



**133** KEYSTONE  
**ELITE**™

***BIGGER • BETTER • FASTER***  
***WITH THE KEYSTONE 133 ELITE™***



*Retaining Excellence™*

A CONTECH COMPANY

# INTRODUCING

KEYSTONE 133ELITE™

## KEYSTONE 133ELITE™

### Work Smarter with the Keystone 133Elite™

The forward-thinking design of the new Keystone 133Elite™ combines great looks with an exciting new way to increase efficiency.

The Keystone 133Elite is perfect for large wall applications. Its 8" x 24" face dimension creates a larger-scale look, aesthetically matching the larger wall look and feel, while reducing the number of units required to complete the job.

Never before have wall designers had so much flexibility in creating the perfect appearance for their Keystone wall. In addition to conventional textures, Keystone's patented StoneArt™ embossing technology can produce units with specially designed natural textures- in combination with the wide variety of colors available in most Keystone products.

The Keystone 133Elite can satisfy a wide array of design requirements from corners to sweeping curves. The Keystone 133Elite is simply the best combination of strength, beauty, and efficiency on the market.



**Ashlar Keystone 133ELITE™**

8" h x 24" w x 11.5" d  
Approximately • 90 lbs



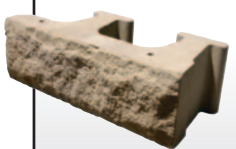
**\*Stone Face Keystone 133ELITE™**

8" h x 24" w x 11.5" d  
Approximately • 90 lbs



**\*Random Score Keystone 133ELITE™**

8" h x 24" w x 11.5" d  
Approximately • 90 lbs



**Hewn Stone Keystone 133ELITE™**

8" h x 24" w x 11.5" d  
Approximately • 90 lbs

\*Note: Units shown have large chamfer on three sides.

# FEATURES & BENEFITS



## Speed of Installation

The large 8" x 24" face dimension makes a real difference when installing larger wall structures. The same effort that nets one-square-foot of wall area with other wall systems produces 1.33 square feet of wall area with the Keystone 133Elite. In addition, Keystone 133Elite's mid-range weight of 95 pounds allows it to be installed by one person—maximizing man-hours. And, the innovative Keystone 133Elite design allows for a 33 percent reduction in the number of pins required.



## Patented Keystone Pin System

Keystone 133Elite uses Keystone's high-strength, pulltruded fiberglass pins for superior shear resistance, alignment and geogrid connection.



## Unique StoneArt™ Appearance

Keystone's patented \*StoneArt™ embossing technology allows units to be produced with a variety of high-quality textures—in combination with the wide variety of colors available in most Keystone products.



## Perfect Scale for Large Structures

Using smaller segmental retaining wall units on larger walls can overwhelm the visual senses. The larger face dimensions of the Keystone 133Elite provides a more appropriate visual scale for big walls.

*\*Note: Availability of Keystone's patented StoneArt™ technology varies by region. Contact your local Keystone sales representative for more information.*

# INSTALLATION STEPS



## 1. Create the Leveling Pad

Start the leveling pad at the lowest elevation along wall alignment. Step up in 8" (200mm) increments with the base as required at elevation changes in the foundation. Level the prepared base with 8" (200mm) 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.



## 2. Install the Base Course

Place the first course of Keystone 133Elite units end to end (with face of wall corners touching) on the prepared base. The receiving channel on the unit should be placed downward and the pin holes should face upward, as shown. Make sure each unit is level. Leveling the first course is critical for accurate and acceptable results. Minimum embedment of the base course should be 8" below grade.



## 3. Insert the Fiberglass Pins

Place the fiberglass pins into the holes of the Keystone 133Elite units.



## 4. Backfill

Once the pins have been installed, provide 1/2" - 3/4" (10 - 20mm) clean crushed stone drainage fill behind the units to a minimum depth of 12" (300mm). Fill open spaces between units and in the "tails" of the units with the same drainage material. Proceed to place backfill (free draining granular fill) in maximum 6" (150mm) layers. Compact to 95% Standard Proctor density with the appropriate compaction equipment.



