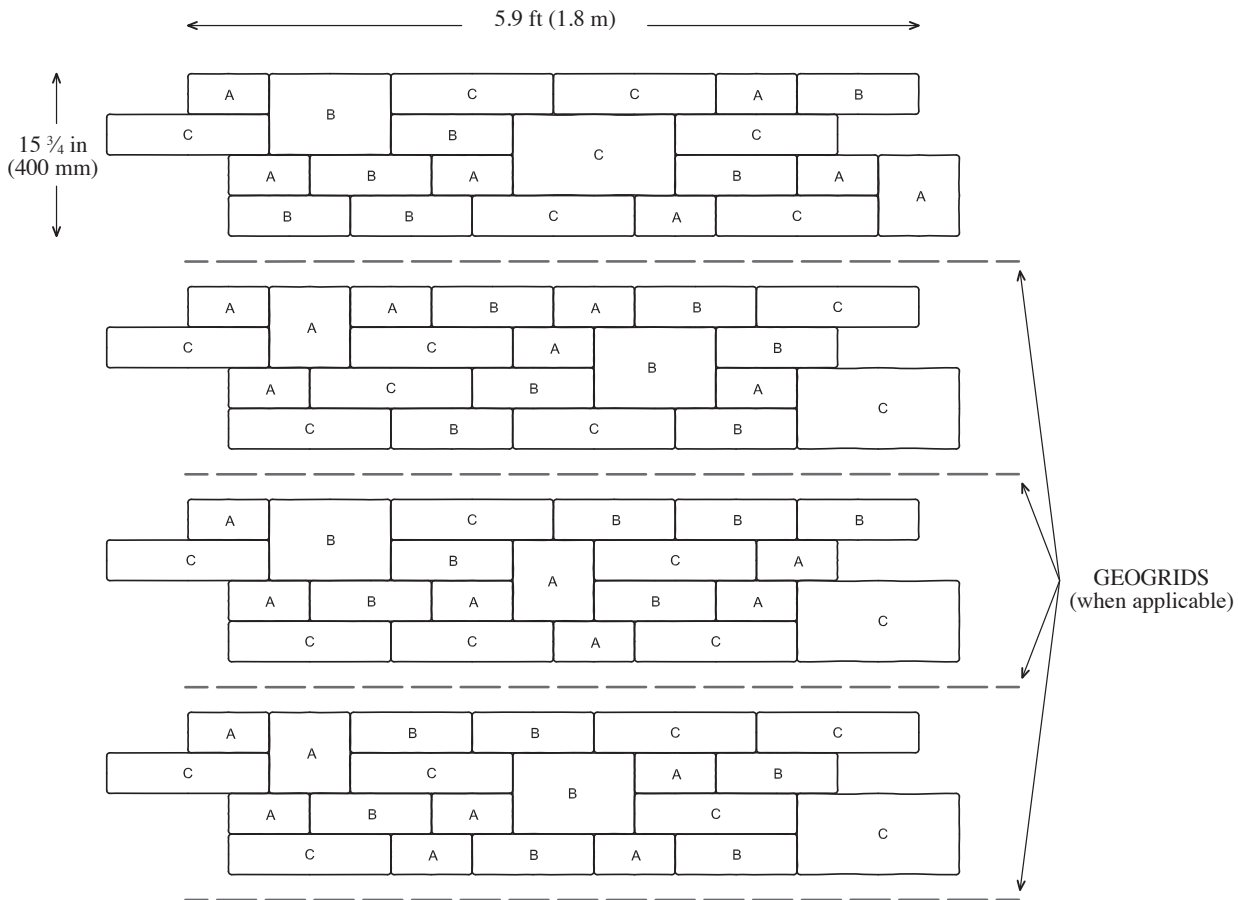
The 1-row model includes six combination examples. Each combination is 8.9 ft. (2.7 m) long and 77/8" (200 mm) high. This model can be used to lay the last course of modules or when the other models cannot be used.



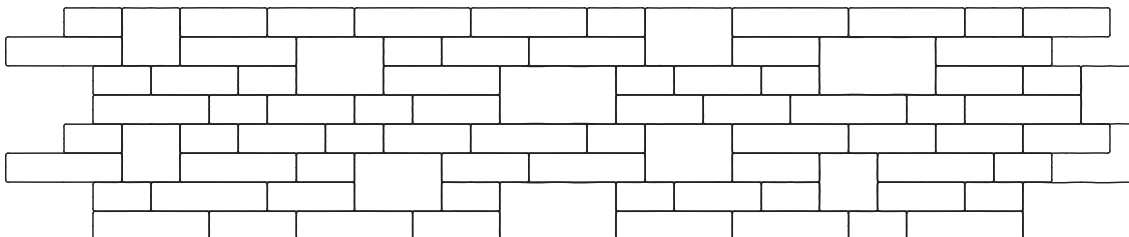
Quarry Stone 100 = 67% of surface

Quarry Stone 200 = 33% of surface

Two-Row model – Combination examples 75% Quarry Stone 100 mm – 25% Quarry Stone 200 mm



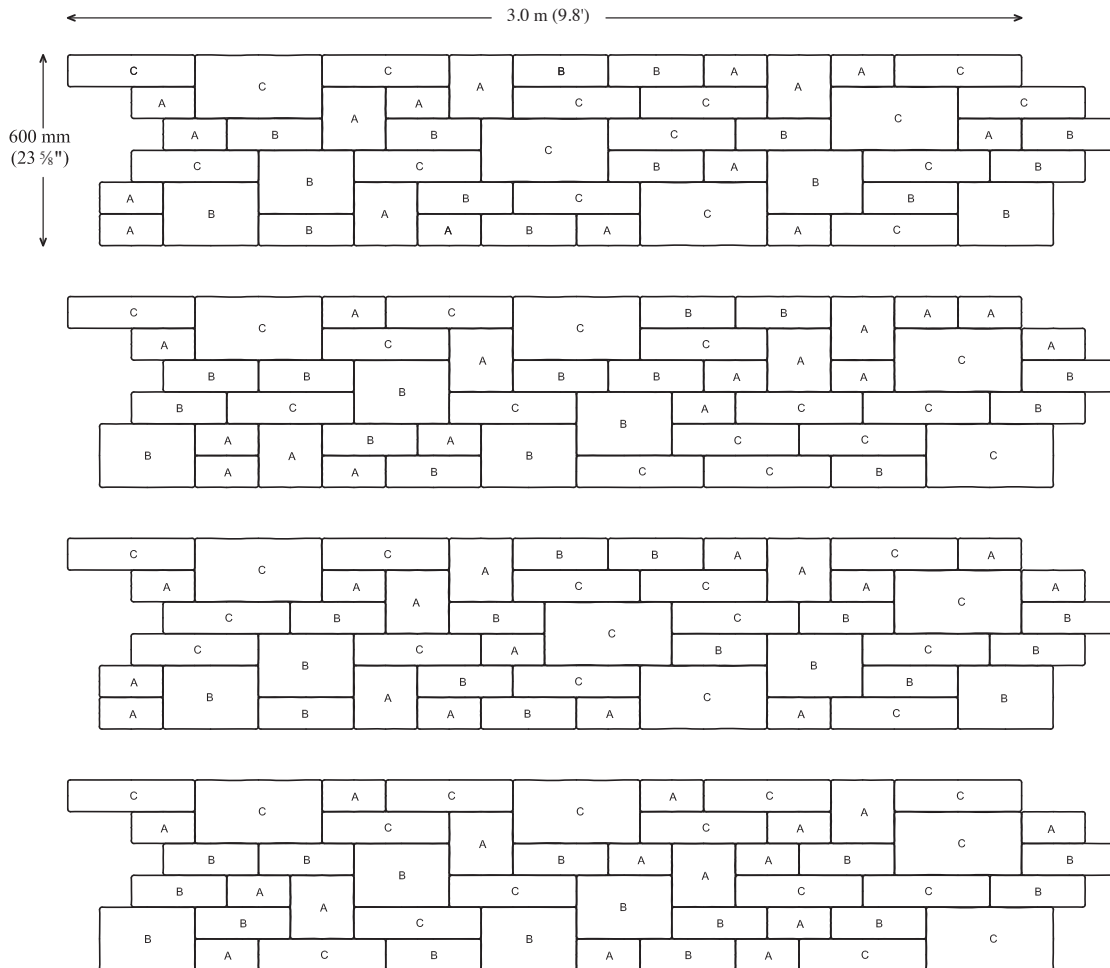
The 2-row model includes four combination examples. Each combination is 1.8 m long and 15 3/4" (400 mm) high. This model gives a leveled surface every 15 3/4" (400 mm), which is the usual spacing between geogrid levels in a Quarry Stone wall. Consultation of this model is recommended when using a geogrid.



