



Keystone® Wall Collection



AND INSTALLATION GUIDE



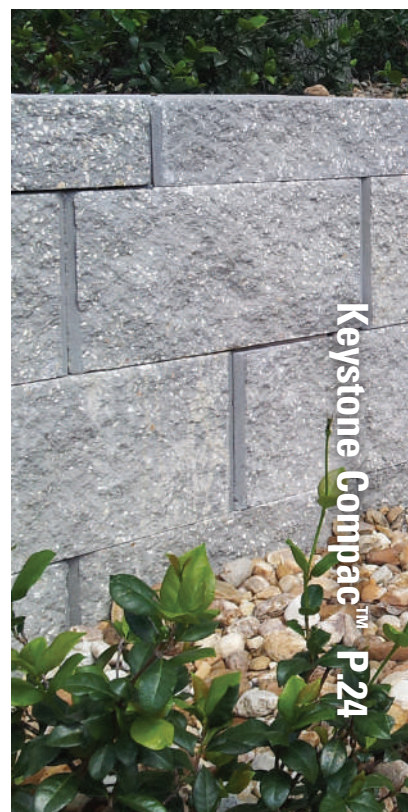
There's Only One Keystone®.

And in Florida, There's Only One Source. Tremron Group.

Tremron Group is Florida's exclusive licensed manufacturer of Keystone's Stonegate, Country Manor, Palazzo and Compac wall systems. Tremron's line of Keystone retaining wall products offer architects, installers, contractors and homeowners, an unsurpassed natural beauty and design flexibility. In addition, Keystone walls are preferred for their ease of installation and extremely low maintenance.

Easy selection. Easy ordering. Easy delivery. That's the promise of the Tremron team. With the most extensive manufactured product line in the Southeast, we are a ***complete solution for your hardscape needs*** – from pavers and natural stone to erosion control and now the one-of-a-kind Keystone retaining wall products.

The best products. The best selection. The best choice.







Keystone Stonegate® - Sierra

Retaining Wall Solutions



Keystone retaining wall block can be used to create everything from large structural retaining walls to dream outdoor living spaces. With colors and textures to complement any project - Keystone products and services offer the best site solutions for governmental, commercial/industrial, recreational, public works and residential applications.





Keystone Country Manor® - Sierra

Successful designers and contractors embrace the Old World grace, and design flexibility of Keystone Country Manor. Keystone Country Manor combines the appearance of rustic, hand-laid stone walls with the strength and ease of installation provided by the latest in dry-stacked, modular, pin-connected technology.



6"h x 16"/14"w x 10"d
60 lbs.



6"h x 6"/4"w x 10"d
25 lbs.



CAP UNIT
3"h x 10"/12"w x 11"d
27 lbs.



Alignment Pins*

*Keystone alignment pins improve the durability of a project and simplify the creation of near-vertical and setback walls.



Shade variation is inherent in all-natural materials. Colors may vary depending upon manufacturing location. Individual product measurements given are rounded. Contact your Tremron Group Sales Representative or visit our website for exact dimensions.

Available colors:



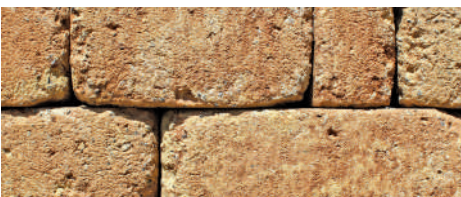
AUTUMN BLEND



GRANITE



OAK RUN



SAND DUNE



SANTA FE



SIERRA



Keystone Stonegate® - Sierra

Keystone Stonegate combines a smooth, weathered stone face with a rustic tumbled finish, reminiscent of walls found throughout the countryside of Europe. Stonegate retains all of the design flexibility and features of the original Country Manor, but delivers them with a more refined look.



6"h x 6"/4"w x 10"d
25 lbs.



6"h x 12"/10"w x 10"d
40 lbs.



6"h x 16"/14"w x 10"d
60 lbs.



Universal Cap
2 3/4"h x 10"w x 12"d
22 lbs.



Alignment Pins*

*Keystone alignment pins improve the durability of a project and simplify the creation of near-vertical and setback walls.



Shade variation is inherent in all-natural materials. Colors may vary depending upon manufacturing location. Individual product measurements given are rounded. Contact your Tremron Group Sales Representative or visit our website for exact dimensions.

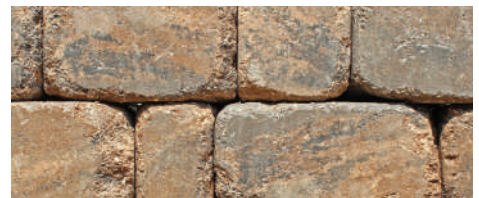
Available colors:



AUTUMN BLEND



GRANITE



OAK RUN



SAND DUNE



SANTA FE



SIERRA



Keystone Stonegate® - Autumn Blend

Fire Pits • Fireplaces • Kitchens • Columns • Benches • Mailboxes • Step-by-Step Designs

With the Country Manor & Stonegate wall systems, outdoor living options are almost endless. Providing unsurpassed design flexibility, outdoor living environments can be built at once, or as time and budget allow. Use one, or multiple, Country Manor/Stonegate step-by-step projects, to take an outdoor space from ordinary, to extraordinary.



Keystone Stonegate® - Sierra



Keystone Stonegate® - Sierra



Keystone Stonegate® - Sierra



Keystone Stonegate® - Sierra



Keystone Stonegate® - Oak Run



Keystone Stonegate® - Sierra



Keystone Stonegate® - Oak Run



Mobile App.



Web Site

For additional inspiration and step-by-step project designs,
visit us at www.tremron.com.



Keystone Stonegate® - Sierra

Features & Benefits

Three Face Dimensions

- Provides the greatest degree of random layout due to variations from unit side dimensions.
- Each unit has three side dimensions.

Colors

- Produced in color blends that enhance the natural stone-like appearance.

Three Textured Sides on Each Unit

- Weathered or antiqued finish creates a more natural stone look to the units.
- Permits each unit to be used in multiple positions within the wall.
- Each unit can be used as an exposed end unit or a 90° corner unit.
- Allows construction of small freestanding walls, parapet walls, pilasters, columns and outdoor living environments, in addition to retaining walls.

Shape

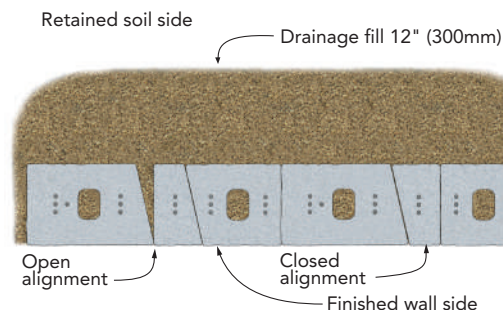
- Each unit has a 90° angle and a tapered (angled) side, allowing the units to be used in 90° corners, tight fitting straight line walls, and radii at curves.

Stonegate Units are Packaged in Sets

- Eliminates the need for the contractor to pull from multiple pallets to maintain random appearance.
- Provides for a simple method of construction and a random appearance to the wall system.
- Improved color consistency throughout finished wall.

High Strength Alignment Pins

- Multiple pin positions allow for near vertical, 9.5° batter (setback), and the opportunity to randomly pull a unit forward to accent the wall.



Pattern & Appearance

"Rule of Thumb" for bond pattern between courses for Stonegate system: Construct the wall using the units as they come off each shipping pallet. Randomly utilize the various unit shapes trying to avoid a repetition of same unit size frequency along a horizontal line (some unit repetition is unavoidable).

Avoid stack bonding of unit joints (vertical joint line between adjoining units) for more than two courses vertically.

If some units seem to have a blemish or too much texturing in a specific area, orient them so the blemish faces the soil side of the wall to hide imperfections or use these units along the wall base.

Embedment

Unit embedment below the grade line shall be a minimum of one unit buried, under all conditions, along with a general provision of H/20 (wall height divided by 20) for total wall embedment of taller walls. Note H=total height of wall from top of base leveling pad to top of wall.

Consult a qualified engineer for sloping grade conditions in front of wall or steep slopes and surcharge loads on top of wall.

