INTRODUCTION

GAGNE & SON has been family owned and operated since its establishment in 1945. Our company manufactures concrete products and provides extensive hardscape and construction product lines for Northern New England. Our recent recognition from the Kennebec Valley Chamber of Commerce as the "2007 Business of the Year" demonstrates our dedication and drive to provide you with quality products and outstanding service.

KEYSTONE RETAINING WALL SYSTEMS, INC. has set the standard for excellence and innovation within the segmental retaining wall industry for over 20 years. Keystone represents the global benchmark in soil retention, erosion control, and landscape systems. Holding over 50 patents, Keystone symbolizes cutting-edge design, performance, and aesthetics.

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**Keystone® Compac Unit**

As a gravity wall or reinforced structure, the Keystone Compac Unit provides a structurally sound, aesthetically appealing and economically beneficial solution. The Keystone Compac Unit features an open core design and high strength pin connection system. Its light weight and short tail design make it easy for installers to handle.

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### 8" Compac Rockface

**Dimensions:**
8" x 12" x 18"

- #430710 – Natural
- #430700 – Brown
- #430720 – Charcoal

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### 8" Compac Straightface

**Dimensions:**
8" x 12" x 18"

- #430750 – Natural
- #430730 – Brown
- #430740 – Charcoal
Keystone® Mini Unit

The Keystone Mini Unit is a great solution for smaller, non-critical applications. It is easy to handle and install, and makes for an attractive wall on its own or as an accent when integrated with the 8" high Compac units. The proportion and scale of the Mini units blend well with brick and ledge stone typically found in residential construction.

4” Mini Rockface

Dimensions:
4” x 10.5” x 18”

#430570 – Natural
#430590 – Brown
#430580 – Charcoal

4” Mini Straightface

Dimensions:
4” x 10.5” x 18”

#430600 – Natural
#430610 – Brown
#430620 – Charcoal
**KEYSTONE WALL ACCESSORIES**

**Universal Cap**
- Dimensions: 4” x 10.5” x 18”
- #430420 – Natural
- #430430 – Brown
- #430440 – Charcoal

**8” Corner Unit**
- Dimensions: 8” x 9” x 18”
- #430810 – Natural
- #430820 – Brown
- #430800 – Charcoal

**4” Corner Unit**
- Dimensions: 4” x 9” x 18”
- #430630 – Natural
- #430640 – Brown
- #430650 – Charcoal

**8” Step Tread**
- Dimensions: 8” x 18” x 18”
- #430830 – Natural
- #430840 – Brown
- #430850 – Charcoal

**4” Step Tread**
- Dimensions: 4” x 18” x 18”
- #430660 – Natural
- #430670 – Brown
- #430680 – Charcoal

**AVAILABLE COLORS**

- **Keystone Natural**
- **Keystone Chestnut Brown**
- **Keystone Charcoal**

[Images of available colors]

gagneandson.com
keystonewalls.com
Step 1 » Prepare the site.

Start by digging a shallow trench 12" deep by 24" wide. Cut through and remove any sod, roots or large rocks. Place 6" leveling pad of compacted sand or gravel in the trench to receive the first course of Keystone Verazzo Stone.

Step 2 » Set the base course.

Place and level the first Keystone Verazzo 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.

Step 3 » Pin, stack, and fill.

Starting with straight areas first, begin placing the second course. Center each Keystone Verazzo Stone unit over the pins on the joints of the course below in a running bond pattern as shown. Now proceed to the next layer, backfilling as you go. For drainage between units and behind the wall, clean gravel or crushed stone is recommended.

Table:

<table>
<thead>
<tr>
<th>WALL HEIGHT*</th>
<th>WALL LENGTH (measured at wall face including curves)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>4 8 12 16 20 24</td>
</tr>
<tr>
<td>8&quot;</td>
<td>8 16 24 32 40 48</td>
</tr>
<tr>
<td>12&quot;</td>
<td>12 24 36 48 60 72</td>
</tr>
<tr>
<td>16&quot;</td>
<td>16 32 48 64 80 96</td>
</tr>
<tr>
<td>20&quot;</td>
<td>20 40 60 80 100</td>
</tr>
<tr>
<td>24&quot;</td>
<td>24 48 72 96 120</td>
</tr>
</tbody>
</table>

*Notes:

- Maximum wall height not to exceed 36". The maximum height is based on a level grade, total granular soil, wall built in setback position, and no surcharge. Contact your local Keystone representative for design options on wall heights exceeding 36" or supporting surcharges and back slope.
- Change in color on chart denotes maximum wall height for vertical and setback positions.
- Keystone recommends cap units as the top course and/or caps of freestanding walls secured with Keystone KapSeal™ adhesive.
KEYSTONE VERAZZO STONE™

6' THREE-PIECE SYSTEM

6" H x 10.5" D x 16/13.83" W
6" H x 10.5" D x 10/7.9" W
6" H x 10.5" D x 6/3.9" W

