

Construction Manual ReCon Walls

Our ReCon retaining walls are flexible, functional, practical and aesthetic.
As a result, they give exceptional added value to your project.



Retaining Walls by CBS Beton

www.reconwalls.eu

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OUR OBJECTIVES

With the tried-and-tested Recon Walls prefabricated block system and our CBS Beton Recon Walls team, we strive to offer exceptional solutions that are functional, practical, flexible, aesthetically pleasing and long-term value create for your retaining wall project.

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Weathered Edge



Rustic



County Limestone



Old World



Northshore graniet



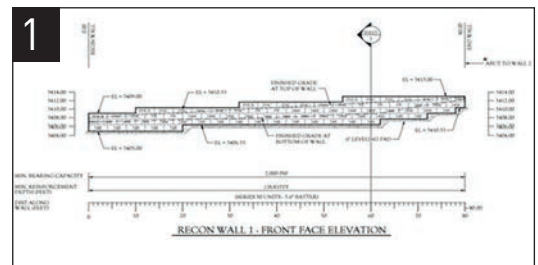
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“ Retaining Walls

Retaining Walls

The following procedures comply with generally accepted industry standards for the installation of Precast Modular Block Retaining Walls with special attention given to the unique features of the ReCon Walls product line. Every attempt should be made to follow these procedures unless the project specifications, drawings or the final engineered wall design directs otherwise. Additional guidance, which should be reviewed by the contractor, is provided in the ReCon Walls Installation Guidelines and Typical Construction Detail Drawings available at www.reconwalls.eu



Documenting the Scope of Work

Although unrelated to the actual installation of the retaining wall, proper preparation of a quote or bid can mean the difference between a profitable project, or working hard to merely break-even. Clearly defining your scope of work during the bidding process can remove ambiguity, allow the customer to better evaluate the bid, and potentially mitigate contractor risk. To request a copy of a typical retaining wall project Scope of Work Checklist, please contact ReCon Walls.

Preconstruction Meeting

For a project to run smoothly, it is important that all parties involved fully understand their role in the installation process. Getting the numerous subcontractors on site to have a common understanding of the timing, coordination, sequencing, and access requirements of each trade is critical. Preconstruction meetings are a good, and often necessary, way to bring everyone together to discuss project roles and coordinate specific site activities.

Engineered Shop Drawings

For an installation contractor, having engineered shop drawings (aka: stamped plans or construction drawings) for the retaining wall, prepared by a qualified retaining wall design engineer, is an essential tool that is necessary for the proper installation of a ReCon wall. A variety of information can be obtained from the stamped plan which will guide the installer during the construction process. This information includes items such as: the proper elevation of the wall, the depth of the gravity wall blocks, the length and strength of the geogrids (if applicable), the required bearing capacity of the foundation soils, as well as the location of any curves, corners, or any structure the wall may encounter. Shop drawings can also be used to help coordinate block delivery schedules and set productivity goals for the installation crew.

“ Site Preparation

Site Preparation

Before beginning work, contractors should make sure they have thoroughly studied the project specifications, the engineered shop drawings for the wall and complied with all the requirements for product submittals. Contractors should also have a clear understanding of their scope of work and their responsibilities that may be covered elsewhere in the project specifications and are not in the actual wall construction section.

For projects that do not have a formal set of grading plans or specifications, but do have engineered shop drawings, the contractor should refer to the construction procedures outlined in this manual whenever a topic is not specifically covered.

Make sure to have the retaining wall site properly surveyed and staked by a qualified surveyor. These grade stakes, and elevation hubs, will be the guide for the excavation contractor and will help the retaining wall installer determine the location of the wall. Be sure to have proper stake offsets to avoid damaging the stakes during the installation process.



EXCAVATION

The contractor should carefully excavate the wall construction area to the lines and grades shown on the construction drawings. Exercise caution to keep the soil undisturbed in areas that will not need modification during wall construction. Be sure to mark the location of any below ground utilities including power lines, communication lines, sewer and drainage structures, etc.



Preparing the Leveling Pad

Using the grade stakes and elevation hubs, excavate the base course trench to a minimum depth of 15 cm and to a width that extends a minimum of 15 cm in front and behind the actual location of the base blocks along their designated placement. It is suggested that a laser transit be used to establish bottom of wall elevation. If the wall layout requires either inside or outside radius curves, it is recommended to increase the width of the leveling pad to accommodate adjustment during wall alignment. Grade stakes should also show where base stepups are located. It is important to keep in mind that each stepup causes the leveling pad location to step back by one inch due to the integral setback of the ReCon Walls block.



Be sure to examine and test any foundation soil that appears inadequate and may not meet the bearing requirements set forth in the engineered plans

Fill the trench and any overexcavated areas with the specified base material. Unless noted otherwise, this material should generally consist of a welldraining material that also contains enough fines that the leveling pad will hold its shape after compaction. Depending on the region, this material may be referred to as road base, 2 cm minus, crush-and-run, or Class 5. Fully compact the base material and add or remove material as necessary to keep the leveling pad as close to the final level grade as possible. Where step-ups are located, base material should taper up at roughly a 45-degree angle.

A concrete leveling pad may be required or desirable in lieu of a compacted granular base material. Unless the leveling pad is designed as a true strip footing that extends below frost depth, the concrete should not contain reinforcing and should consist of a relatively weak mix capable of breaking under frost pressure. This type of footing allows for resettlement as the frost dissipates. Concrete leveling pads, however, do not allow for minor adjustments to elevation or pitch once the concrete cures so it is important to take extra care to keep the pad level and any stepups at their proper height to avoid difficulty in maintaining height tolerances.

Depending on the type of material used for the leveling pad, and how level the pad is to start with, base course leveling may be easier if the leveling pad is topped with up to 1 cm of clean sand or loose base course material. This increases the ability of the installer to make adjustments to block elevation, maintain a positive wall batter and minimize rotation during soil compaction when large compaction equipment is used.