Deeper embedment may be required in areas prone to surface scouring where base erosion is possible, or in areas where freestanding walls are desired and frost depths require deeper foundations.



Closed end of receiving channel

The closed channel end at the unit bottom allows for finished end aesthetics on 90° corners, pilasters and wall end conditions. As required for pin interlock, remove the solid closed end of the receiving channel. Remove only if pin from unit below strikes this area.

The receiving channel on the bottom surface of each unit connects over the pins from the course below. Walls can be built with positive mechanical connection in 90° corners, curves and straight wall geometry without loss of connection or strength.

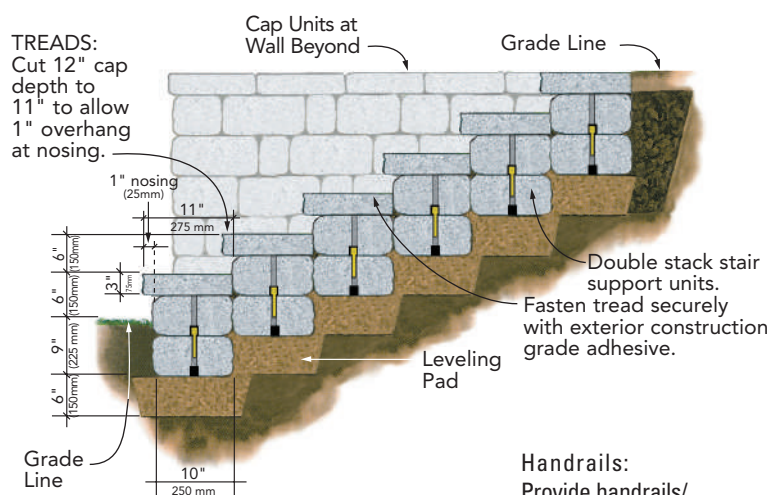


Keystone Stonegate® - Sierra

Step Designs

Keystone Country Manor and Stonegate can be used on your step/stair projects with the following considerations:

- Provide the same material at the step foundation as used on the Country Manor/Stonegate wall leveling pad.
- Compact leveling pad material to a minimum 95% Standard Proctor.
- Double stack the base support units to create a foundation for the stair "tread" units.
- Use pins and exterior construction grade adhesive as required for a unified step assembly.



Handrails:
Provide handrails/
railings as per local
building code.

Freestanding Wall Applications

When considering freestanding wall conditions of any height, the designer must consider the requirements of geometry and internal reinforcing to resist overturning and seismic forces (where applicable). Reinforced footings/ foundation depth must be considered to provide support and bearing as applied to soil and frost conditions. Due to the variable nature of each site situation, a qualified engineer should be consulted for appropriate design in accordance with local building codes.

The design details shown on the next few pages are for concept representation only and are not intended to represent final design. Consult a qualified engineer for specific design considerations.

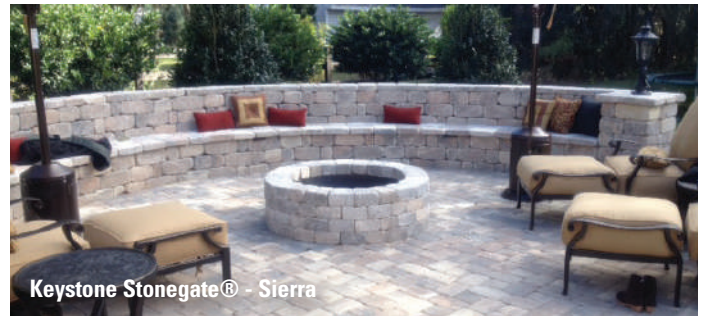


Mobile App.

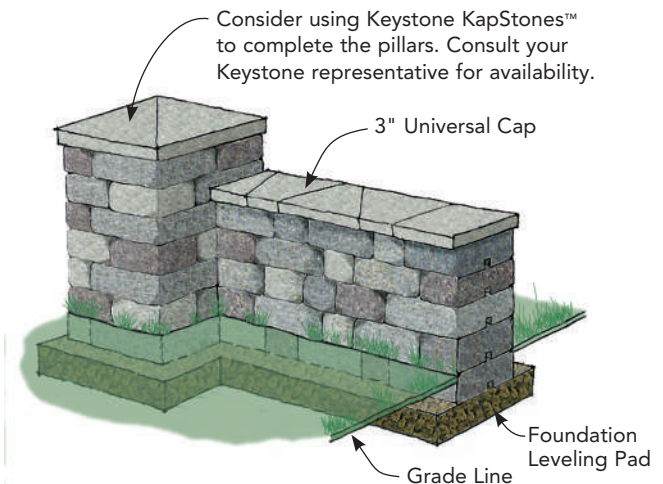


Web Site

Need additional inspiration?
Visit us at www.tremron.com.



Keystone Stonegate® - Sierra



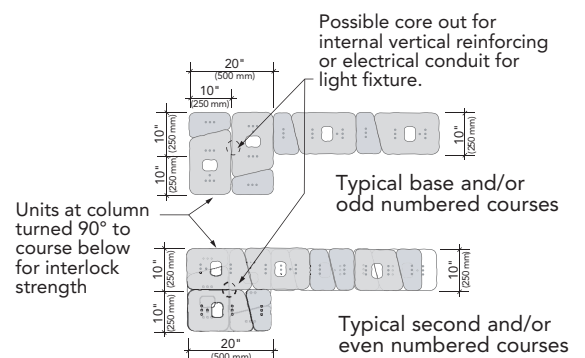
Keystone Country Manor® - Granite



Keystone Country Manor® - Granite

COLUMN CORNER

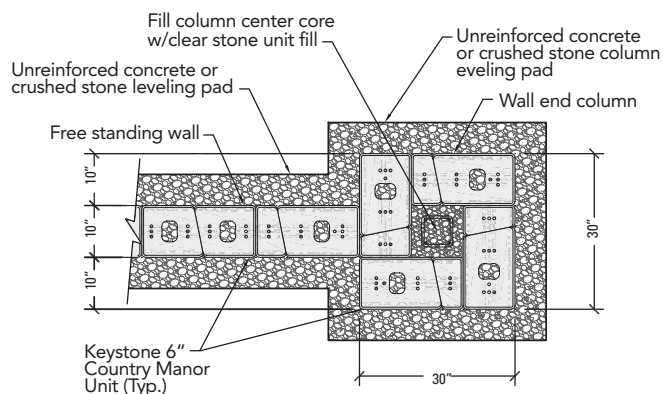
A typical column corner utilizes a 20"x 20" column geometry to develop an integrated pier at the end of a running wall. This detail offers visual aesthetic interest as well as provides strength at the end of the freestanding wall.



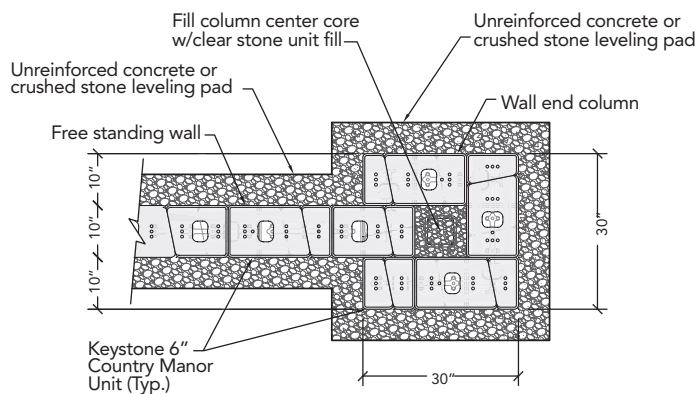


Wall End Column

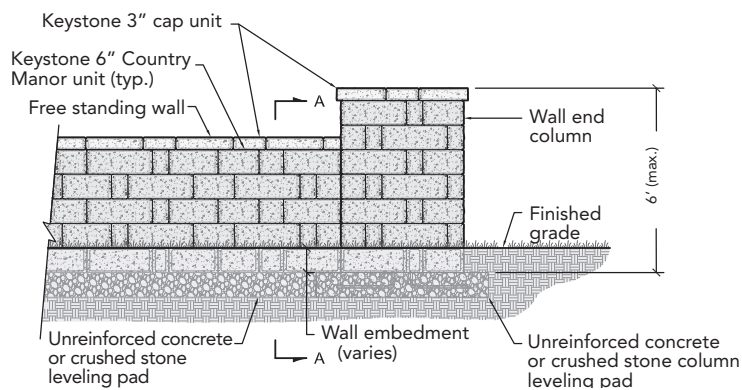
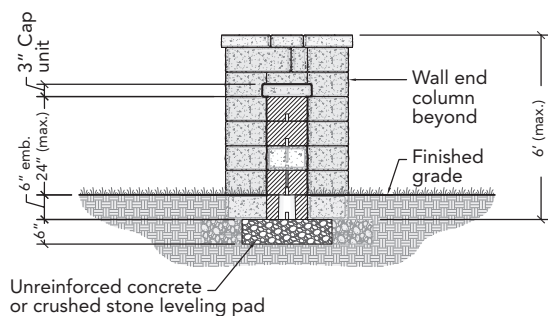
The wall end column is a larger version of the "Column Corner" detail. The benefit of this design option is the development of internal reinforcement to provide for greater strength and height, along with a larger footprint dimension for aesthetic purposes.