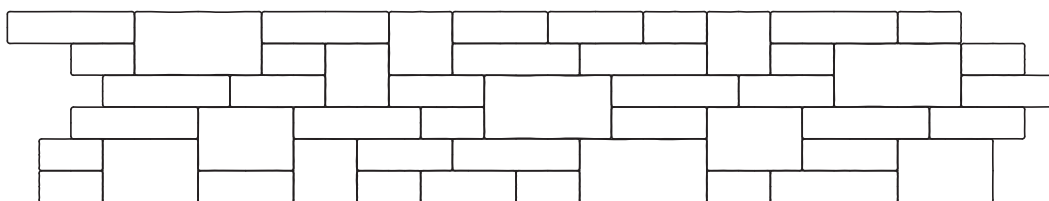
Quarry Stone 100 = 75% of surface

Quarry Stone 200 = 25% of surface

Three-Row model – Combination examples 60% Quarry Stone 100 mm – 40% Quarry Stone 200 mm



The 3-row model includes four combination examples. Each combination is 9.8 ft. (3 m) long and 23⁵/₈" (600 mm) high. This model should only be used where geogrids are not required.



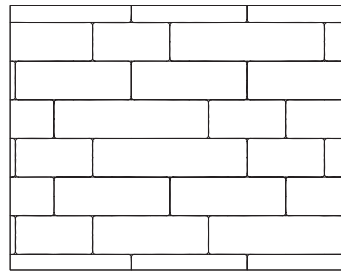
Quarry Stone 100 = 60% of surface

Quarry Stone 200 = 40% of surface

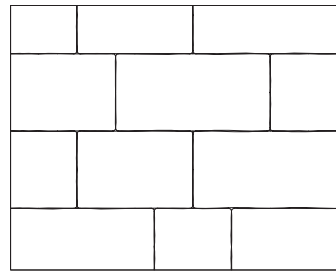
Installation guide for walls

Patterns

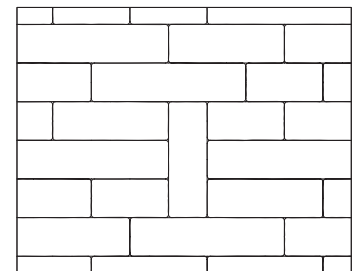
Different patterns for Quarry Stone



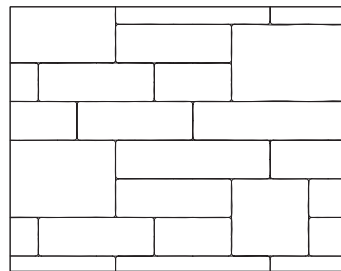
Quarry Stone 100



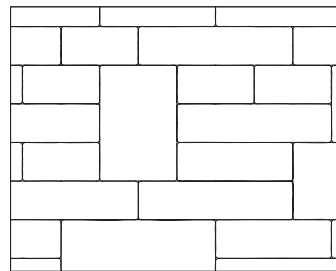
Quarry Stone 200



Quarry Stone 100 with vertical units



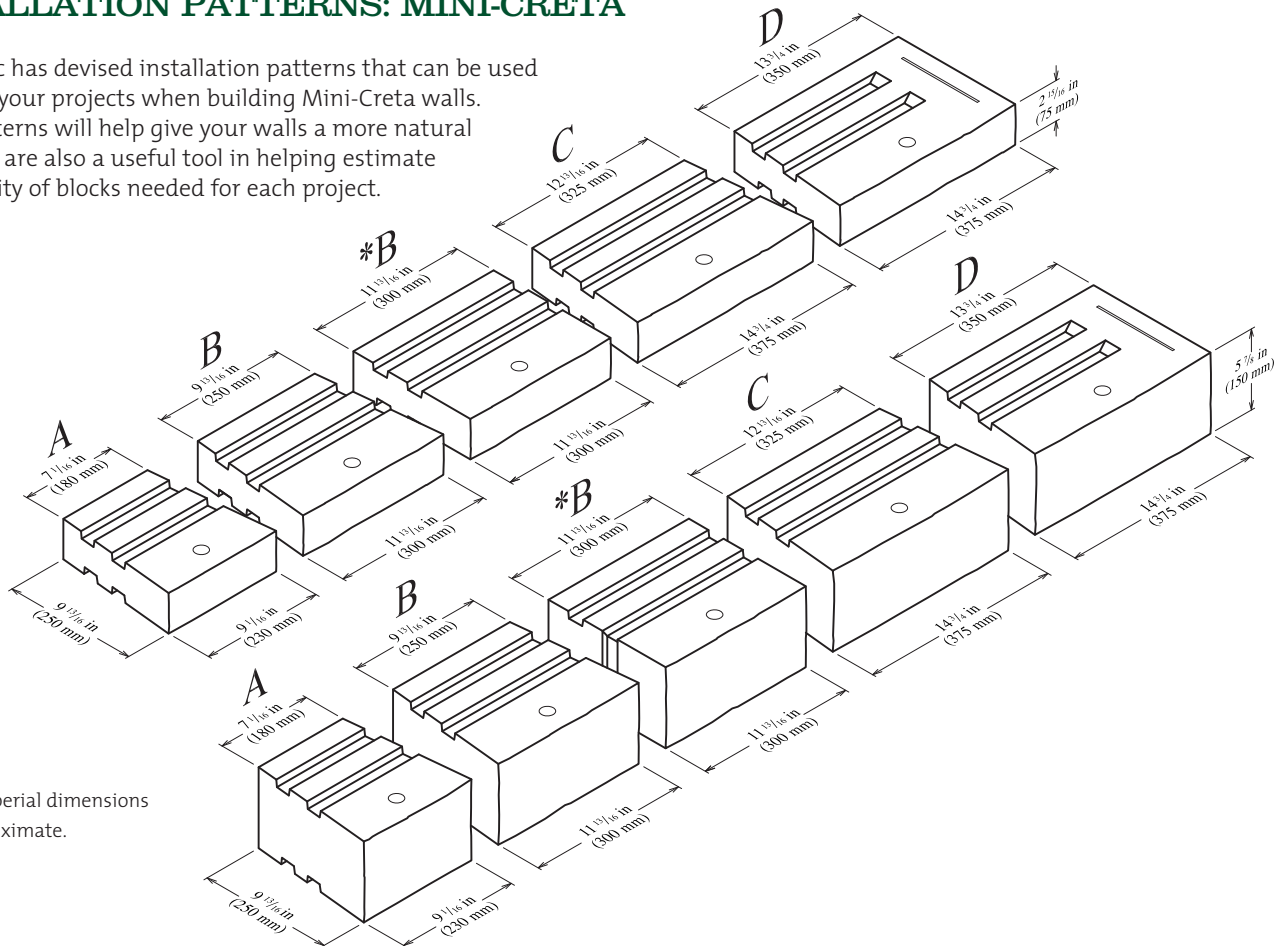
Quarry Stone 100 & 200



Quarry Stone 100 & 200 with vertical units

INSTALLATION PATTERNS: MINI-CRETA

Techo-Bloc has devised installation patterns that can be used as part of your projects when building Mini-Creta walls. These patterns will help give your walls a more natural finish and are also a useful tool in helping estimate the quantity of blocks needed for each project.



100 Note: Imperial dimensions are approximate.

MODULES

The Mini-Creta system is comprised of blocks known as modules. These modules come in two heights: 75 mm ($2\frac{15}{16}$ inches) and 150 mm ($5\frac{7}{8}$ inches). The 75 mm high modules are called Mini-Creta 3" and the 150 mm modules are called Mini-Creta 6".

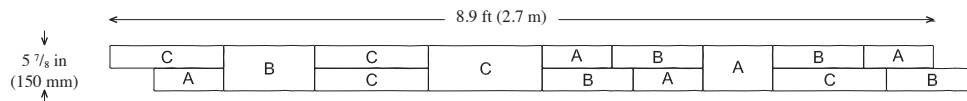
MINI-CRETA 3" AND MINI-CRETA 6"