2 molded pins required per unit
2-3/8" (60 mm) total length
1" (26 mm) shoulder length

Total Pallet = 30 sq. ft.
5 rows of 6 sq. ft./pallet
Sold by the layer

3' THREE-PIECE SYSTEM

3" H x 10.5" D x 16/13.83" W
3" H x 10.5" D x 10/7.9" W
3" H x 10.5" D x 6/3.9" W

2 molded pins required per unit
2-3/8" (60 mm) total length
1" (26 mm) shoulder length

Total Pallet = 24 sq. ft.
8 rows of 3 sq. ft./pallet
Sold by the layer

Fieldstone Blend

Granite Hill Blend
KeyStone Arbor Stone™

Perfect for Patio, Lawn or Sidewalk Edging

- Easy to Install
- Adds Beauty
- Offers Design Versatility
- Long-Lasting & Durable

• Unit Dimensions: 12”L x 9”W x 4”D
• Each KeyStone Arbor Stone unit weighs approximately 29 pounds, making it fast and easy to install by yourself.

WALL LENGTH (measured at wall face including curves)

<table>
<thead>
<tr>
<th>WALL HEIGHT</th>
<th>5'</th>
<th>10'</th>
<th>15'</th>
<th>20'</th>
<th>25'</th>
<th>30'</th>
</tr>
</thead>
<tbody>
<tr>
<td>4” (1 course)</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>8” (2 courses)</td>
<td>10</td>
<td>20</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>12” (3 courses)</td>
<td>15</td>
<td>30</td>
<td>45</td>
<td>60</td>
<td>75</td>
<td>90</td>
</tr>
<tr>
<td>16” (4 courses)</td>
<td>20</td>
<td>40</td>
<td>60</td>
<td>80</td>
<td>100</td>
<td>120</td>
</tr>
<tr>
<td>20” (5 courses)</td>
<td>25</td>
<td>50</td>
<td>75</td>
<td>100</td>
<td>125</td>
<td>150</td>
</tr>
<tr>
<td>24” (6 courses)</td>
<td>30</td>
<td>60</td>
<td>90</td>
<td>120</td>
<td>150</td>
<td>180</td>
</tr>
</tbody>
</table>

Please Note:
Maximum wall height not to exceed 2’. This chart is based on site conditions which include a level grade, granular soil and no surcharge. Contact KeyStone Retaining Wall Systems for design options and patented soil reinforcement guidelines on wall heights exceeding 2’.

Add beauty to any home or garden landscape in 3 easy steps!

Step 1 » Prepare the site.
Start by digging a shallow trench 4” deep by 12” wide. Cut through and remove any sod, roots or large rocks. For organic loam soils, dig 4” deeper and add a leveling pad of sand or gravel. Compact and level the soil to receive the first course of KeyStone Arbor Stone.

Step 2 » Set the base course.
Place and level the first KeyStone Arbor 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.

Step 3 » Stack and fill.
Starting with straight areas first, begin placing the second course. Center each KeyStone Arbor Stone unit on the seams of the course below in a running bond pattern as shown. Now proceed to the next layer, backfilling as you go. For drainage behind the wall, clean gravel or crushed stone is recommended.
PRODUCT INSTALLATION

The Keystone Retaining Wall System was developed with simplicity of construction in mind. These step-by-step instructions will guide you through the basic process from start to finish. If more detailed information is required to meet your specific site situation, consult your local Keystone representative.

Step 1 » Prepare the Base Leveling Pad.
Start the leveling pad at the lowest elevation of the wall. Level the prepared base with 6" of well-compacted granular fill (gravel, road base, or 1/2" to 3/4" [13 - 20 mm] crushed stone). The base trench should be wide enough to allow for the Keystone unit and drainage zone.

Step 2 » Install the Base Course.
Place the first course of Keystone units side by side (with sides touching) on the prepared base, with the paired pin holes facing up. Make sure each unit is level — side to side and front to back. The first course is critical for accurate and acceptable results.

Step 3 » Insert Interlocking Fiberglass Pins.
Place the reinforced fiberglass pins into the paired holes (2) of each Keystone unit. (Pins of adjoining units should be 12" [305 mm] on center.) Once placed, the pins create an automatic setback for the additional courses.

Step 4 » Install and Compact Backfill.
Fill in all voids — in and between Keystone units — using 1/2" to 3/4" [13 - 20 mm] crushed stone or clean, well-draining granular fill. Place drain zone behind the units as required to achieve total 2 ft. (0.6 m) depth of drainage zone from unit face. Peagravel should not be used. Sweep off any pebbles or debris so the next Keystone units rest evenly upon the layer below.

Step 5 » Install Additional Course.
Place the next course of Keystone units over the fiberglass pins, fitting the pins into the kidney-shaped recesses. Center the unit over the two underlying units as shown. Visually sight down in the kidney-shaped recess for pin positioning. Pull the Keystone unit toward the face of the wall until it makes full contact with both pins. For each remaining course, repeat Steps 3 - 6.