## 5. Continue Installation

Place the next course of Keystone 133Elite units over the fiberglass pins, fitting the pins into the receiving channel recess of the units above. Push the Keystone 133Elite units toward the face of the wall until they make full contact with the pins. If pins do not connect with channel, place drainage fill in the "tails" to provide interlock with unit below. Continue backfilling and building to desired top elevation.



## GENERAL NOTES:

- Verify unit type, size, weight availability by region. Unit depth (face to tail) may vary up to 1 inch ± (25mm) due to texture variations.
- Remove any excess concrete slag from 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 channels.
- Cut or split units as required (with a mason saw, hydraulic break or chisel and hammer) wherever units need to be altered to allow construction to be finalized.
- When cutting concrete units, always wear safety goggles, gloves, and filter mask per manufacturer's recommendations.



# STRUCTURAL FEATURES



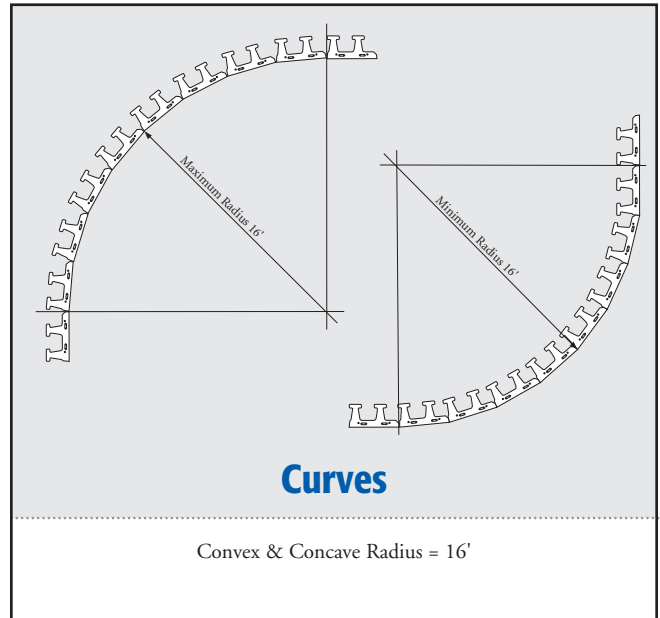
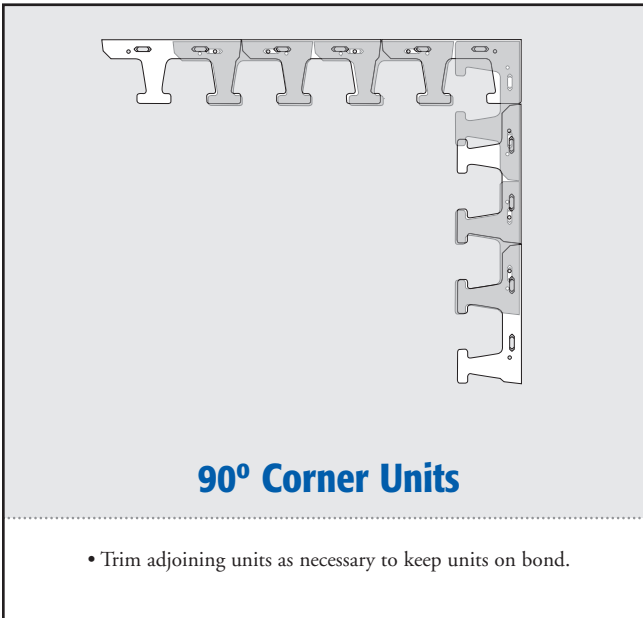
## Product Design

Efficiency is the bottom line for the Keystone 133Elite. Its design provides a number of forward-thinking innovations that make it easy to use on a wide-variety of projects. For example: The tail section of Keystone 133Elite reduces the weight of the unit and also makes an excellent carrying handle for installers to use in maneuvering the unit. In addition, the Keystone 133Elite requires one-third less pins to assemble a wall. These efficiencies directly translate into savings for the end user, making the Keystone 133Elite a must have for large wall projects.