Base Course Installation

The first (base) course of a ReCon wall requires the use of a **Base Block**. This block does not have a groove along the bottom, which makes for easier leveling and provides greater frictional resistance at the interface between the leveling pad and ReCon Walls base block.

ReCon Walls should generally be built starting at the lowest elevation along the wall. However, if there are corners and/or abutting structures along the wall profile, these locations may be better places to start construction.

As base blocks are laid, ensure that they are in full contact with the leveling pad and check to confirm that the blocks are level both front-to-back and left-to-right. Lay blocks end-to-end and avoid gaps between blocks. The use of a string line will help ensure proper wall alignment along straight sections of the wall. Curved base course locations can be established by using the grade stakes and a can of spray paint around the wall radius point.

Extra care should be considered for base course step-ups. Be sure to account for the 2,5 cm setback when establishing the next course location. If using granular material, the wedge of leveling pad material below the overlapping block must be properly compacted using a hand tamper or vibrating plate compactor. Concrete step-ups should be checked for consistent elevation from one course to the next.

After the base blocks have been placed and before compacting the backfill material behind the wall, compaction to the specified embedment depth should be done in front of the wall.



Backfilling and Compaction

When all the blocks comprising a section of wall at a single elevation have been placed, aligned and leveled, fill the peshaped voids between the blocks with a clean crushed rock material at least 1 cm to 2 cm in size. Use this same material behind the back of the block to a depth of at least 30 cm or as otherwise indicated in the final engineering drawings. Because this material is generally selfcompacting, this rock zone reduces the need for installers to operate compaction equipment close to the back of the blocks. In addition, this material can serve as a drainage column behind the block.

At times, a **filter fabric** may be specified behind the drainage aggregate material. This helps keep the drainage zone clean and free from sedimentation. If present, wrap the fabric forward over the drainage aggregate as the other backfill material is placed.



When **drain tile** is used (see illustration next page), it should be located as shown in the plans or drawings. Generally, the drain tile runs along the back of the wall and is located near the bottom of the drainage aggregate zone. Drain tile should be installed at an elevation at or slightly above the finished grade level at the front of the wall, unless otherwise specified. Drain tile should daylight through the face of the wall at least every 1524 cm along the length as well as at every low point in the wall, unless otherwise specified.

Place the specified backfill material and thoroughly compact the material in 20 cm lifts. Backfill material should be compacted to minimum 95% of standard proctor density. **Improper or inadequate compaction is a primary source of contractorcaused wall settlement and failures.** Close attention should be paid to changes in consistency and moisture content of all backfill material. Depending on the backfill type, it is important to use the proper type of compaction equipment. For sandy or gravelly materials, it is typical to use plate compaction equipment. Clayey materials generally require kneading by using a handoperated jumping jack or sheep's foot roller. Only handoperated compaction equipment shall be used within 91 cm of the back of the ReCon Walls blocks. Large, heavy compaction equipment should be kept a minimum of 152 cm from the back of the ReCon Walls blocks to avoid wall rotation.

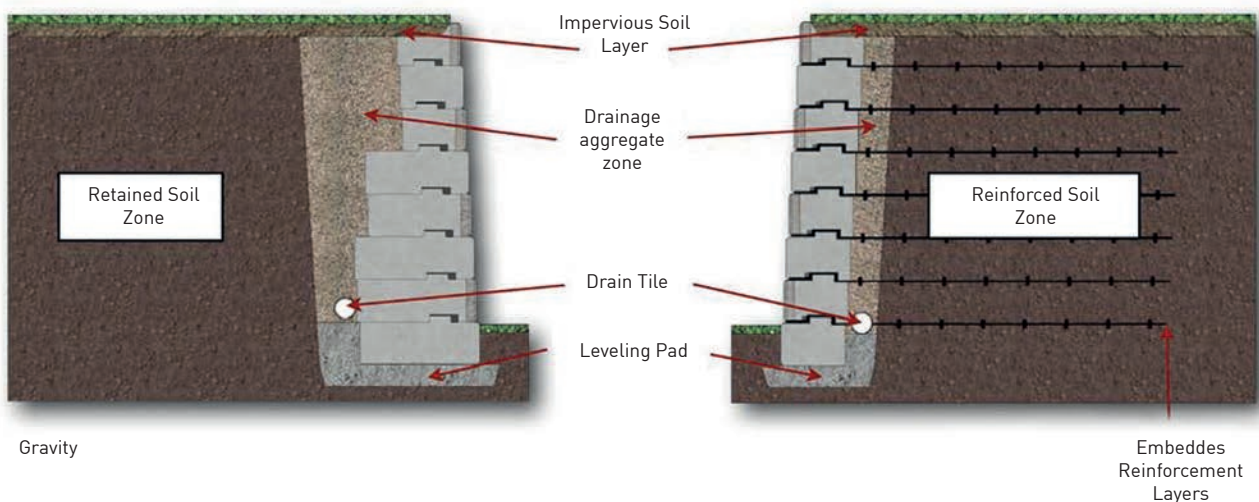
Placing Additional Courses

Prior to placing successive courses, remove and keep clean any backfill material from the top of the ReCon blocks and make sure that all voids are filled with the proper drainage material. A handoperated or backpack leaf blower makes quick work of this task. Place the next course in a running bond pattern or as otherwise shown on the engineer's detailed wall elevation. Set the upper block and **slide it forward to engage the groove with the tongue on the block below**. Check and adjust level at every course elevation.

If shimming is required, plastic shims with high compressive strength should be used. Cover as much of the low sur-face area as possible to achieve the desired result and to minimize any point loading.