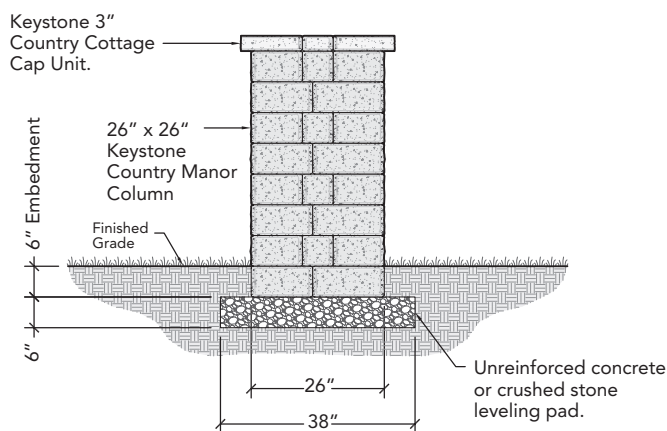
Typical base and/or odd numbered courses



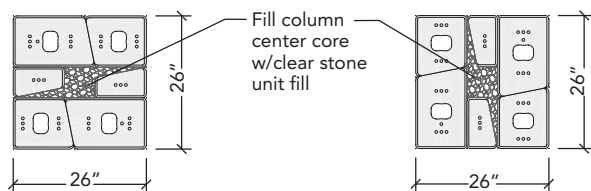
Typical second and/or even numbered courses



Stonegate: 26" Column



Front Elevation View



Typical base and/or odd numbered courses

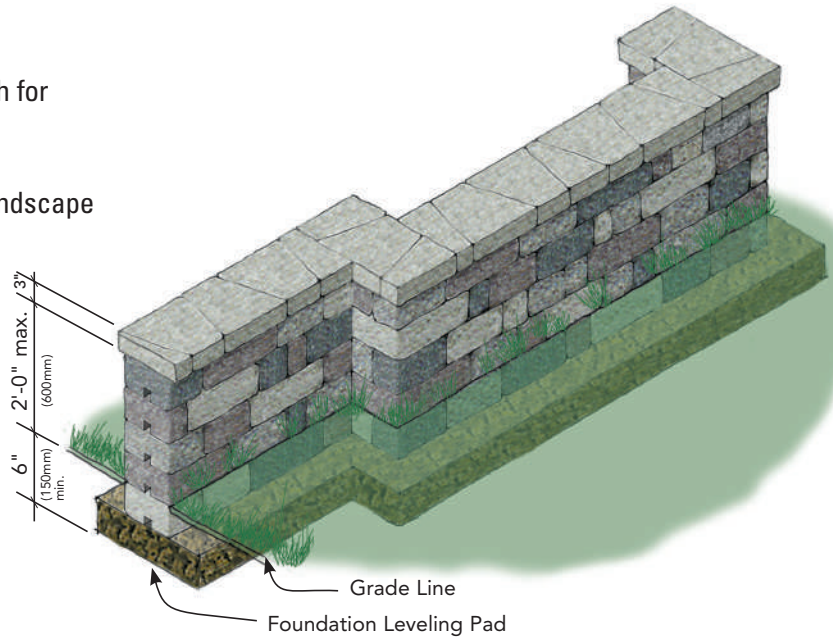
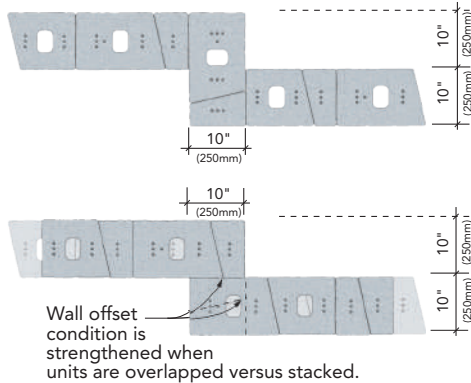
Typical second and/or even numbered courses

COLUMN OPTIONS

- Landscape lighting/entry
- Planter with flowers or ornamentals
- Yard figurine/sculpture
- Mailbox
- Street address monument

Wall Offset

- Wider wall geometry (footprint) provides greater strength for parapet walls to resist overturning.
- Offsets allow for graceful changes in wall direction.
- Offsets are an opportunity for aesthetic geometry and landscape feature areas.



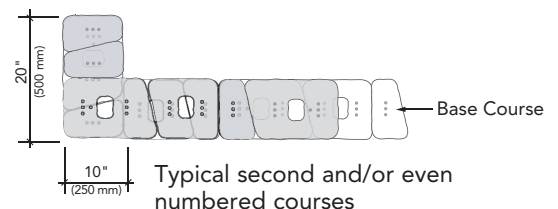
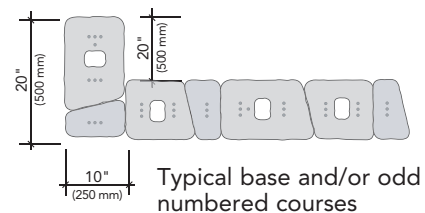
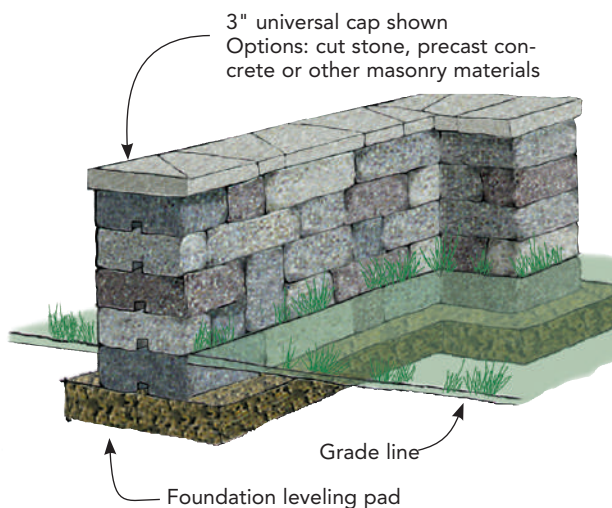
Notes

- The minimum offset for two parallel walls, as shown in the details on this page, is 10". Continuous offsets at maximum 10'-0" O.C. will provide strength at parapet walls in coordination with exterior construction grade adhesive and/or vertical reinforcement as required by engineer.
- It is important to use overlapping unit combinations at the offset location where two units combined together equal 20" in length (see plan geometry on the right).
- Details showing freestanding wall applications show partial sections of walls. The unfinished ends, with channel openings visible, are not meant to portray a finished condition.