The Mini-Creta 3" and Mini-Creta 6" modules are divided into three lengths. Modules "A" are 230 mm ($9\frac{1}{16}$ inches) long, modules B are 300 mm ($11\frac{13}{16}$ inches) long and modules C and D are 375 mm ($14\frac{3}{4}$ inches) long.

COMBINATIONS

The design of these patterns is largely based on three models: the 1-row model, 3-row model and 5-row model. Each model contains different examples of module combinations. The same combination example can be used several times or combined with other combination examples. Depending on the height of the wall or whether a geogrid is used, combination examples from different models can be used for the same wall. (Note: only modules A, B and C have been used to illustrate the different length modules).

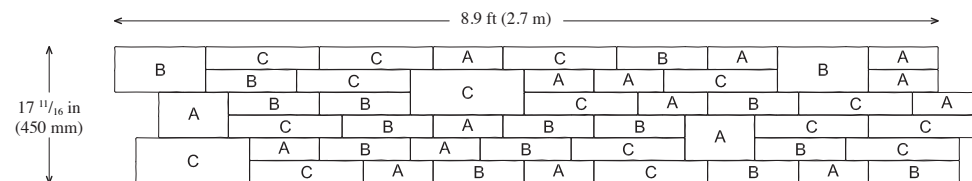
Pattern – 1-row model 66.7% Mini-Creta 3" – 33.3% Mini-Creta 6"



Number of blocks required

		MODULE LENGTH (MM)		
Mini-Creta		230 (A)	300 (B)	375 (C)
66.7%	MINI-CRETA 3"	4	4	4
33.3%	MINI-CRETA 6"	1	1	1

Pattern – 3-row model 77.8% Mini-Creta 3" – 22.2% Mini-Creta 6"

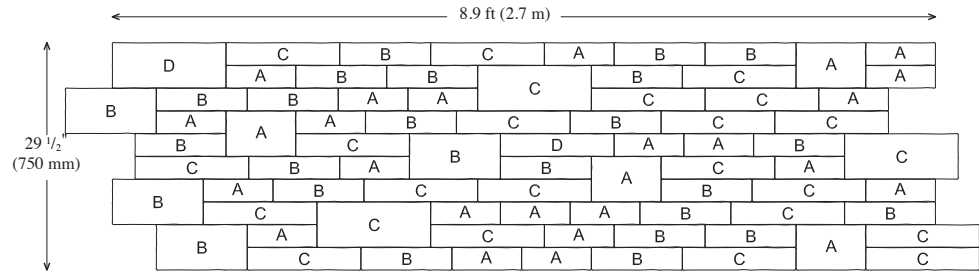


Number of blocks required

		MODULE LENGTH (MM)		
Mini-Creta		230 (A)	300 (B)	375 (C)
77.8%	MINI-CRETA 3"	14	14	14
22.2%	MINI-CRETA 6"	2	2	2

Installation guide for walls

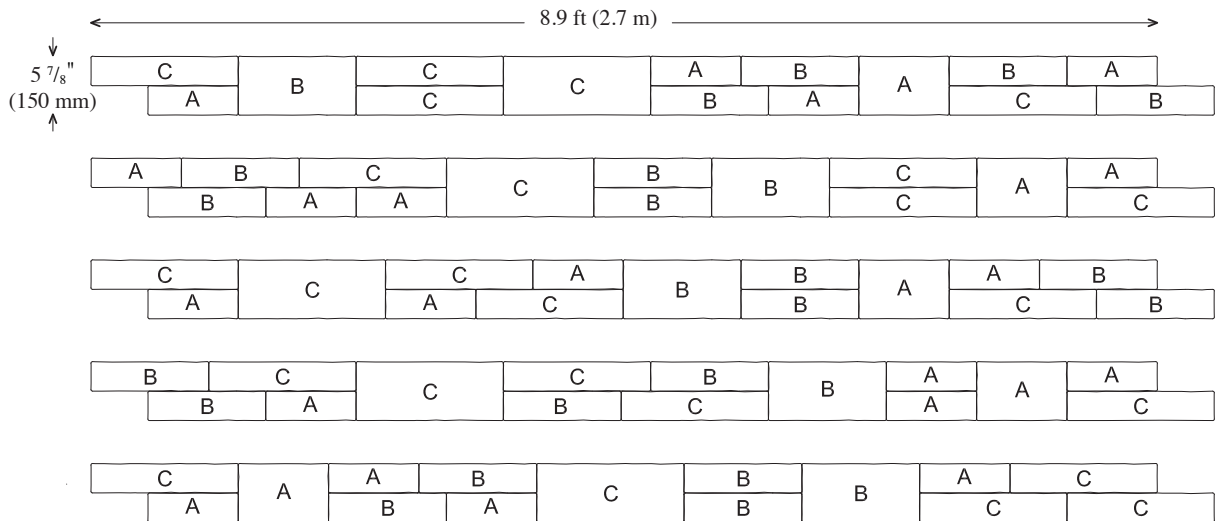
Pattern – 5-row model 77.8% Mini-Creta 3" – 22.2% Mini-Creta 6"



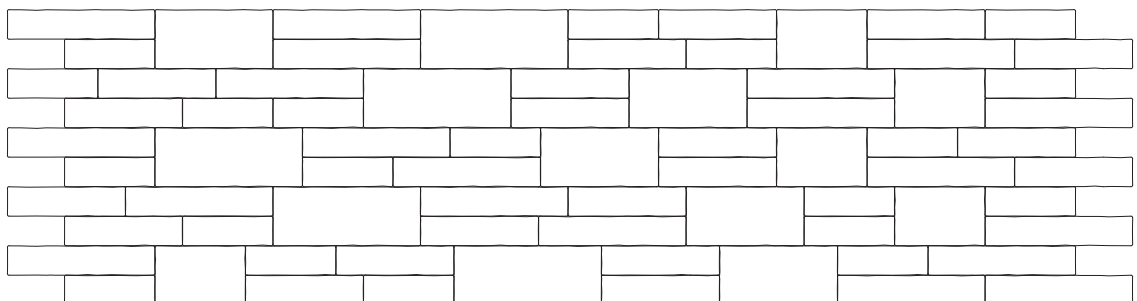
Number of blocks required

	MODULE LENGTH (MM)		
Mini-Creta	230 (A)	300 (B)	375 (C)
73.3% MINI-CRETA 3"	22	22	22
26.7% MINI-CRETA 6"	4	4	4

One-Row model – Combination examples for Mini-Creta



The 1-row model includes five combination examples. Each combination is 8.9 ft. (2.7 m) long and 5 7/8" (150 mm) high. This model can be used to lay the last course of modules or when the other models cannot be used.