Placing drain tile

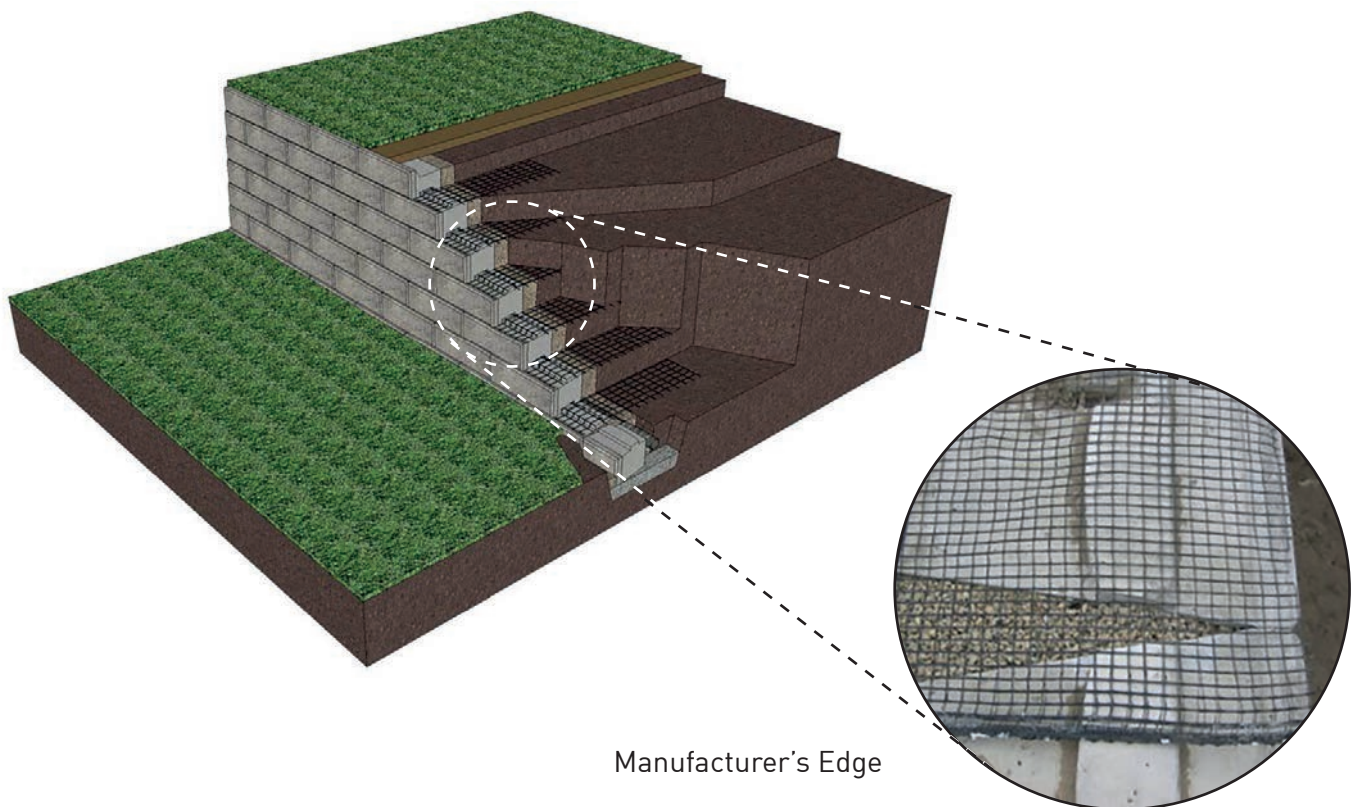


“ Geogrid Placement

Required geosynthetic reinforcement

When a geosynthetic reinforcement (geogrid) is required, use only the type(s) specified. Also, make sure the reinforcement is cut to the proper lengths as indicated on the final engineered plan. Most geogrid types are uniaxial (stronger in one direction) and **must be laid with the manufacturer's edge perpendicular to the wall face.**

Check the manufacturer's data to insure proper orientation. The geogrid should be laid on the top of the block as near to the front face as possible and extend back over a compacted, level backfill to the length required. Sandwich the reinforcement under the next course of ReCon Walls blocks to anchor in place. Pull the tail (loose end) of the grid taut to remove slack or wrinkles. Stake the tail of the geogrid prior to placing backfill material to maintain tension. When placing backfill over a layer of geogrid, start just behind the drainage aggregate and fill toward the tail of the geogrid. Avoid operating backfill equipment directly on the tensioned geogrid as much as possible. A minimum of 15 cm of backfill should be placed over the grid before driving any equipment on top of the grids. Avoid sharp turning and sudden braking with all types of equipment to avoid displacing, wrinkling or damaging the geogrid reinforcement.

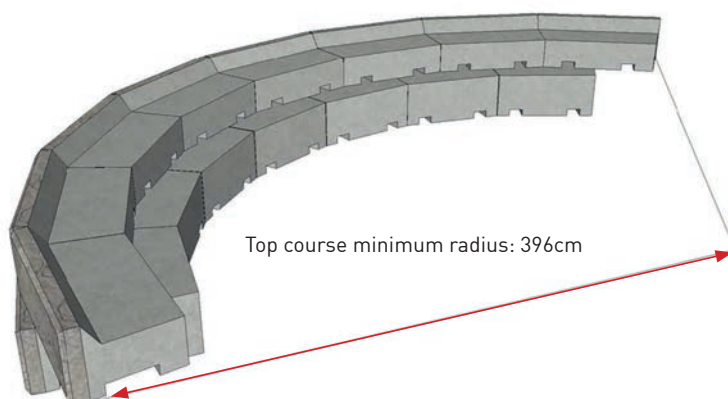
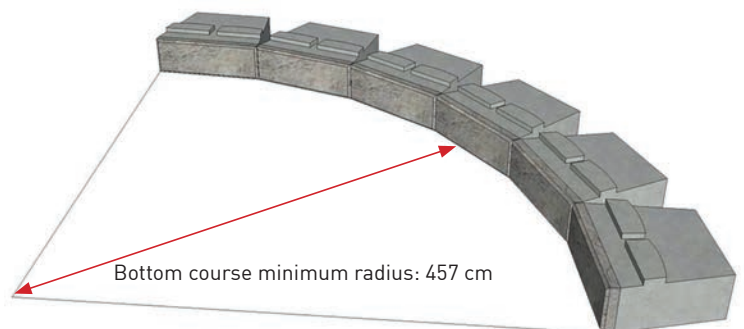