## Positive Mechanical Connection

Keystone's patented pin system provides dependable strength where it's needed most. High-strength fiberglass pins provide built-in alignment for the Keystone 133Elite and ensure that each unit is securely interlocked within the wall face. In addition, this unique retaining wall system allows for a mechanical connection with geogrid soil reinforcement, securing its placement between units and allowing for proper tension and maximum efficiency of the geogrid.



GRAVITY WALLS (maximum unreinforced wall height)		
Maximum Height Near Vertical	Level	3H:1V
SAND/GRAVEL PHI = 34°	2'-4" (0.7m)	2'-4" (0.7m)
SILTY SAND PHI = 30°	2'-4" (0.7m)	1'-8" (0.5m)
SILT/LEAN CLAY PHI = 26°	1'-8" (0.5m)	1'-8" (0.5m)

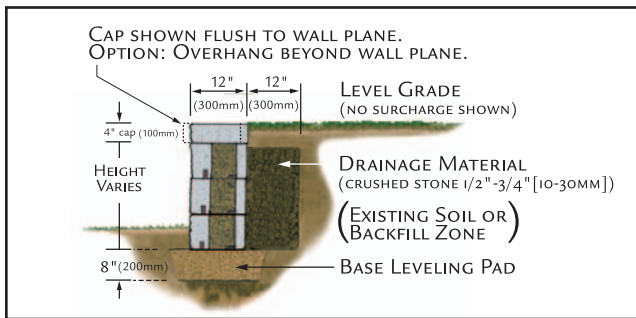
- Friction angle (PHI) for use in earth pressure calculations of geogrid reinforced walls is evaluated at 26°, 30°, and 34° only. For other soil type analysis, refer to KeyWall software program or consult with a qualified engineer.
- Moist unit weight for the three soil types used is 120 lbs./ft.<sup>3</sup> (19kN/m<sup>3</sup>).
- Sliding calculations use 8 inch (200mm) crushed-stone leveling pad as the compacted foundation material.
- All backfill soils are calculated as compacted to 95% Standard Proctor density.
- 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, Inc., assumes no liability for the improper use of this information.

# DESIGN ASSUMPTIONS

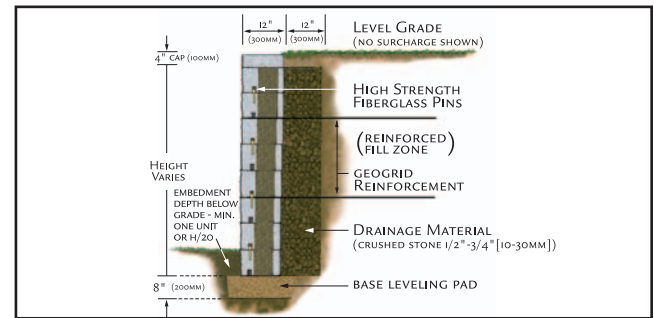
For low (non-structural) landscape retaining walls, Keystone 133Elite™ can be constructed as an unreinforced gravity wall as shown in the chart below.

KEYSTONE 133ELITE™

## Gravity Wall - Near Vertical Detail (2.0°± batter)



## Reinforced Wall - Near Vertical Detail (2.0°± batter)



## GEOGRID CHART NOTES

The Keystone geogrid charts are graphically presented to show the proper orientation and lengths of geogrids used with Keystone 133Elite Units at the near vertical 2° batter.

Design Chart Wall sections are shown to increase in 16-inch (400mm) increments beginning at 3 feet (0.9m) and ending 11 feet (3.4m). Engineering judgement should be used when interpolating between heights. Walls under 3 feet (0.9m) in height may require geogrid reinforcement depending upon the soil types, and surcharge loadings. (see Gravity Walls chart).

Soil ranges are selected to approximate good (34°), medium (30°), and poor (26°), soil conditions which span the typical design range. Wall height is the total height of the wall from top of leveling pad to top of wall.