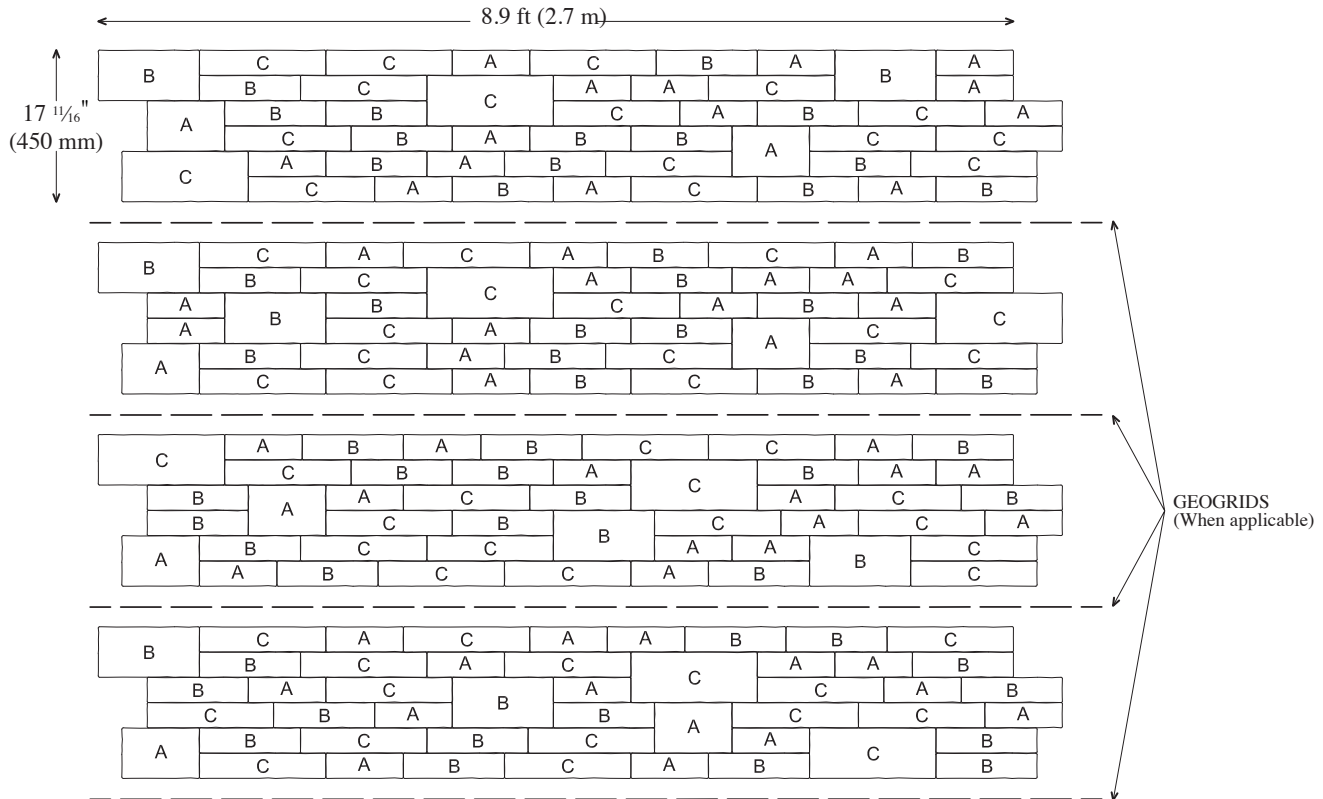


Mini-Creta 3" = 67% of surface

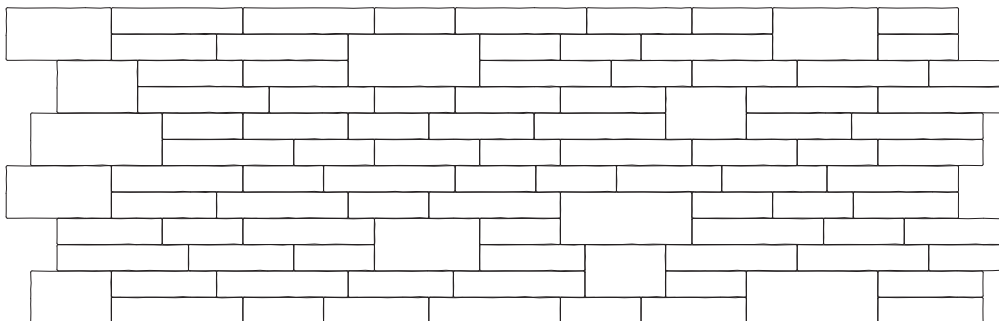
Mini-Creta 6" = 33% of surface

Three-Row model

Combination examples for Mini-Creta



The 3-row model includes four combination examples. Each combination is 8.9 ft. (2.7 m) long and 17¹¹/₁₆" (450 mm) high. This model gives a leveled surface every 17¹¹/₁₆" (450 mm), which is the usual spacing between geogrid levels in a Mini-Creta wall. Consultation of this model is recommended when using a geogrid.