Curved Walls

The absolute minimum turning radius for ReCon Walls blocks is a little over 396 cm. Due to the integral setback of the blocks, the actual minimum radius grows or shrinks by approximately 5 cm for each additional course depending on whether it is an inside or outside curve. For ease of installation, it is recommended that the radius, of a multiple course wall, be no less than about 457 cm at the bottom of an inside radius or top of an outside radius wall. From this starting point, you should add approximately 5 cm for each additional course on a curved wall.

Because ReCon Walls blocks have a fixed length and a builtin setback, walls constructed along radiuses will tend to run offbond over long curves and as the height of the wall increases. For wall integrity, it is recommended that whenever a point is reached where there is less than 1/3 of an upper block bearing on the block below, a partial block (created by cutting a fitting block) should be inserted into the wall to return the bond to normal. For aesthetic purposes, it is recommended that you stagger any partial blocks placed so they don't all occur in the same section along the length of the wall face.

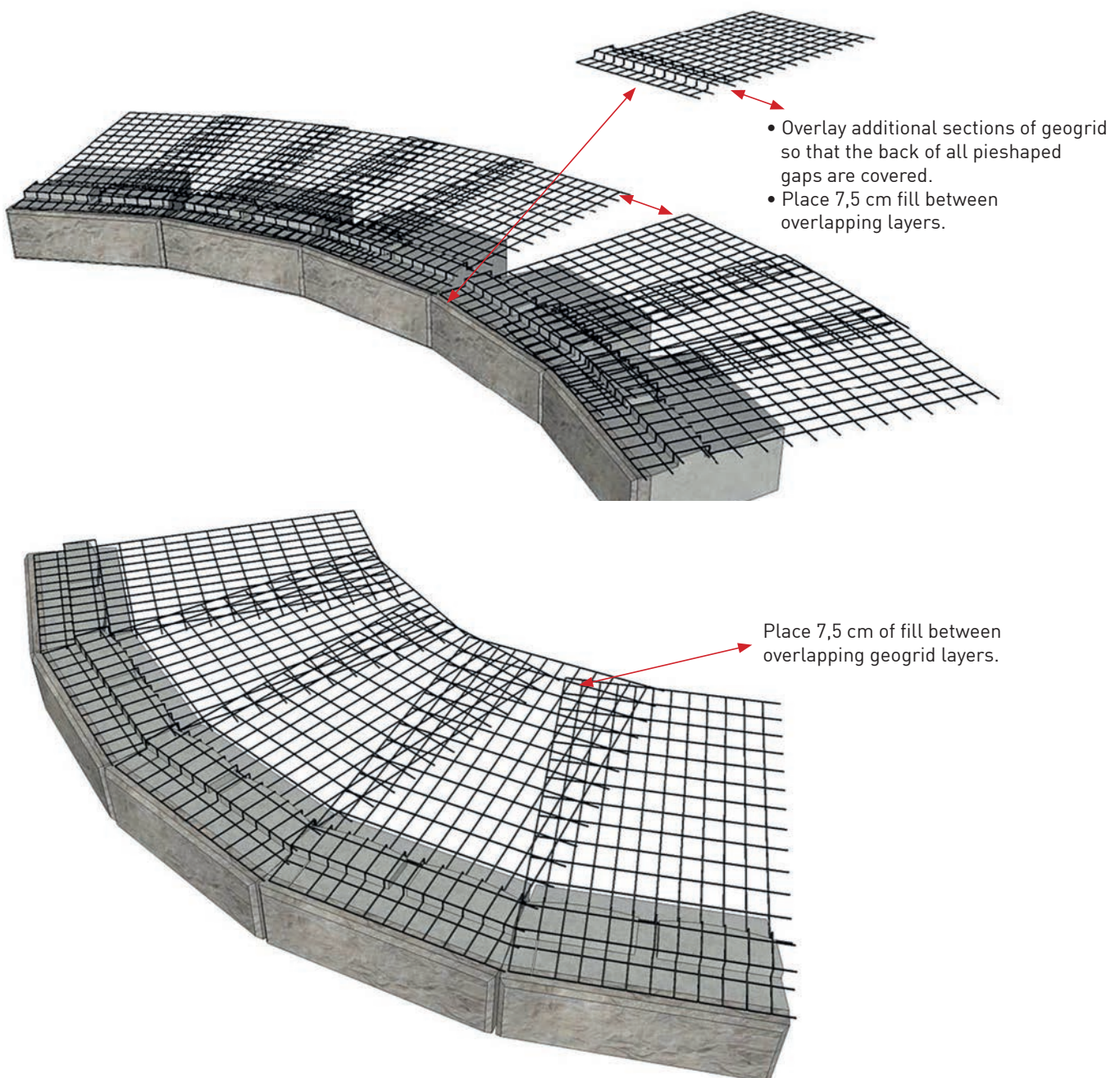
Inside Curve Minimum Radius		
Wall Height (cm)	Number of courses	Top Row (cm) Min. radius
81	2	462
121	3	467
162	4	472
203	5	477
244	6	482
284	7	487
325	8	492
366	9	497



Inside Curve Minimum Radius		
Wall Height (cm)	Number of courses	Top Row (cm) Min. radius
81	2	426
121	3	441
162	4	457
203	5	472
244	6	487
284	7	502
325	8	518
366	9	533