"L" Return End

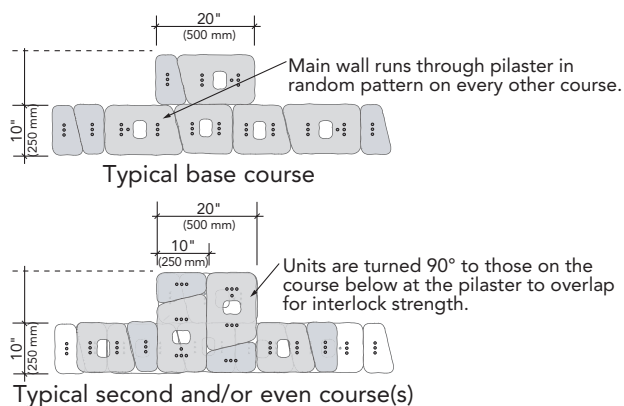
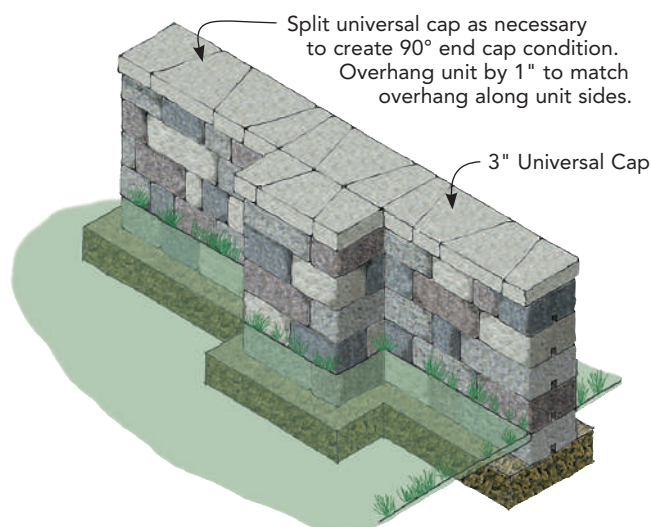
Similar to column corners, this detail offers stability and strength to resist overturning forces at the end of a freestanding wall.





Pilaster Detail

The pilaster detail creates a deeper wall section within the wall which can provide stability for a retaining structure, freestanding wall or parapet.

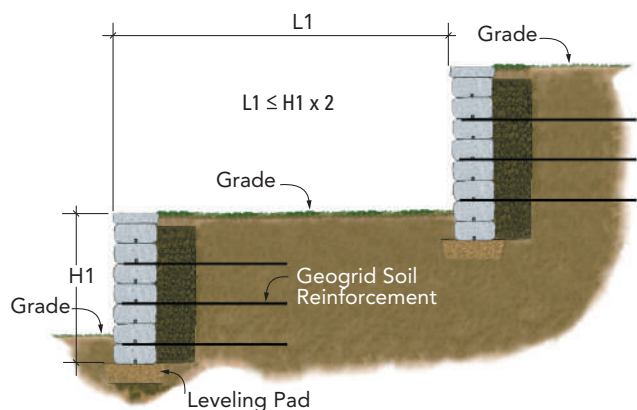


Terraces

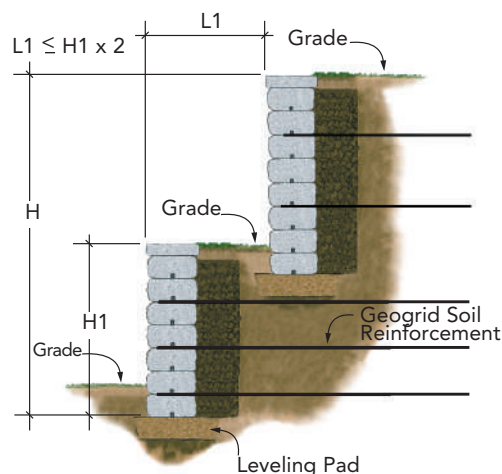
Terraces are a pleasing way to build a taller retaining wall where aesthetics dictate the separation of walls to reduce the wall height and large mass appearance. Closely spaced terraces need to be reviewed by a qualified engineer to avoid global instability issues and to make sure soil reinforcement (geogrids) are properly designed to handle the loads for the entire wall structure.

Terraced walls should be analyzed as a complete wall system versus individual walls unless they are spread apart greater than twice the wall height of each terrace and the soils are free draining and granular in nature.

TERRACE WALL PROXIMITY EVALUATION



For walls where $L1$ is greater than or equal to $H1 \times 2$, then the walls typically are analyzed separately. Walls built on slopes greater than or equal to 3:1 or on soft soils need to be analyzed for "global stability". Consult a qualified engineer.



For walls where $L1$ is less than or equal to $H1 \times 2$, then the walls are to be considered as a composite and the entire wall height (H) needs to be considered in the design.

Installation Steps



STEP 1: Prepare the Base Leveling Pad

Remove all surface vegetation and debris. Do not use this material as backfill. After selecting the location and length of the wall, excavate the base trench to the designed width and depth (min. 20" W x 12" D)[500mm x 300mm]. Start the leveling pad at the lowest elevation along wall alignment. Step up in 6" (150mm) increments with the base as required at elevation changes in the foundation. Level the prepared base with 6" (150mm) of well-compacted granular fill (gravel, road base, or 1/2" to 3/4" [10-20 mm] crushed stone). Compact to 95% Standard Proctor or greater. Do not use PEA GRAVEL or SAND for leveling pad.



STEP 2: Install the Base Course

Place the first course of Country Manor/Stonegate units end to end (with front corners touching) on the prepared base. The long groove (receiving channel) on the unit should be placed down and the three pin holes should face up, as shown. Make sure each unit is level - side to side and front to back. Leveling the first course is critical for accurate and acceptable results. For alignment of straight walls, use a string line aligned on the unit pin holes for accuracy. Minimum embedment of base course is 6" below grade.



STEP 3: Insert the Fiberglass Pins

Place the alignment pins into the holes of the Country Manor/Stonegate units (note: place one pin only per each grouping of three holes). Place pins in the middle hole for near vertical alignment or the holes nearest the embankment for a 9.5° ± setback per course. According to wall requirements and design, the front pin hole (towards the face of the wall) can be used randomly to allow a forward projection of a specific unit for accent and variation in the wall appearance.



STEP 4: Install Fill & Compaction

Once the pins have been installed, provide 1/2"- 3/4" (10-20mm) crushed stone drainage fill behind the units to a minimum depth of 12" (300mm). Fill open spaces between units and open cavities/cores with the same drainage material. Proceed to place backfill in maximum 6" (150mm) layers (lifts) and compact to 95% Standard Proctor with the appropriate compaction equipment. Do not use heavy ride-on compaction equipment within 3' (1m) from back of wall. Do not use jumping or ramming type compaction.



STEP 5: Install Additional Courses

Place the next course of Country Manor/Stonegate units over the alignment pins, fitting the pins into the long receiving channel recess of the units above (Note: Some removal of debris in the pin holes and channel may be necessary prior to placement). Push the Country Manor/Stonegate units toward the face of the wall until they make full contact with the pins. If pins do not connect with channel but align in open core of upper unit, place drainage fill in core to provide unit interlock with pin. For near vertical alignment, center the above unit over the center placed pins below.



STEP 6: Capping the Wall

Continue all steps until ready to place the wall cap. Clean off the last course of Country Manor/Stonegate in preparation for the cap or coping to finalize the wall. With units dry and clean, use an exterior construction grade adhesive for a mechanical bond. Install the Country Manor/Stonegate 3" (75mm) capping unit, architectural precast concrete or cut stone as a coping element. Cap may be flush or overhanging as required by aesthetics and design. Note: For taller, more critical walls, refer to geogrid soil reinforcement instructions on the following page.

Geogrid Soil Reinforcement

Taller walls or walls supporting surcharge loads require the use of geogrid reinforcement material to reinforce the soil mass directly behind the retaining wall and provide



connection to the concrete facing units. Geogrid properties and wall design require knowledge of wall heights, soil properties (Phi angle and moist unit weight), surcharge loads and manufacturer's requirements for specific geogrid types and strength capabilities. For general design of limited

height walls, refer to the "Design Charts" in the back of this brochure. For conditions beyond these basic charts, consult a qualified engineer. To install geogrid into your wall, continue the installation process with the following steps.

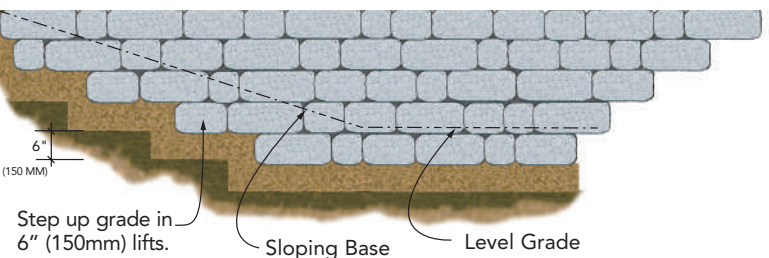
Excavate Reinforced Soil Area: Remove existing soil in the reinforced soil zone to the maximum embedment length of the geogrid design. Level and compact soil behind the wall prior to placement of each geogrid layer.