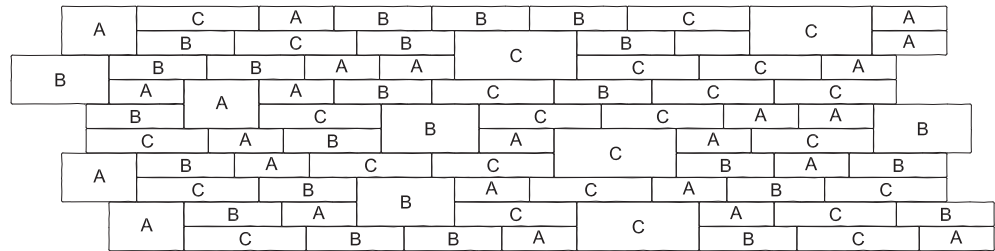
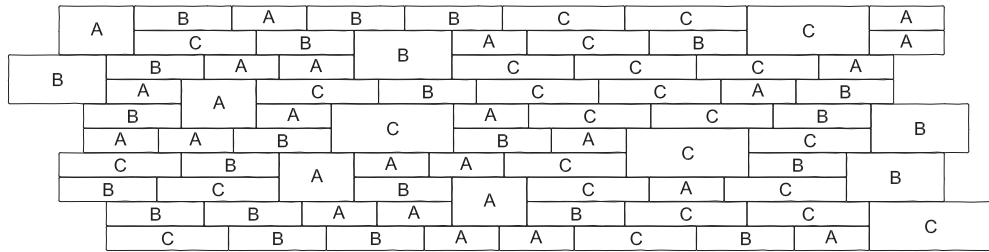
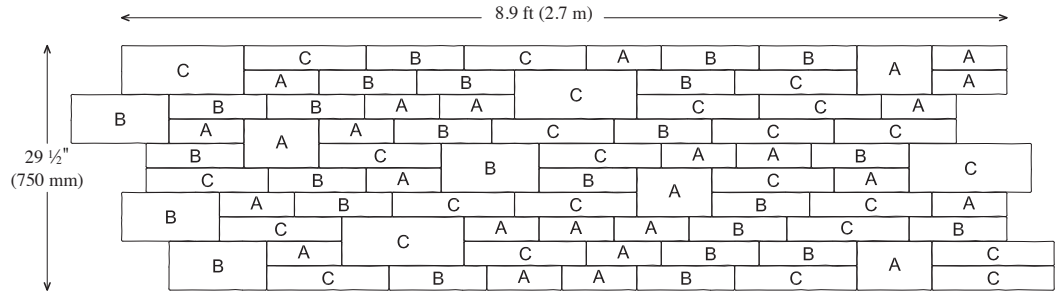
Mini-Creta 3" = 78% of surface

Mini-Creta 6" = 22% of surface

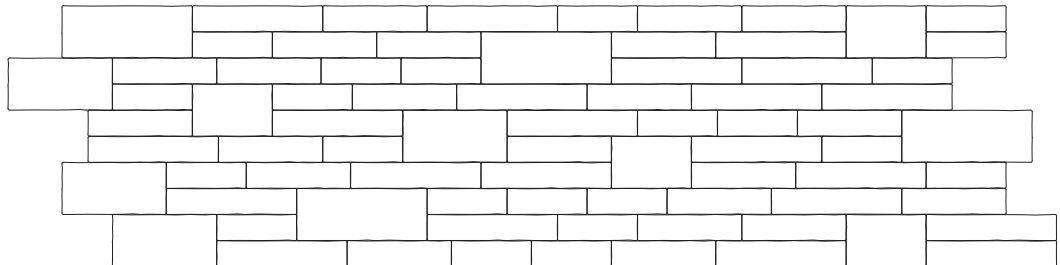
Installation guide for walls

Five-row model

Combination examples for Mini-Creta



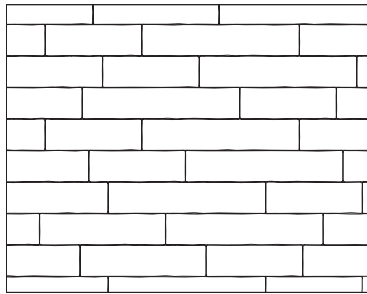
The 5-row model includes three combination examples. Each combination is 8.9 ft. (2.7 m) long and 29½" (750 mm) high. This model should only be used where geogrids are not required.



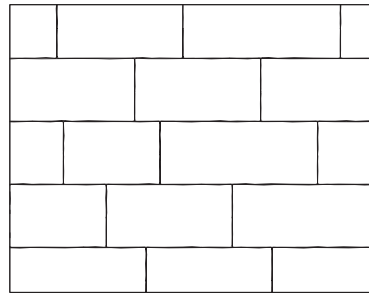
Mini-Creta 3" = 73% of surface

Mini-Creta 6" = 27% of surface

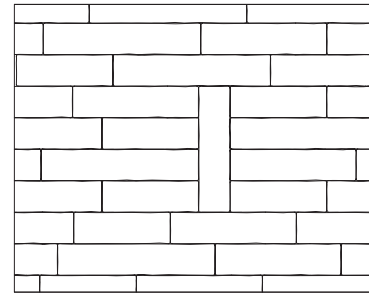
Patterns - Different patterns for Mini-Creta



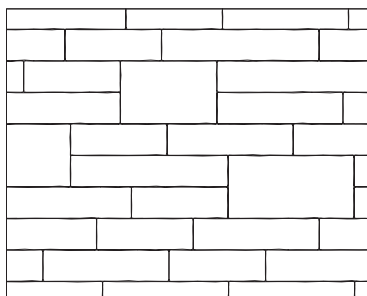
MINI-CRETA PLUS 3" - LINEAR PATTERN



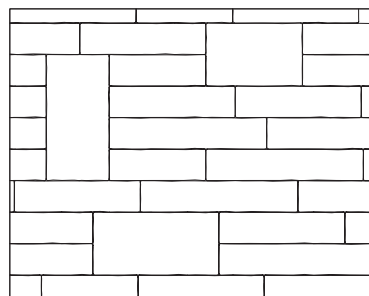
MINI-CRETA PLUS 6" - LINEAR PATTERN



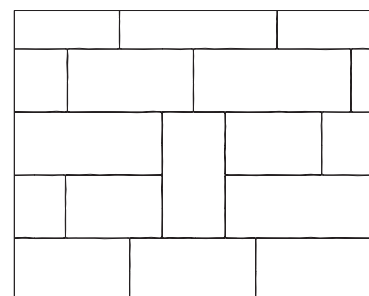
MINI-CRETA PLUS 3" - WITH VERTICAL UNITS



MINI-CRETA PLUS 3" & 6"