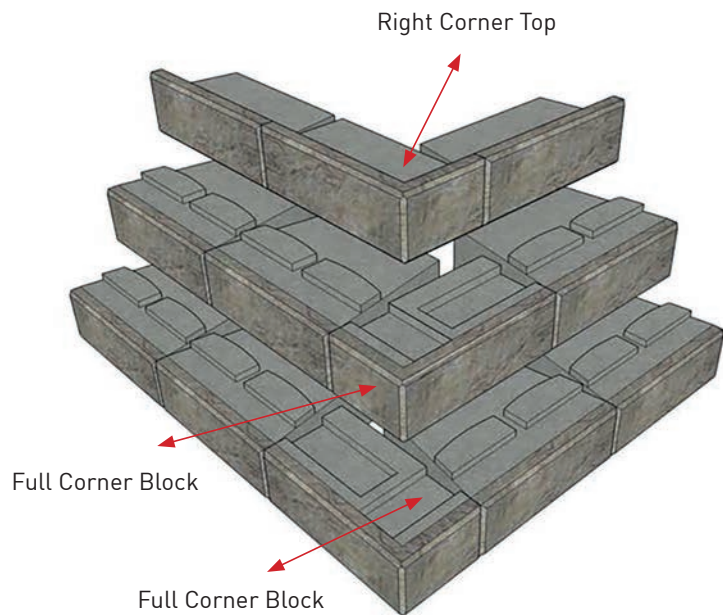
Geogrid Placement on Curved Walls

Most accepted design methodologies stipulate that the reinforcement shall be continuous along the length of the wall at both the front and rear of the reinforced soil zone. Geogrid layers should not overlap unless there is at least 7,5 cm of compacted soil separating the individual layers. In addition, the natural rectangular sections of geogrid should never be cut to form a wedge shape. Rectangular reinforcement sections will naturally overlap in a pieshaped fashion at either the front or the back of the reinforced zone depending on whether it is an inside or outside curve. The figures show how reinforcement is laid out in this situation. All the pieshaped overlap areas should be separated by at least 7,5 cm of backfill.



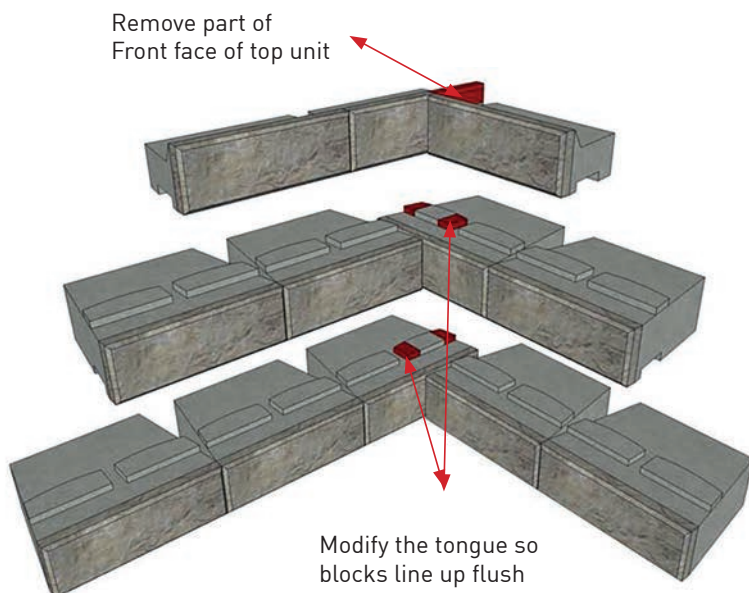
Outside 90-degree Corners

When building a wall with an outside 90-degree corner, it is recommended that construction start at the corner and work away from this point in both directions. Unless one of the walls going away from the 90-degree corner runs into another corner or abutment, no block should need to be cut. One standard corner block will be used at the corner on each course, alternating the long and short returns. The corner blocks should be glued at the corner where they overlap with a high quality, exterior grade concrete adhesive and extra drainage stone placed in the corner (Refer to ReCon Walls Typical Construction Drawings for additional information).