Cut Geogrid: Cut sections from the geogrid roll to the specified length (embedment length) by design charts or engineers design analysis. Check manufacturer's criteria for biaxial or uniaxial geogrids. In most cases, the correct orientation is to roll the geogrid perpendicular to the wall face.

Install Geogrid: Place geogrid over the 6" Country Manor/Stonegate alignment pins already in place. NOTE: Allow approximately 3" (75mm) of geogrid material to rest on the unit top surface ahead of the pin (from pin to face of wall). This will ensure that the next course above will be fully supported on geogrid. Place all sections of geogrid, abutting each other side-to-side as per manufacturer's instructions.

Secure Geogrid: Pull the pinned geogrid taut to eliminate loose folds. Stake or secure the back edge of geogrid before backfill and compaction. As possible, compact from back of wall area towards embankment to avoid loosening geogrid or putting compaction pressure on wall. Remove stakes, as required, once backfill is placed.

Install the next course of Keystone Country Manor/Stonegate Units: Follow steps 3-5 (on page 18) until next geogrid layer or completion of wall.



NOTE: Maintain a minimum one unit of base course buried or H/20 (see below).

Stepped Footing (Leveling Pad)

Leveling pad options:

- Crushed stone road base
- 3/8"-3/4" crushed stone
- Non-reinforced concrete (2000 psi)

Leveling pad thickness:

- 6" (150mm) ± granular materials
- 3" (75mm) ± concrete option

Always start wall at lowest elevation of site location where wall is to be constructed. Build step-ups in leveling pad to match 6" Country Manor/Stonegate unit thickness. When using non-reinforced concrete for the leveling pad option, it is critical that the step-ups exactly match the 6" Country Manor/Stonegate unit thickness! With a concrete leveling pad, there are few options for correction if the step-up is built higher than the unit height.

General Notes

- Units may vary due to texturing processes and unit sizes by region. Verify unit type, size, weight availability by region. Units may vary up to 1" + (25mm) due to texture variations.
- Clean out pin holes and receiving channel as required to assemble wall. During manufacturing, some concrete crumbs may deposit in these areas and should be removed to permit pins to be placed in the appropriate holes and receiving channel.
- Cut or split units as required (with a mason saw, hydraulic break or chisel and hammer) for corners, caps or wherever units need to be altered to allow construction to be finalized. (Cuts produce smooth finish; splits produce textured finish.)
- When cutting concrete units, always wear safety goggles, gloves and filter mask per manufacturer's recommendations.
- Use exterior construction grade adhesive for all units in parapet walls, columns, etc. where wall is built freestanding (not retaining soil). Use vertical bead of adhesive between units in freestanding wall to avoid daylight view through wall units. Use adhesive as required at 90° corners or where pins do not interconnect units.

DESIGN ASSUMPTIONS

- Friction angle (PHI) for earth pressure calculations of geogrid reinforced walls is evaluated at 26°, 30° and 34° only. For other soil type analysis, refer to KeyWall® Software program or consult with a qualified engineer.
- Moist weight of three soil types indicated is 120 lb./ft.³ (19kN/m³).
- Sliding calculations use 6" (150mm) crushed stone leveling pad as compacted foundation material.
- All backfill materials are compacted to 95% Standard Proctor density.
- The term "vertical" is a wall built to a near vertical alignment having a slight positive setback (1° ±).
- The information provided herein is for preliminary design use only. A qualified engineer should be consulted for design and analysis of structures. Keystone Retaining Wall Systems LLC assumes no liability for the improper use of this information.

GRAVITY WALLS (maximum unreinforced wall height)				
MAXIMUM HEIGHT	NEAR VERTICAL		95°+BATTER	
	level	3h:1v	level	3h:1v
Sand/Gravel phi=34°	2'-0" (0.6m)	1'-6" (0.45m)	3'-0" (0.9m)	2'-6" (0.75m)
Silty Sand phi=30°	1'-6" (0.45m)	1'-6" (0.45m)	2'-6" (0.75m)	2'-0" (0.6m)
Silt/Lean Clay phi=26°	1'-6" (0.3m)	1'-0" (0.75m)	2'-0" (0.6m)	1'-6" (0.45m)

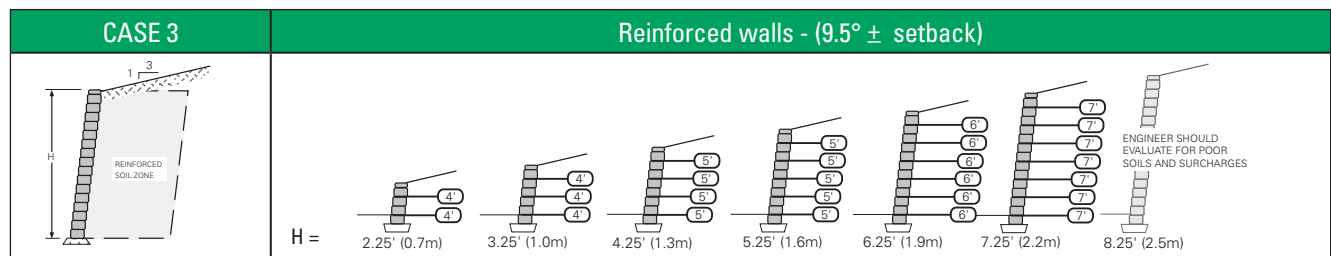
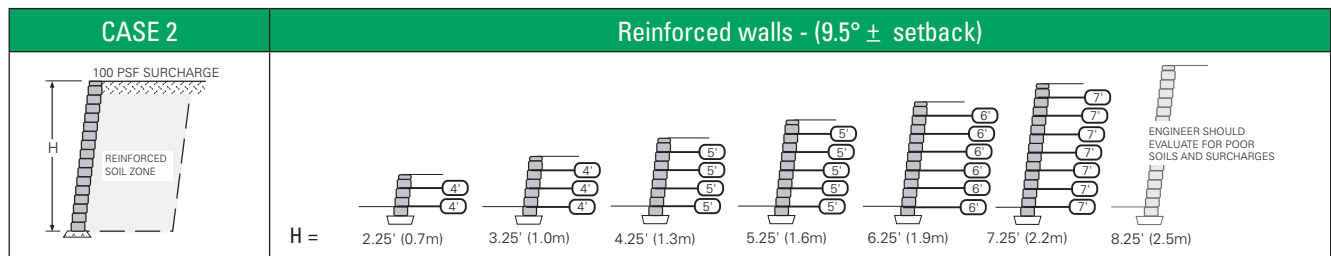
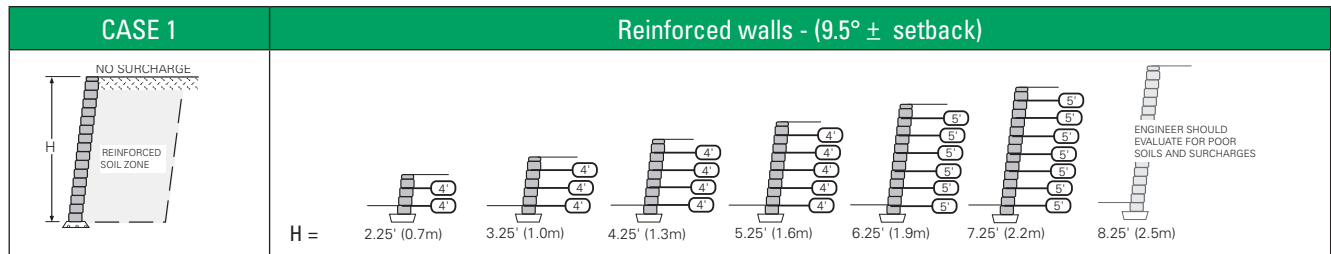
Design Notes

For low (non-structural) landscape retaining walls, Keystone Country Manor/Stonegate can be constructed as a non-reinforced gravity wall as shown in the chart to the left. This chart is for retaining walls in the "near vertical" option. Note: use pins and exterior construction grade adhesive at low border/parapet walls.