MINI-CRETA PLUS 3" & 6" - WITH VERTICAL UNITS

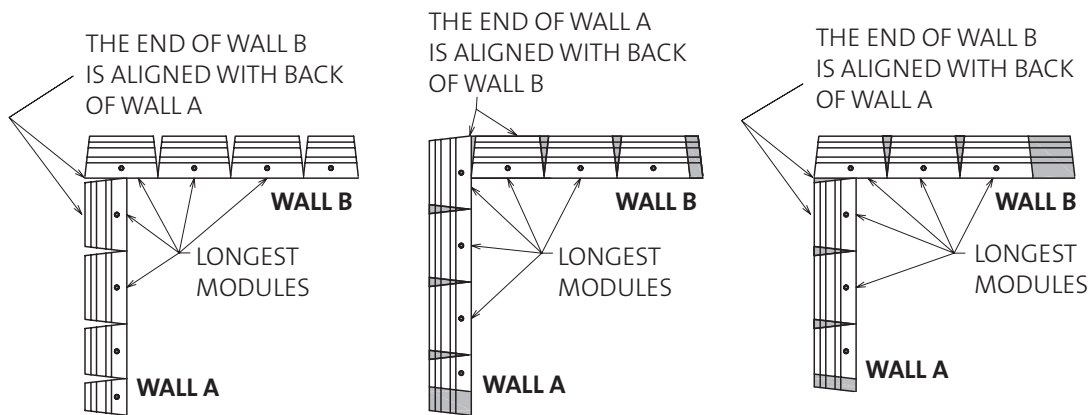


MINI-CRETA PLUS 6" - WITH VERTICAL UNITS

CORNERS

INTERNAL CORNER

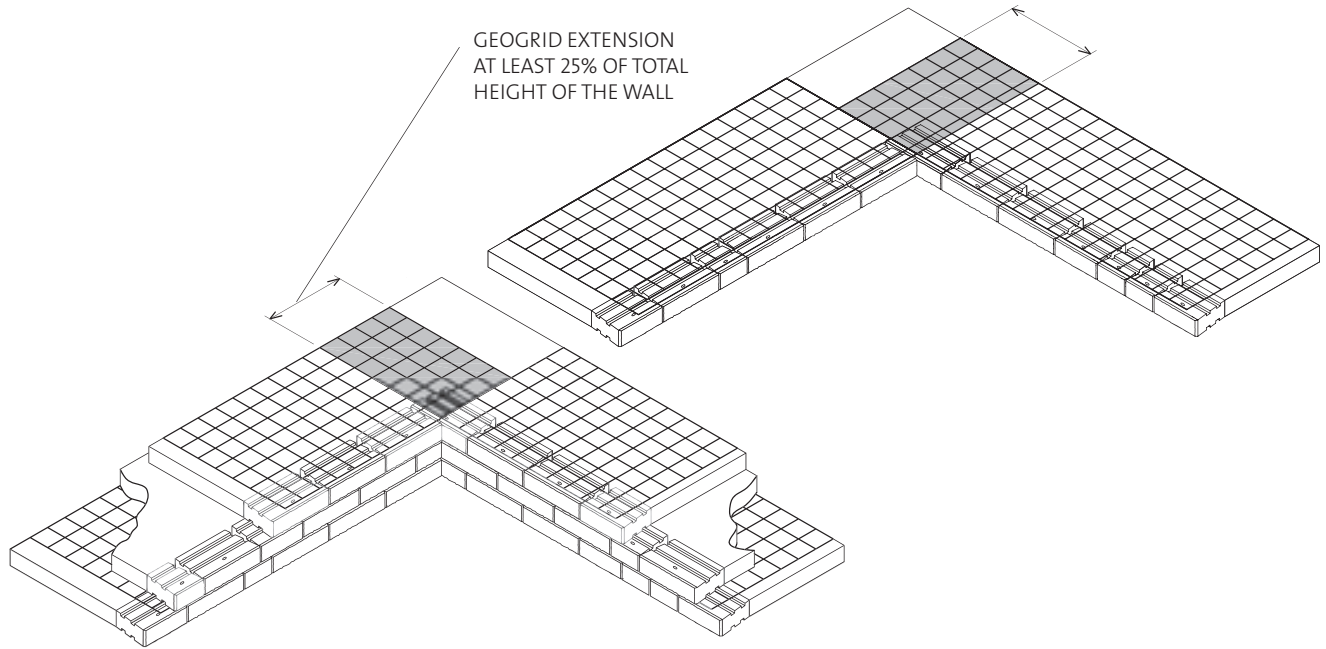
When building a wall with an internal corner, start constructing the wall at the corner and build out from this point in both directions. To form the corner, use the longer modules as illustrated. Build wall B by extending it out from wall A such that the end of wall B is aligned with the back of wall A. For subsequent courses, simply alternate the extension of walls A and B.



The construction of an interior corner is achieved by alternating the extension of walls A and B.

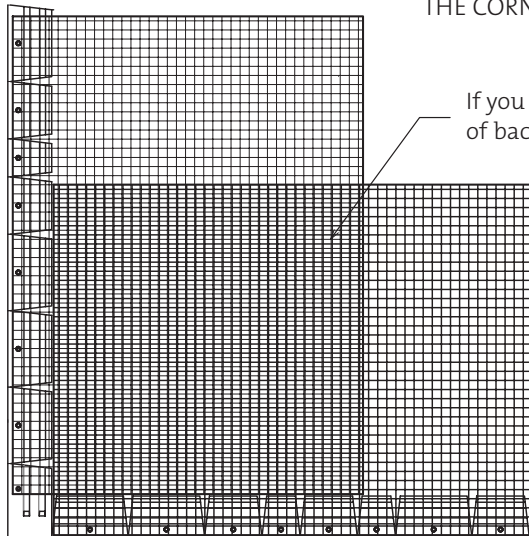
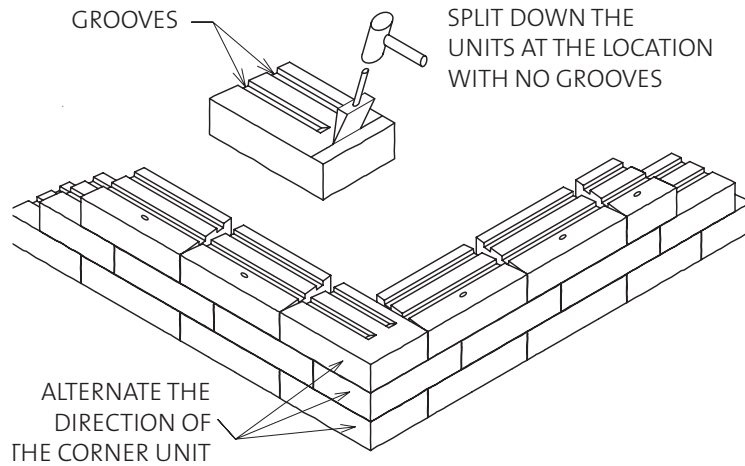
Installation guide for walls

If you are using a geogrid, this must be extended beyond the internal corner by at least 25% of the total height of the wall. Alternate the extension of the geogrid for subsequent layers.



EXTERNAL CORNER

For walls with an internal corner, start building the wall from the corner and continue from this point in both directions. Each pallet contains units that can be used to make a corner. On-site, these units (except the Suprema blocks) must be split down the side using a hammer and chisel in order to obtain a corner unit. For each subsequent course, alternate the direction of the corner unit and secure the corner unit to the block below using concrete adhesive.

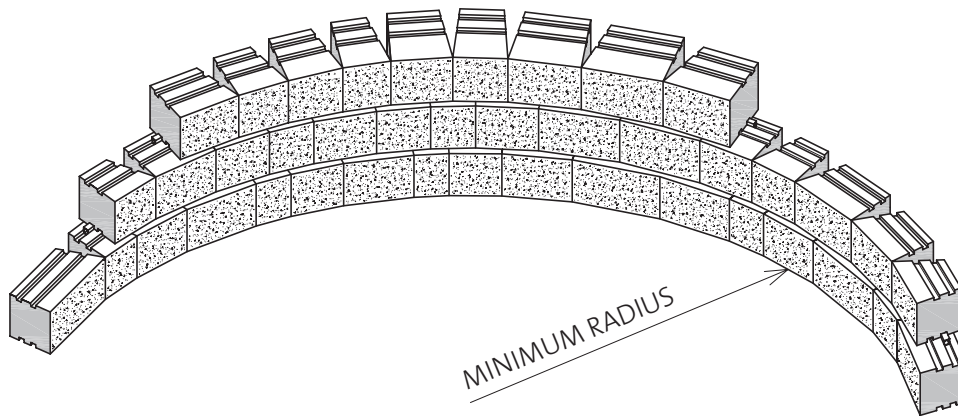


CURVES

The Techo-Bloc retaining wall system allows walls to be built with internal and external curves. These curves can be achieved without cutting the blocks. You will need to angle the curves according to the minimum radius indicated by Techo-Bloc.