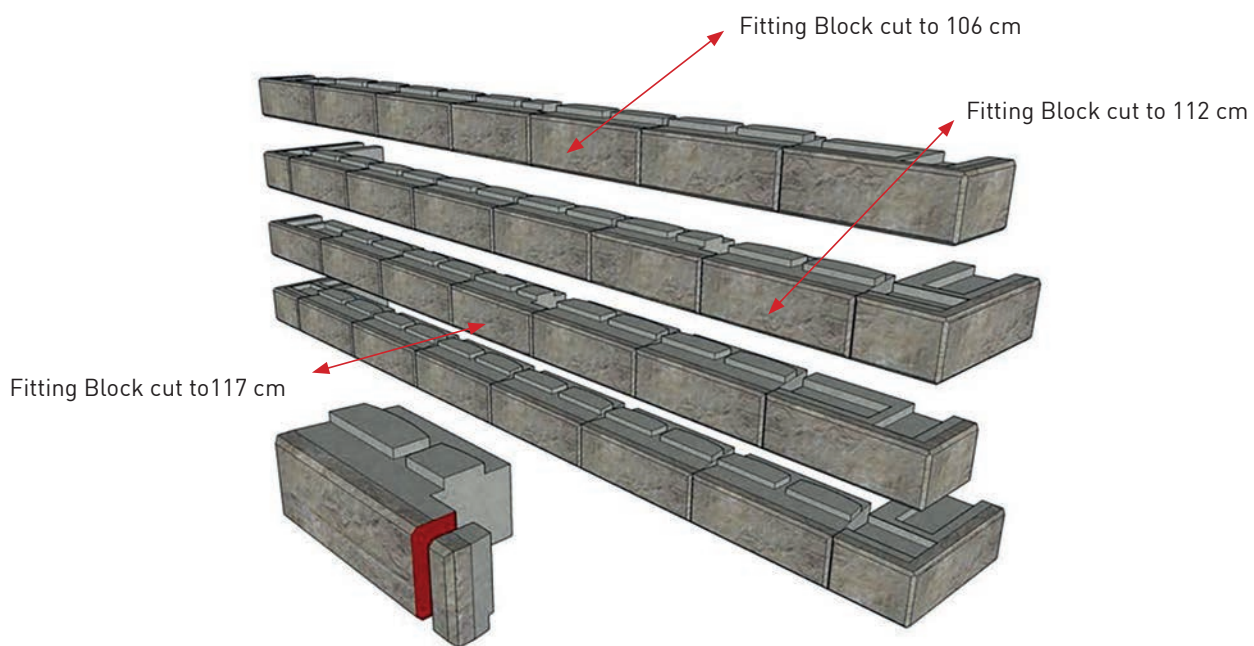
Inside 90-degree Corners

When building a wall with an inside 90-degree corner, it is recommended that once the base row is laid to the location of the inside corner, subsequent courses should begin at the corner and be laid outward from there. This aids with the alignment of blocks at the corner, given the 2,54 cm setback that will occur with each additional course of block. On taller walls, the running bond joint will tend to slide off center by 5 cm for every other course of block placed but this does not affect the integrity of the wall. In the corner, a portion of the tongue on one block will need to be removed as shown below. It is preferable to use a retaining wall block with a portion of the tongue removed in lieu of a corner block (especially for taller gravity walls). The use of the retaining wall block in the corner provides full engineered depth of the block at the corner. If a corner block is used, then the blocks must be glued where they overlap.



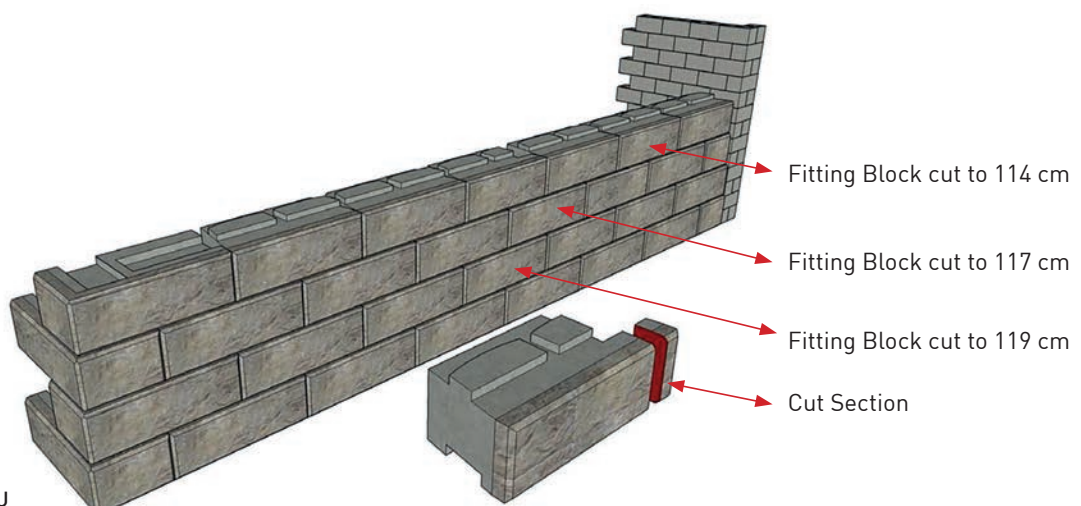
Double Outside 90-degree Corners

When building a wall with a section that is terminated on each end with an outside 90-degree corner, start by placing the corners in their proper location and elevation. Because the wall will narrow by 5 cm (on a 3.6-degree battered wall) for each successive course, a partial block must be cut to fit somewhere along the length of the wall. Use a ReCon Walls fitting block to create this partial block, thus making the cutting procedure easier. For aesthetic purposes, it is recommended that you locate these partial blocks at varying locations along the length of the wall.



Outside 90-degree Corner to Abutment

At times, a ReCon wall may start against an abutment, such as a garage or walkout basement. Often the other end of the wall will turn with a 90-degree corner. When such a wall is built with the normal setback, each successive course will be 2,5 cm shorter in length than the course below. The simplest way to build this wall is to use the ReCon Walls fitting block and cut the fitting end so that the block will fit into the space left after the rest of the blocks on that course have been laid.

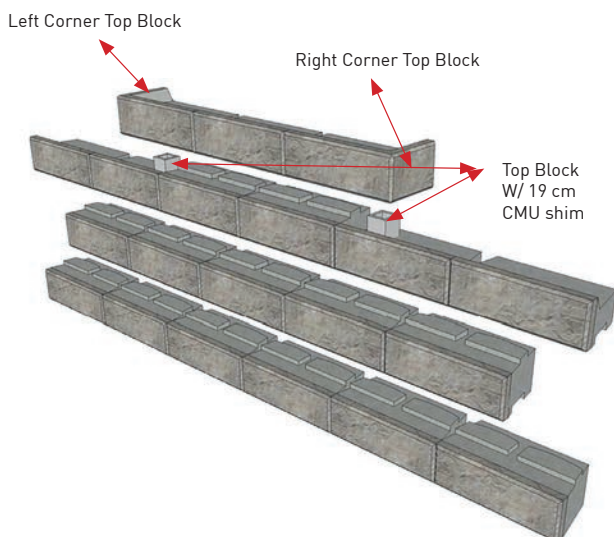


Top of Wall Treatments

There are several options when finishing the top of a ReCon retaining wall including the use of top blocks, caps, and fullhigh caps. Other treatments are available and typically involve special construction, such as forming and pouring a concrete parapet or attaching specialty, precast components.