Step 6 » Install Keystone Caps.
Complete your wall with Keystone Caps. In areas of high public usage, apply Keystone KapSeal™ (a construction adhesive for masonry units) on the top surface of the last course before applying cap units. Place the Keystone Cap unit over the pins on the underlying unit. Pull the Cap unit forward to the automatic setback position.

GEOGRID INSTALLATION

For taller or more critical walls that require use of geogrid, continue with the following installation process after Step 4.

Step 7A » Excavate Reinforced Soil Area.
Remove existing soils in the reinforced soil area to the maximum embedment length of the geogrid design. Provide a generally level soil condition behind the wall units for the placement of each geogrid layer.

Step 7B » Cut Geogrid.
Cut sections from geogrid roll to the specified length (embedment depth). Geogrid roll direction is from the wall toward the embankment. Check manufacturer's criteria for biaxial or uniaxial geogrids. In most cases correct orientation is to roll the geogrid perpendicular to the wall face.

Step 7C » Install Geogrid.
Hook geogrid over the Keystone fiberglass pins to ensure a positive mechanical connection between the unit and geogrid.

Step 7D » Secure Geogrid.
Pull the pinned geogrid taut to eliminate loose folds. Stake or secure back edge of geogrid before and during backfill and compaction. Remove stakes, if desired, once backfill is placed. Place additional sections of geogrid, abutting each other, for continuous coverage at each layer.

Step 7E » Install Next Course of Keystone Units.

Step 7F » Place Compacted Backfill Over Geogrid in 8" Lifts.
Provide a minimum of 6" (150mm) reinforced fill coverage prior to driving equipment over the geogrid with tired equipment. Avoid driving or turning vehicles directly on geogrid to avoid excessive damage.
90° OUTSIDE CORNER - USING NEAR VERTICAL SETBACK

The following information will provide a general explanation of construction techniques for building retaining walls with these conditions.

INSTALLATION PROCEDURES:

- Follow standard installation instructions for preparation of sub grade and leveling pad.
- Construction can start at the corner and work away from this point or with the method shown below, the wall can be started elsewhere and worked into the corner. This detail gives the builder flexibility.

3-PLANE SPLIT UNITS

FIRST COURSE

SECOND COURSE

CAP COURSE

STRAIGHT SPLIT UNITS

FIRST COURSE

SECOND COURSE

CAP COURSE
When building an inside 90° corner, how much should be cut off the first course?

A good place to start is approximately at the half unit range. This will result in field cutting the caps to finish the top of wall in the corner. If it is important to finish the wall with full cap units versus a cut unit as shown below, you will need to know how much setback occurs in your wall from base course to cap course to determine the starting location of the last full unit (uncut) at the base. To determine setback, follow this simple method: Place 3 units on a smooth level surface. Place fiberglass pins in desired setback option. Place next course of units in running bond pattern over base units. Pull upper unit forward towards face of wall. Now measure distance from tail surface of lower and upper courses. This is your setback dimension! Multiply this measurement times the total number of vertical courses. This will then give you the projected horizontal shift required to handle the setback of the two 90° walls away from the starting point.

How do I determine the smallest concave radius I can construct before unacceptable gapping between units may occur?

Multiply the height of wall by two. The result is the smallest radius dimension.

**Example:**
Wall Height (4') (1.2m) x 2 = Smallest Radius (8') (2.4m)

**NOTE:** This formula applies to installations using the 8.8° batter. For the 4.4° batter use a multiple of 1.5. For the near vertical batter, no radius limitations are expected. No minimum radius applies. The near vertical batter is recommended for walls with multiple curves.

How do I determine the smallest convex radius I can construct before binding between units may occur?

Multiply the height of wall by two. The result is the smallest radius dimension.

**Example:**
Wall Height (4') (1.2m) x 2 = Smallest Radius (8') (2.4m)

**NOTE:** This formula applies to installations using the 8.8° batter. For the 4.4° batter use a multiple of 1.5. For the near vertical batter, no radius limitations are expected. Minimum overall radius is 3.5' (1m).

How do I determine how many Keystone® units will be required for a given radius or for a complete circle?

Multiply the diameter of the circle (the measurement of a line passing through the center from one side of the circle to the other or 2 x the radius) by 3.146. Divide the result by 1.5. The result is the number of units for a complete circle.

**Example:**
Diameter (10') x 3.146 = 31.46 ÷ 1.5 = 21 units for a 10' circle or 5 units for a 90°-5' radius arc within a wall (3.05m x 3.146 = 9.6m x 2.19 units/m = 21 units)
The information contained herein has been compiled by Keystone® Retaining Wall Systems, Inc. and to the best of our knowledge, accurately represents the Keystone product use in the applications which are illustrated. Final determination of the suitability for the use contemplated and its manner of use are the sole responsibility of the user. Structural design and analysis shall be performed by a qualified engineer.