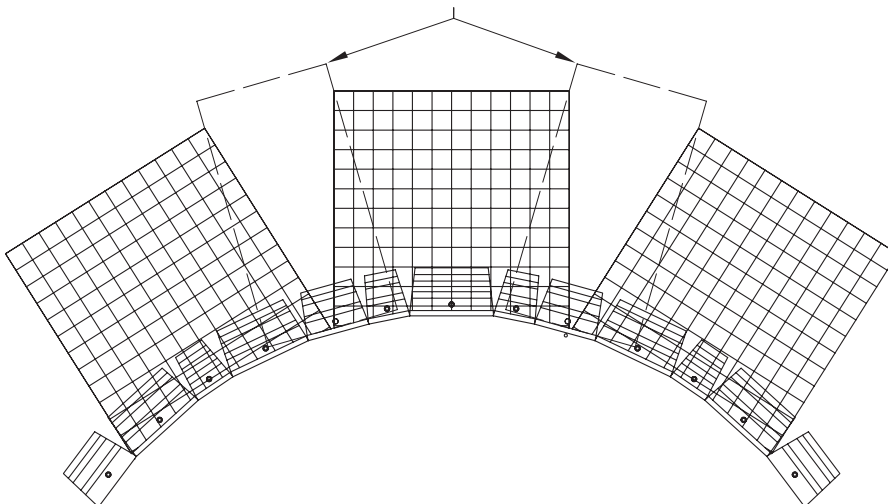
INTERNAL CURVE

Where possible, start building the wall at the center of the curve and place blocks alternately to the left and right of the central block. If the wall is to be constructed with a setback (inclined wall), each course should be offset to the back and the curve will then become bigger. The minimum radius is therefore that of the first course.



If you are using a geogrid, it must cover 100% of the surface around the curve. To do this, you need to use additional layers of geogrids on the next row of blocks where the geogrid is required in order to fill in any voids that are created.

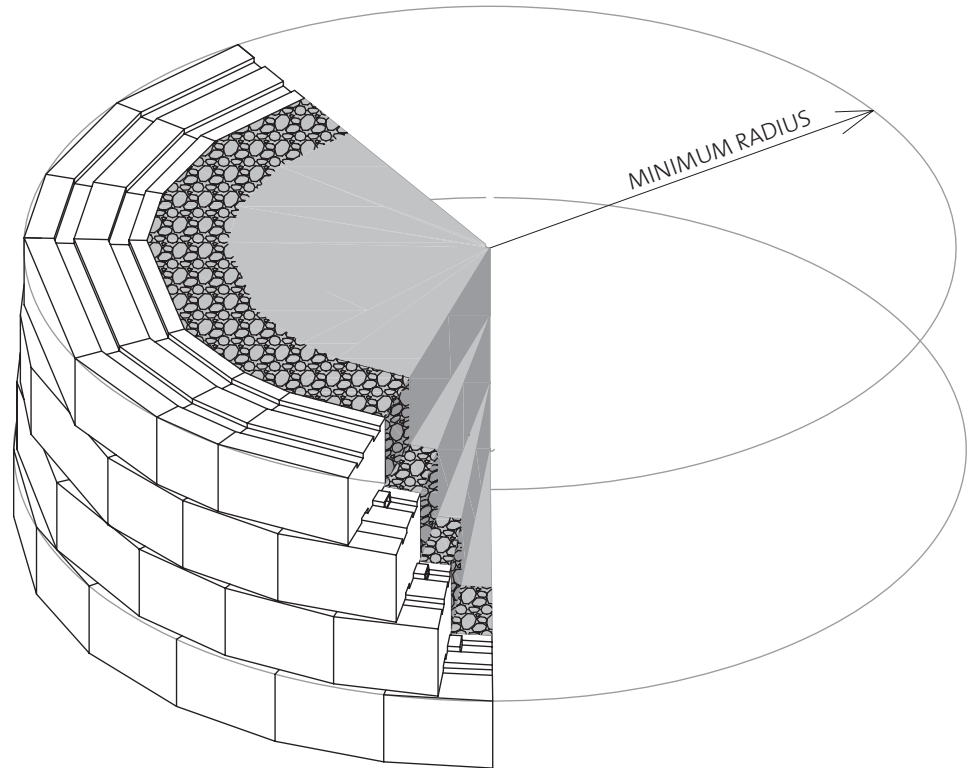
ADDITIONAL LAYERS OF GEOGRIDS ARE PLACED
ON THE NEXT COURSE OF BLOCKS TO FILL VOIDS
CREATED FROM PREVIOUS COURSE



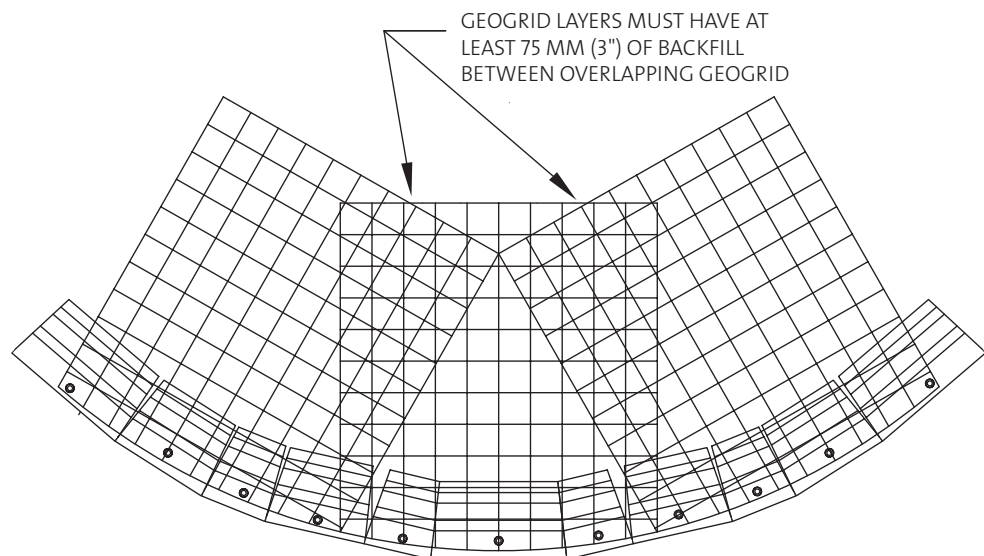
Installation guide for walls

EXTERNAL CURVE

As with a wall with an internal curve, start building the wall at the center of the curve and place blocks alternately to the left and right of the central block. Unlike for internal curves, this curve gets smaller as courses are added. The minimum radius is therefore that of the last course.

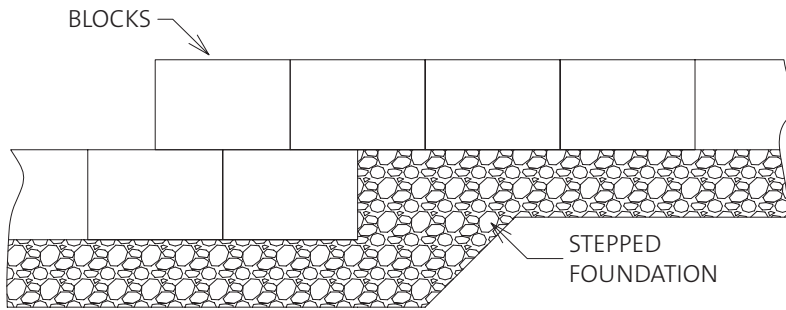


If you are using a geogrid, allow at least 75 mm (3 inches) of backfill between the overlapping layers of geogrids.