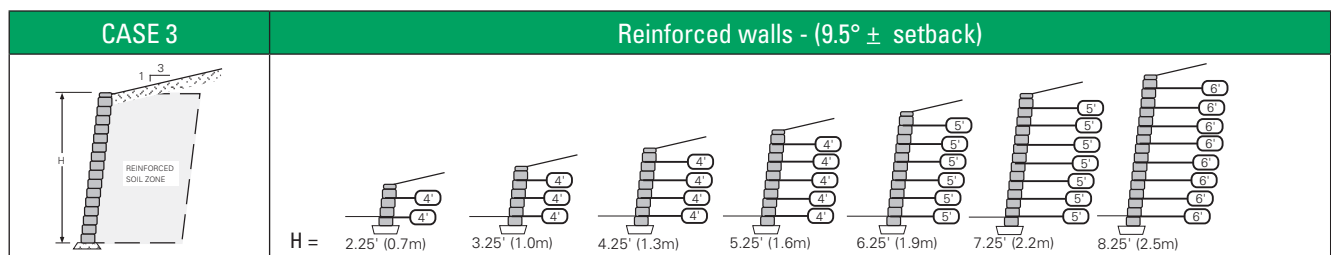
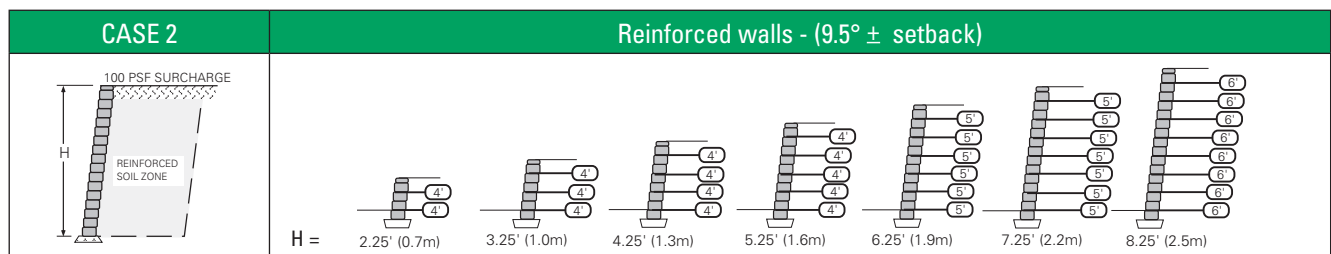
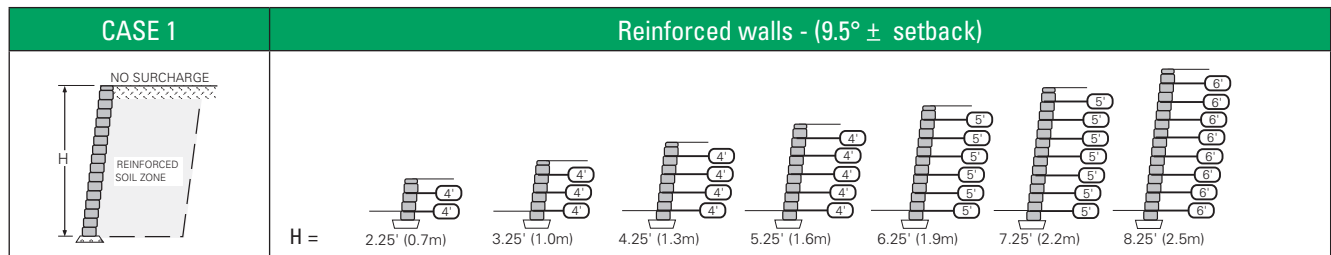
GRAVITY WALL	GRAVITY WALL
Near Vertical Detail	Setback Detail 9.5° ± Batter
10" (250mm) 12" (300mm) 3" cap (75mm) Height Varies 6" (150mm) No Surcharge/Level Grade Backfill Drainage Material Base Leveling Pad	10" (250mm) 12" (300mm) 3" cap (75mm) Height Varies 6" (150mm) No Surcharge/Level Grade Backfill Drainage Material Base Leveling Pad
REINFORCED WALL	REINFORCED WALL
Near Vertical Detail	Setback Detail 9.5° ± Batter
12" (300mm) 10" (250mm) 12" (300mm) 3" cap (75mm) Parapet (Max. 1'-0" [300mm]) Height Varies 6" (150mm) NOTE: Wall geometry with 90° corners or serpentine curves is necessary for stability and resistance to overturn of parapet. Geogrid Reinforcement Reinforced Fill Drainage Material (Crushed Stone 1/2" - 3/4" (10-20mm)) Base Leveling Pad Embedment depth below grade is a minimum of 1 unit or H/20.	12" (300mm) 10" (250mm) 12" (300mm) 3" cap (75mm) Height Varies 6" (150mm) Geogrid Reinforcement Reinforced Fill Drainage Material (Crushed Stone 1/2" - 3/4" (10-20mm)) Base Leveling Pad Embedment depth below grade is a minimum of 1 unit or H/20.

Design Charts

Silt/Lean Clay: $\phi=26^\circ$, $\gamma=120$ pcf (19kN/m³)



Silty Sand: $\phi=30^\circ$, $\gamma=120$ pcf (19kN/m³)



The above charts assume the use of a coated polyester geogrid with a minimum allowable design strength of: LTDS = 750 plf (10.9 kN/m) or Tal = 500 plf (7.3 kN/m)

The information provided herein is for preliminary design use only. A qualified engineer should be consulted for design and analysis of structures. Keystone Retaining Wall Systems LLC assumes no liability for the improper use of this information. *Information on specific geogrids is available from the geogrid manufacturer.



Keystone Palazzo Stone® - Autumn Blend

Keystone Palazzo Stone features an attractive antique finish, creating the look of natural stone. Keystone Palazzo Stone's random pattern appearance is achieved by alternating unit side dimensions. Each unit is angled and textured on both sides, providing two different face lengths; simplifying the creation of tight-fitting straight line walls and radii at curves. Keystone Palazzo turns any project into an attractive focal point. In addition to an untumbled finish, Keystone Palazzo Stone is available in a tumbled variation. The tumbled option adds a rustic charm to any retaining wall project.

Shade variation is inherent in all-natural materials. Colors may vary depending upon manufacturing location. Individual product measurements given are rounded. Contact your Tremron Group Sales Representative or visit our website for exact dimensions.



4"h x 12"w x 9"d
25 lbs.



3"h x 12"w x 8"d
18 lbs.

Available colors:



AUTUMN BLEND



GRANITE



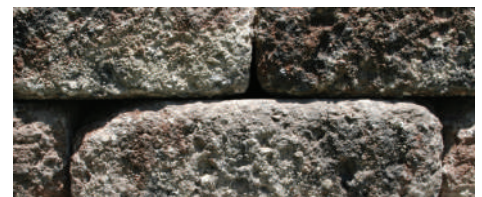
OAK RUN



SAND DUNE



SANTA FE



SIERRA

Installation Steps



STEP 1: Prepare the Base Leveling Pad

Remove all surface vegetation and debris. Do not use this material as backfill. After selecting the location and length of the wall, excavate the base trench to the designed width and depth (min. 20" W x 12" D) [500mm x 300mm]. Start the leveling pad at the lowest elevation along wall alignment. Step up in 4" (150mm) increments with the base as required at elevation changes in the foundation. Level the prepared base with 6" (150mm) of well-compacted granular fill (gravel, road base, or 1/2" to 3/4" [10-20 mm] crushed stone). Compact to 95% Standard Proctor or greater. Do not use PEA GRAVEL or SAND for leveling pad.



STEP 2: Install the base course

Place and level the first Keystone Palazzo Stone unit. Level each additional unit on the base course as you place it, making sure that the outside edges touch. If your wall contains both straight and curved areas, start with a straight area and build into the curves. Complete the base course before proceeding to the second course.

*Note: For straight line walls, unit faces can be alternated to create a more random look. Secure all units in place with appropriate concrete adhesive.