Top Blocks, standard placement.

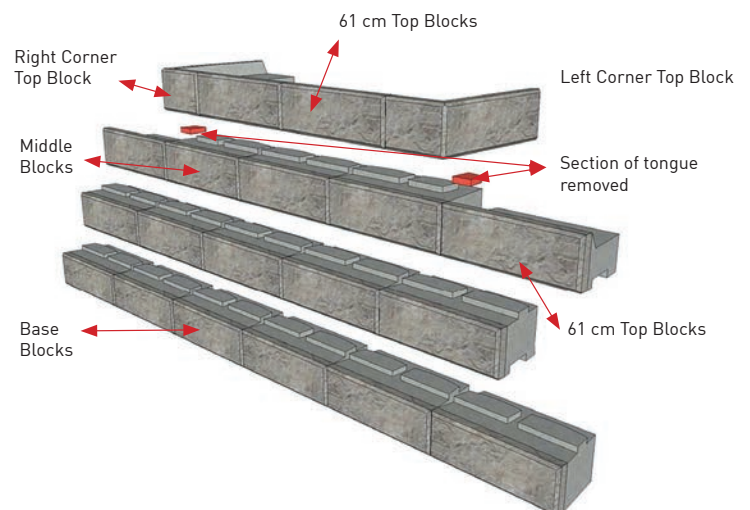
Using the ReCon Walls top blocks to finish off a wall allows for the ability to fill blocks with a landscape rock or plant material to within 10 cm of the wall face. When stepping up or down at the top of a wall using top blocks, a corner top block is used to make this transition. A corner top block can be laid with either the 60 cm or 120 cm face as the return side. Usually the wall layout elevation plan, prepared by the design engineer, will indicate the proper block location or type. In the absence of such a plan, the left and right corner top blocks designate which side the 60 cm return dimension is located as you face the finished wall. This is referred to as **standard placement**.



Top Blocks, alternate placement

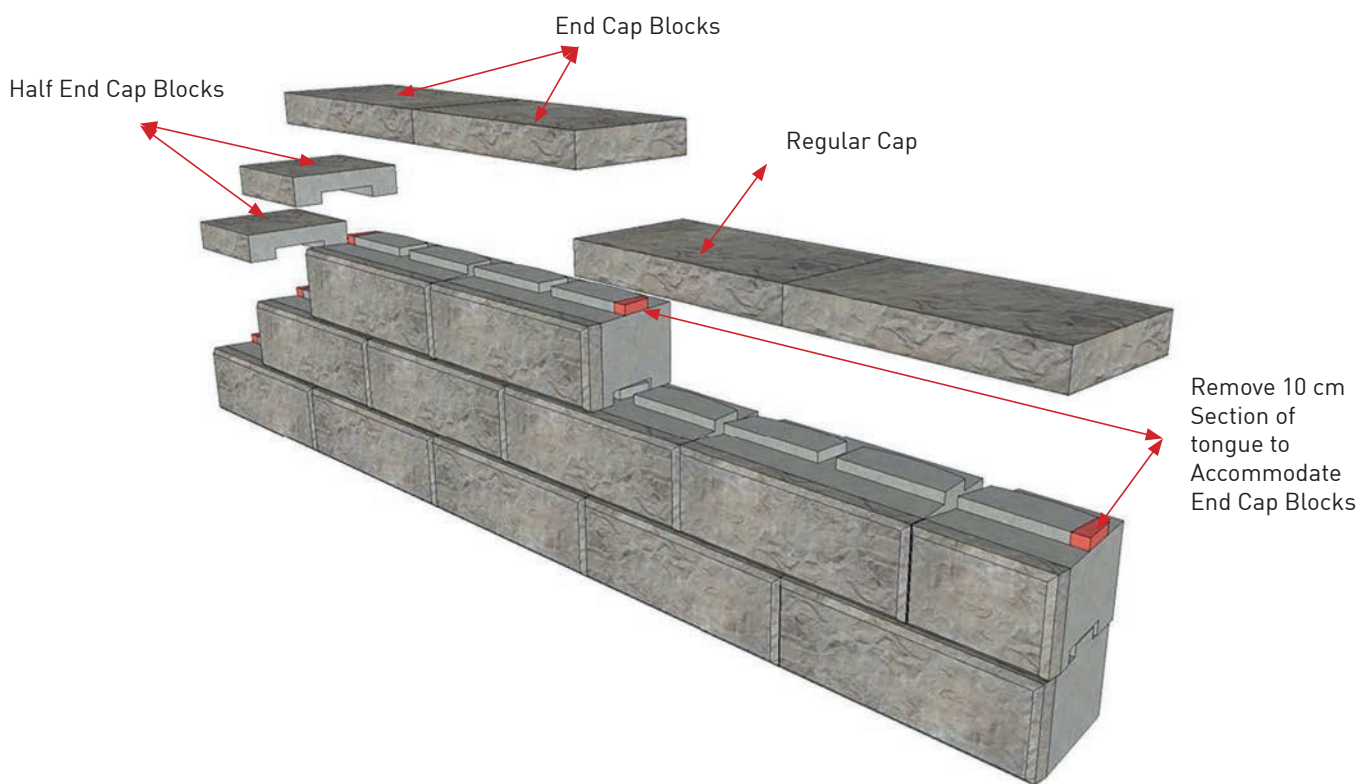
When the standard placement (120cm face, 60 cm return) is used, it will be necessary for block stability to add a concrete shim beneath the portion of the corner top block that bears over the top block below. This shim is usually made or cut, if necessary, from a standard concrete masonry block (CMU). Gluing this shim in place will resist movement during the backfilling process. If it is desired that the 120 cm face returns into the retained soil, then a left corner top block will return (with respect to the wall face) on its right side and visa-versa for a right corner top block. This is referred to as alternate placement as shown in the figure on the next page.