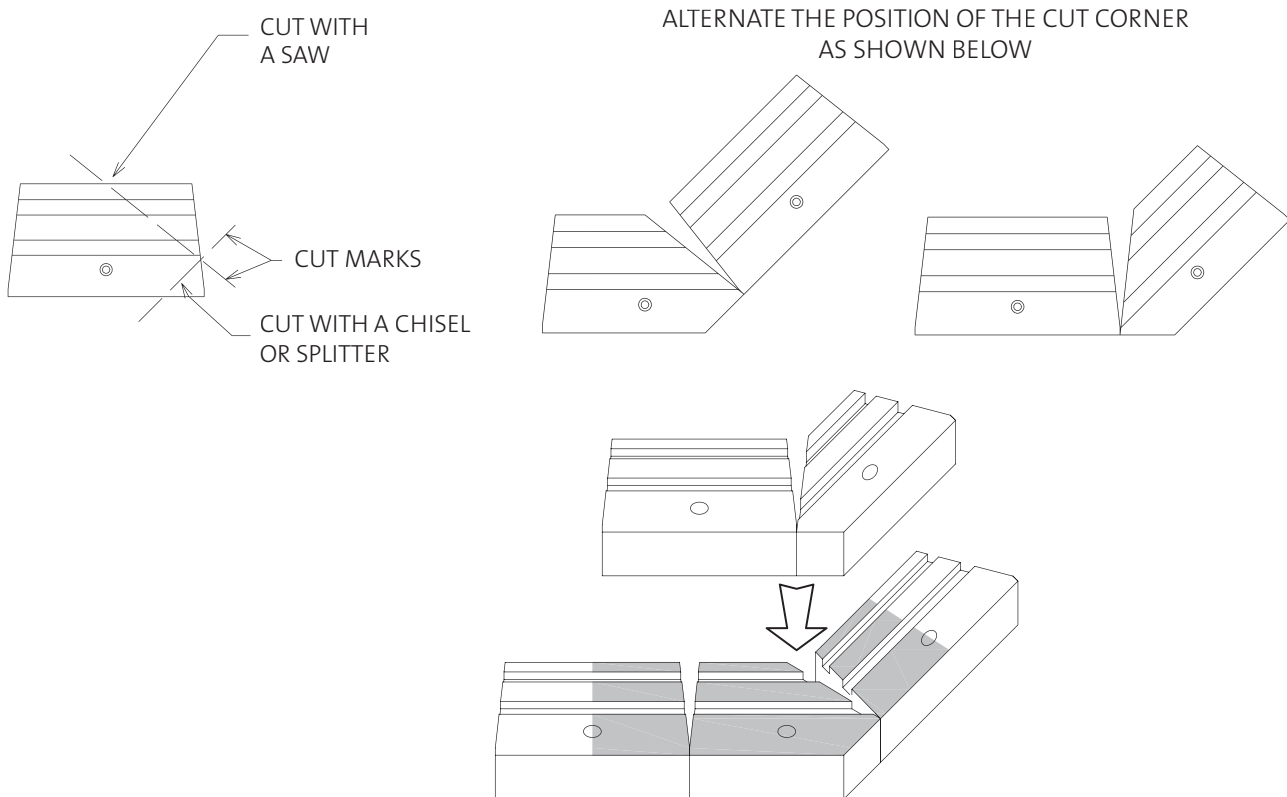
STEPPED FOUNDATION

A wall built on an incline requires stepped foundations, and for steep inclines, several steps may be required. Construction should start at the lowest level. Each of the steps must follow a level horizontal path and the vertical distance separating the successive steps must equal the height of a block.



OBLIQUE CORNER

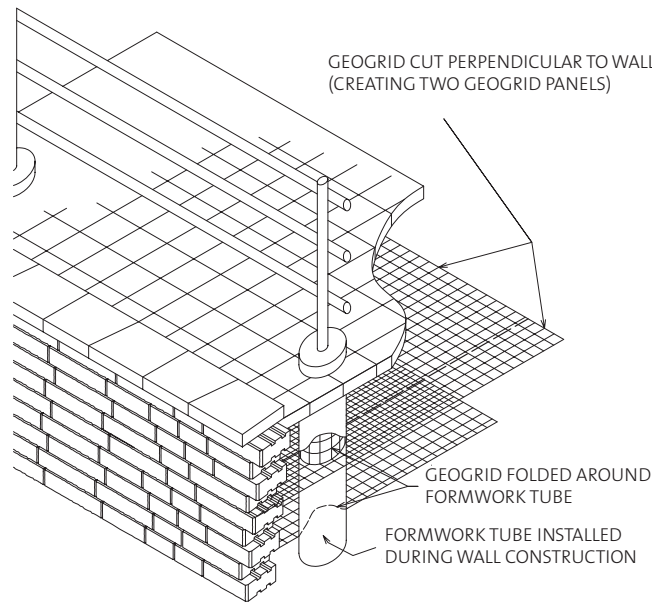
The longer modules should be used to build an oblique external corner. Cut the non-exposed part of the block using a saw. Use a chisel or splitter to give the exposed face of the block a textured look. Alternate the cutting of the blocks for each subsequent course.



ALTERNATE THE CORNER UNIT FOR EACH SUBSEQUENT COURSE AS SHOWN ABOVE

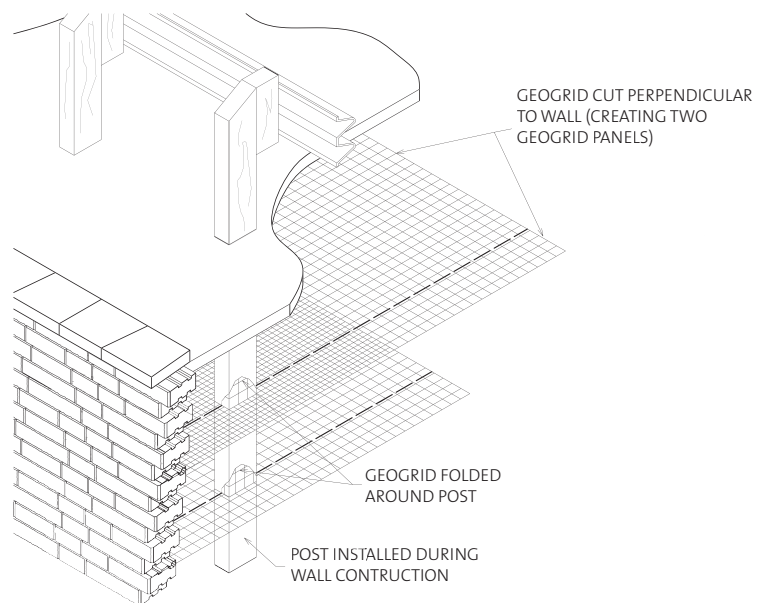
FENCING

Fencing can be erected behind the blocks. The fence posts must be placed in formwork tubes positioned during construction of the wall, and then filled with concrete. The geogrids may be cut to accommodate installation of the tubes. Cut the geogrid in alignment with the center of the formwork tube and perpendicular to the wall, thus creating two geogrid panels. Connect the two geogrid panels at the front and back of the formwork tube and bend the geogrid to fit around the formwork.



GUARD RAIL

As with fencing, a guard rail can be incorporated behind the blocks. The guard rail posts must be installed during construction of the wall. The geogrid is cut perpendicular to the wall and in alignment with the center of the post, thus creating two geogrid panels. These two panels are connected at the front and back of the post. The geogrid can be bent to fit around the post.



TIERED WALLS

Although tiered walls look appealing, it is important to take into account the additional load the upper wall places on the lower wall. If the distance between the walls is at least twice the height of the lower wall, then the walls are generally independent of each other. However, if this distance is less, the lower wall must be built to take account of the load of the upper wall and geogrids may be required.