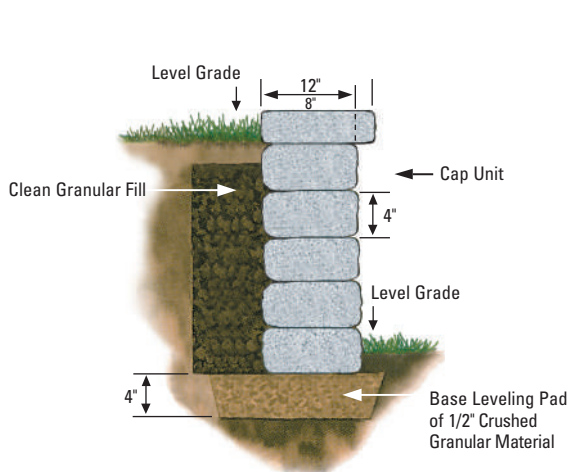


STEP 3: Apply Concrete adhesive

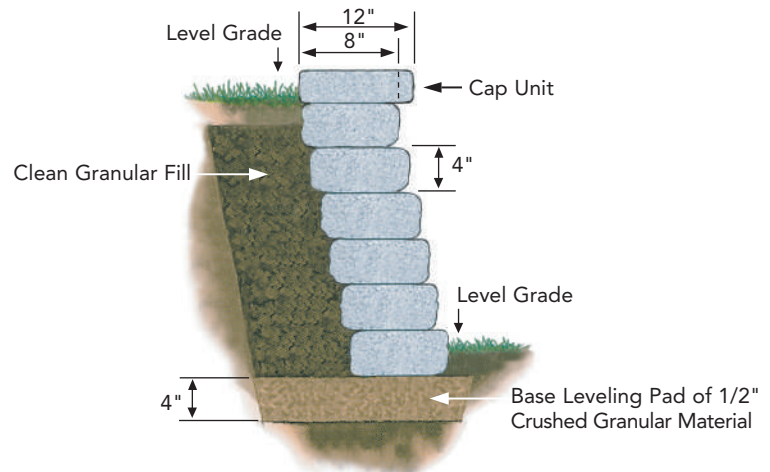
For all applications of this product, additional courses must be secured in place with an exterior construction grade adhesive.

*Note: It is recommended to put all the units in each course in place first, for easy adjustment and cutting, before securing with glue.

Setback Details



Shown vertical



Shown with setback

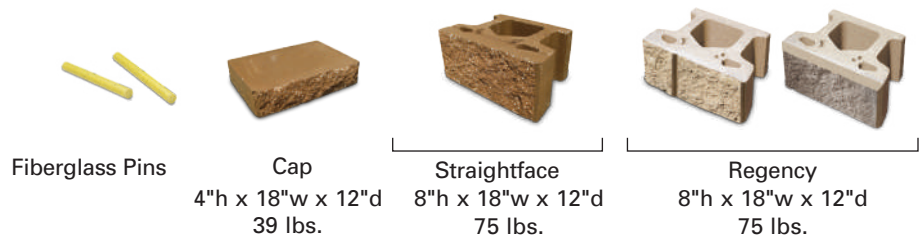


Keystone Compac™ III - Sandstone

The #1 commercial retaining wall product in the market: Keystone Compac III is the perfect choice for large residential and small to large commercial projects. The improved design, and unique geometry, of the Keystone Compac III unit allows for easier installation and increased connection strength with geogrid reinforcement. This unit allows for various positive connections with reinforcement to build walls in excess of 60 feet tall.* Units are interlocked with high-strength fiberglass pins, which allow for ease of unit alignment and a secure positive mechanical connection with soil reinforcement materials.

*Based on design by a professional engineer.

Shade variation is inherent in all-natural materials. Colors may vary depending upon manufacturing location. Individual product measurements given are rounded. Contact your Tremron Group Sales Representative or visit our website for exact dimensions.



Available colors:



COFFEE



MOCHA



NATURAL GREY



PRAIRIE

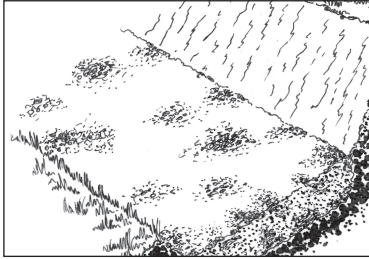


SANDSTONE



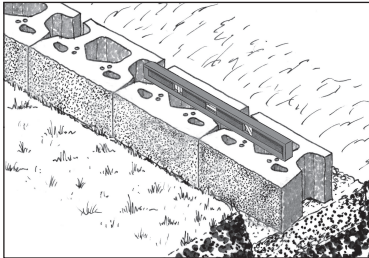
TAN

Installation Steps



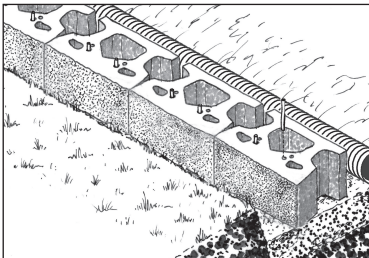
STEP 1: Prepare the Base Leveling Pad

Excavate the base trench to the designed width and depth. Start the leveling pad at the lowest elevation along the wall alignment. Step up in 8" (200mm) increments with the base as required at elevation change in the foundation. Level the prepared base with maximum lifts of 6" (150mm) of well-compacted granular fill (gravel, road base, or ½" to ¾" [10 - 20mm] crushed stone). Compact to 95% Standard Proctor or greater. **Do not use PEA GRAVEL or SAND for leveling pad.**



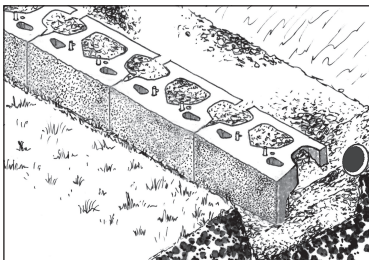
STEP 2: Install the Base Course

Place the first course of Keystone units end to end (with face of wall corners touching) on the prepared base. The receiving pin holes should face upward, as shown. Make sure each unit is level. Leveling the first course is critical for accurate and acceptable results. Keystone recommends minimum embedment depth for below grade placement of Keystone units on a ratio of 1" (25mm) below grade for each 8" (200mm) of wall height above grade or one unit, whichever is greater.



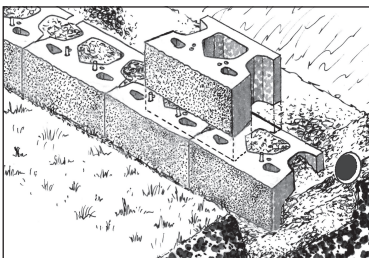
STEP 3: Insert the Fiberglass Pins

Place the straight fiberglass pins into the holes of each Keystone unit as required. Once placed, the pins create an automatic setback for the additional courses. Place pins in the front holes for near vertical (1/8" or [3mm]) setback and the rear holes for 1¼" (32mm) setback per course.



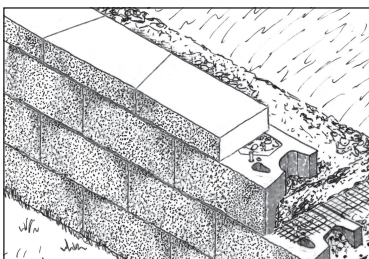
STEP 4: Install Fill & Compaction

Provide ½" - ¾" (10 - 20mm) clean crushed stone drainage fill behind the units to a minimum distance behind the tail of one foot (300mm). Fill all open spaces between units and open cavities/cores with the same drainage material. Proceed to place backfill in maximum 6-8" (150 - 200mm) layers and compact to 95% Standard Proctor with the appropriate compaction equipment.



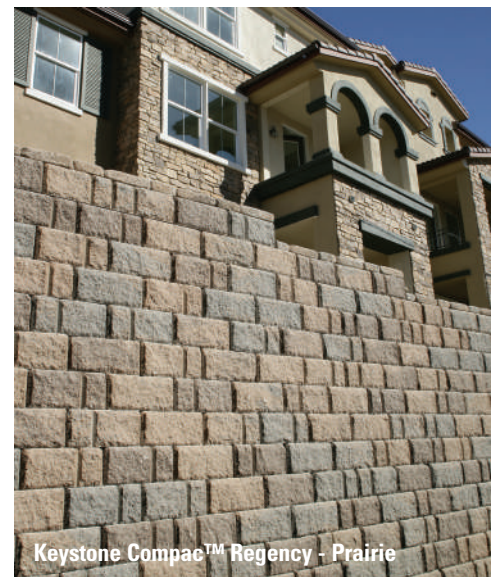
STEP 5: Install Additional Courses

Place the next course of Keystone units over the fiberglass pins, fitting the pins into the triangular shaped receiving hole in the units above. Push the units toward the face of the wall until they make full contact with the pins. Continue backfilling and building to desired top elevation.