When alternate placement is used, it will not be necessary to shim beneath the corner top blocks. In this scenario, the block will be resting entirely on half of a full block below. For the corner top block to lay flat and level, approximately 18 cm of the tongue on the lower block must be removed as shown in the figure.



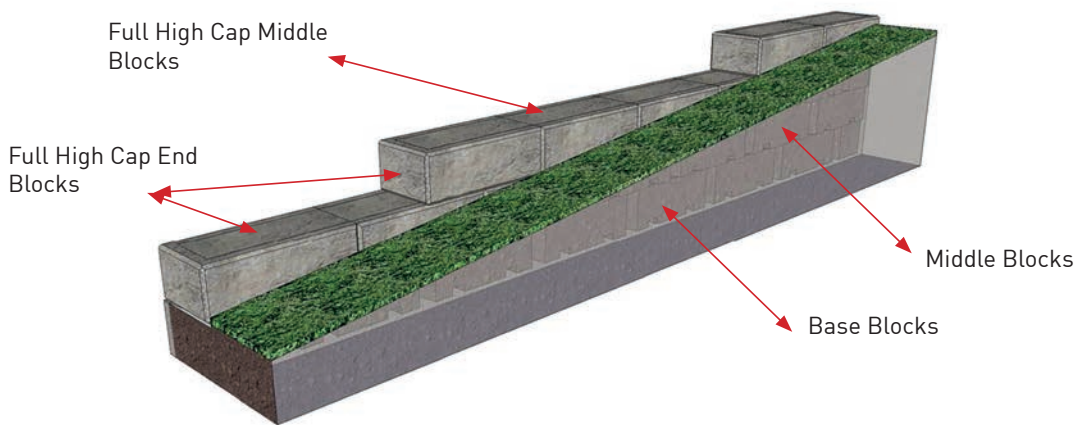
Cap Blocks

ReCon Walls Cap Blocks are rectangular and are available in two types, a regular cap that has a groove along the entire bottom of the block and an end cap where the groove terminates 10 cm short of the end to provide a finished end appearance. These caps are placed with a scissor clamp and are intended primarily for straight walls. If cap blocks are to be used atop curved wall sections they will need to be cut to provide a continuous finished appearance. Additional installation time must be considered when cutting cap blocks around a radius.

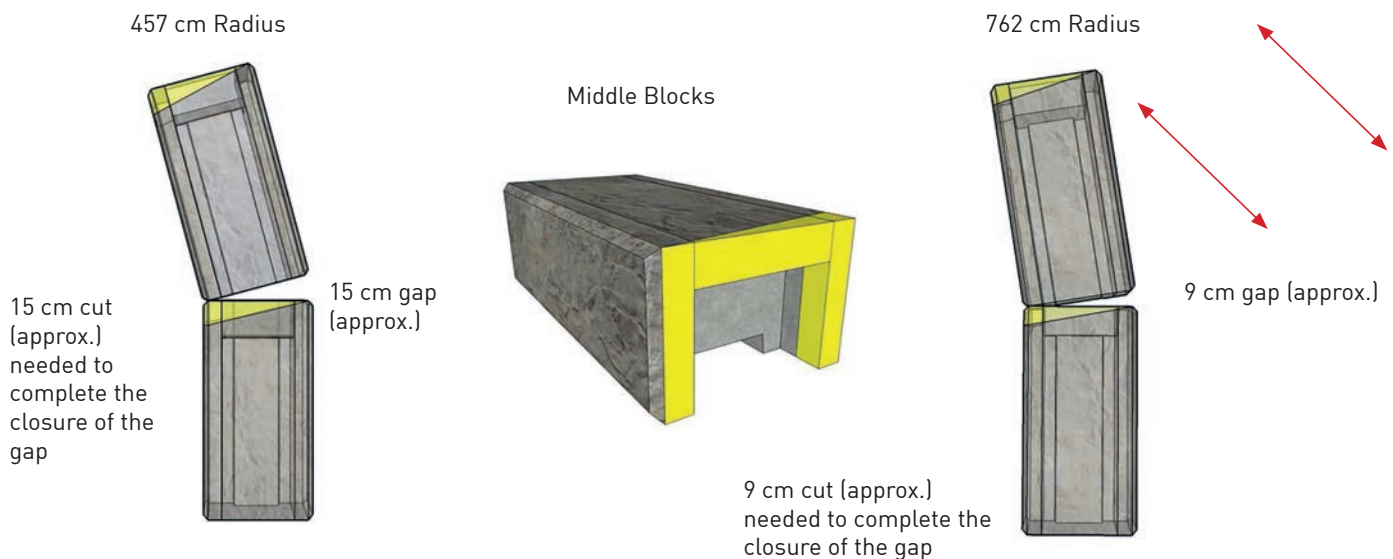


Full-High Cap Blocks Back Side of Wall

ReCon Walls Full-High Cap Blocks can be used when freeboard, above the top of wall finished grade, is required. This solution can be useful when the wall involves numerous stepups at the top of the finished wall and a finished appearance is desired for all exposed block above grade.



The top of a ReCon retaining wall or freestanding wall can be finished using the ReCon Walls Full High Cap (41 cm high). When the wall is curved, miter cutting will be required to eliminate the opening that will form between the blocks. Cutting the ReCon Walls Full High Cap can require substantial effort since it is a solid piece of concrete, 61 cm thick and 41 cm in height. To reduce the time and energy required to complete this cut, ReCon Walls offers a Full High Cap Middle Fitting Block. This block is precast with a recess on one end of the block that is 15 cm deep and leaves about 10 cm of concrete along the top and sides of the block. Thus, the time required to cut this thinner section is significantly reduced when using a standard 36 cm concrete chop saw.



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