STEP 6: Capping the Wall

Complete your wall with the appropriate Keystone capping units. With units dry and clean, use an exterior construction grade adhesive on the top surface of the last course before applying cap units. Backfill and compact to finish grade.



Keystone Compac™ Regency - Prairie



Keystone Compac™ III - Sandstone

Design Chart

Silty Sand: $\phi=30^\circ$, $\gamma=120$ pcf (19kN/m³)

CASE 1	Reinforced walls - 1-1/4" (25mm) setback
NO SURCHARGE REINFORCED SOIL ZONE H	Geogrid Placement H= 4.3' (1.3m) 5.7' (1.7m) 7.0' (2.1m) 8.3' (2.5m) 9.7' (3.0m) 11.0' (3.4m)
CASE 2	Reinforced walls - 1-1/4" (25mm) setback
(12 kN/m²) 250 PSF SURCHARGE REINFORCED SOIL ZONE H	Geogrid Placement H= 4.3' (1.3m) 5.7' (1.7m) 7.0' (2.1m) 8.3' (2.5m) 9.7' (3.0m) 11.0' (3.4m)
CASE 3	Reinforced walls - 1-1/4" (25mm) setback
1 3 REINFORCED SOIL ZONE H	Geogrid Placement H= 4.3' (1.3m) 5.7' (1.7m) 7.0' (2.1m) 8.3' (2.5m) 9.7' (3.0m) 11.0' (3.4m)

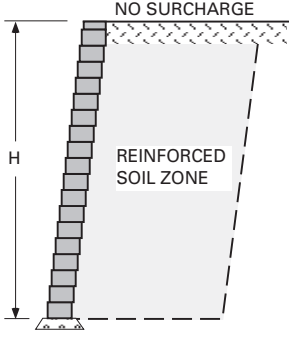
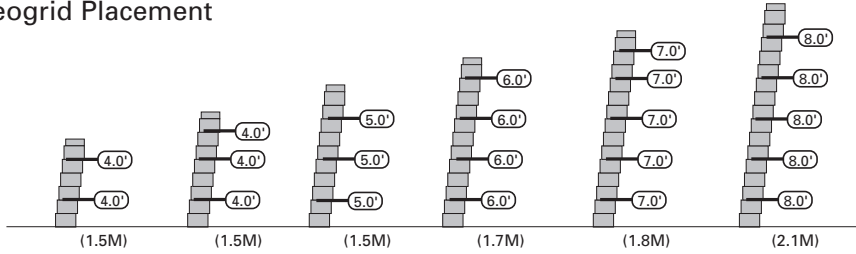
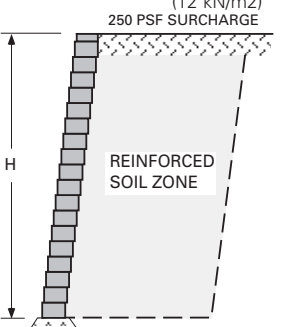
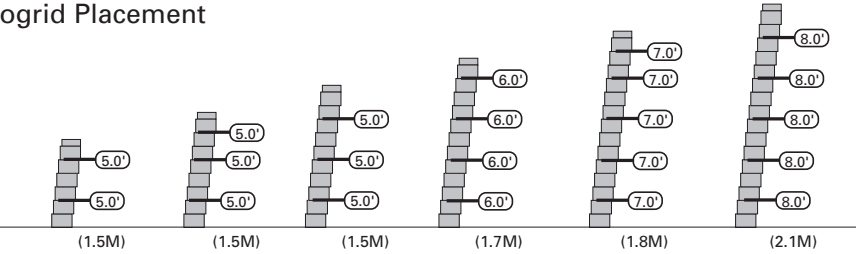
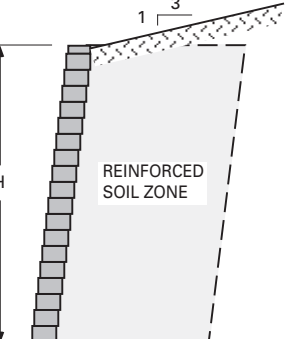
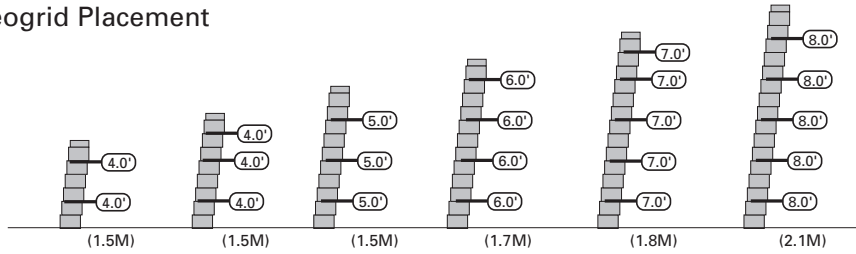
The above charts assume the use of a coated polyester geogrid with a minimum allowable design strength of: LTDS = 750 plf (10.9 kN/m) or Tal = 500 plf (7.3 kN/m)



The information provided herein is for preliminary design use only. A qualified engineer should be consulted for design and analysis of structures. Keystone Retaining Wall Systems LLC assumes no liability for the improper use of this information. *Information on specific geogrids is available from the geogrid manufacturer.

Design Chart

Sand/Gravel: $\phi=34^\circ$, $\gamma=120$ pcf (19kN/m³)

CASE 1	Reinforced walls - 1-1/4" (25mm) setback
 NO SURCHARGE REINFORCED SOIL ZONE H	Geogrid Placement  H= 4.3' (1.3m) 5.7' (1.7m) 7.0' (2.1m) 8.3' (2.5m) 9.7' (3.0m) 11.0' (3.4m)
CASE 2	Reinforced walls - 1-1/4" (25mm) setback
 (12 kN/m²) 250 PSF SURCHARGE REINFORCED SOIL ZONE H	Geogrid Placement  H= 4.3' (1.3m) 5.7' (1.7m) 7.0' (2.1m) 8.3' (2.5m) 9.7' (3.0m) 11.0' (3.4m)
CASE 3	Reinforced walls - 1-1/4" (25mm) setback
 1 3 REINFORCED SOIL ZONE H	Geogrid Placement  H= 4.3' (1.3m) 5.7' (1.7m) 7.0' (2.1m) 8.3' (2.5m) 9.7' (3.0m) 11.0' (3.4m)

The above charts assume the use of a coated polyester geogrid with a minimum allowable design strength of: LTDS = 750 plf (10.9 kN/m) or Tal = 500 plf (7.3 kN/m)



Keystone Stonegate® - Sierra



Web Site



TREMRON.COM



Mobile App.

PLANT LOCATIONS

ARCADIA

9144 Highway 17 NE
Arcadia, FL 34266
(863) 491-0990

ATLANTA

1436 Municipal Parkway
Douglasville, GA 30134
(404) 968-8280

LAKELAND

1030 Airport Road
Lakeland, FL 33811
(863) 603-0995

MIAMI

11321 NW 138th Street
Medley, FL 33178
(305) 825-9000

Headquarters JACKSONVILLE

2885 St. Clair Street
Jacksonville, FL 32254
(904) 359-5900

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Arcadia, FL 34266
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LAKELAND

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Lakeland, FL 33811
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Boca Raton, FL 33431
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(305) 825-9000

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1001 SE 11th Street
Hialeah, FL 33010
(305) 888-6443

NAPLES

2403 Trade Center Way, #37
Naples, FL 34109
(239) 314-7395

JACKSONVILLE

9440 Philips Hwy, Unit 6
Jacksonville, FL 32256
(904) 886-1970

ORLANDO

402 Northlake Blvd, #1030
Altamonte Springs, FL 32714
(407) 834-0997

DESIGN CENTERS

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