All geogrid lengths shown are the actual lengths of geogrid required as measured from the connection pins to the end of the geogrid.

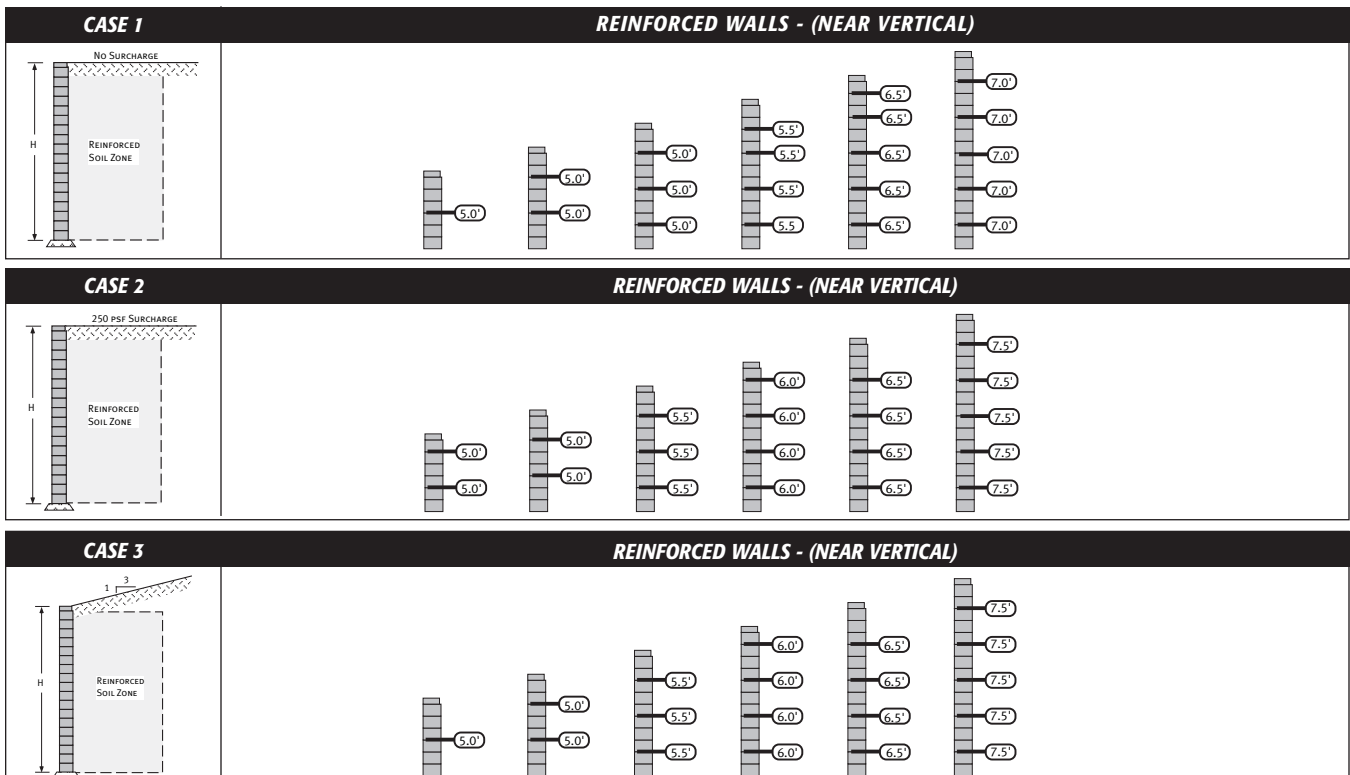
Near vertical is 1/4" - 3/8" setback per course.

The Design Charts assume that the walls are constructed in accordance with Keystone specifications and good construction practice. All soils should be compacted in maximum 8-inch (200mm) lifts to 95% Standard Proctor density as determined by laboratory testing.

The information contained in the Design Charts is for preliminary design use only. A qualified engineer should be consulted for final design assistance. Keystone Retaining Wall Systems, Inc. accepts no liability for the improper use of these charts.

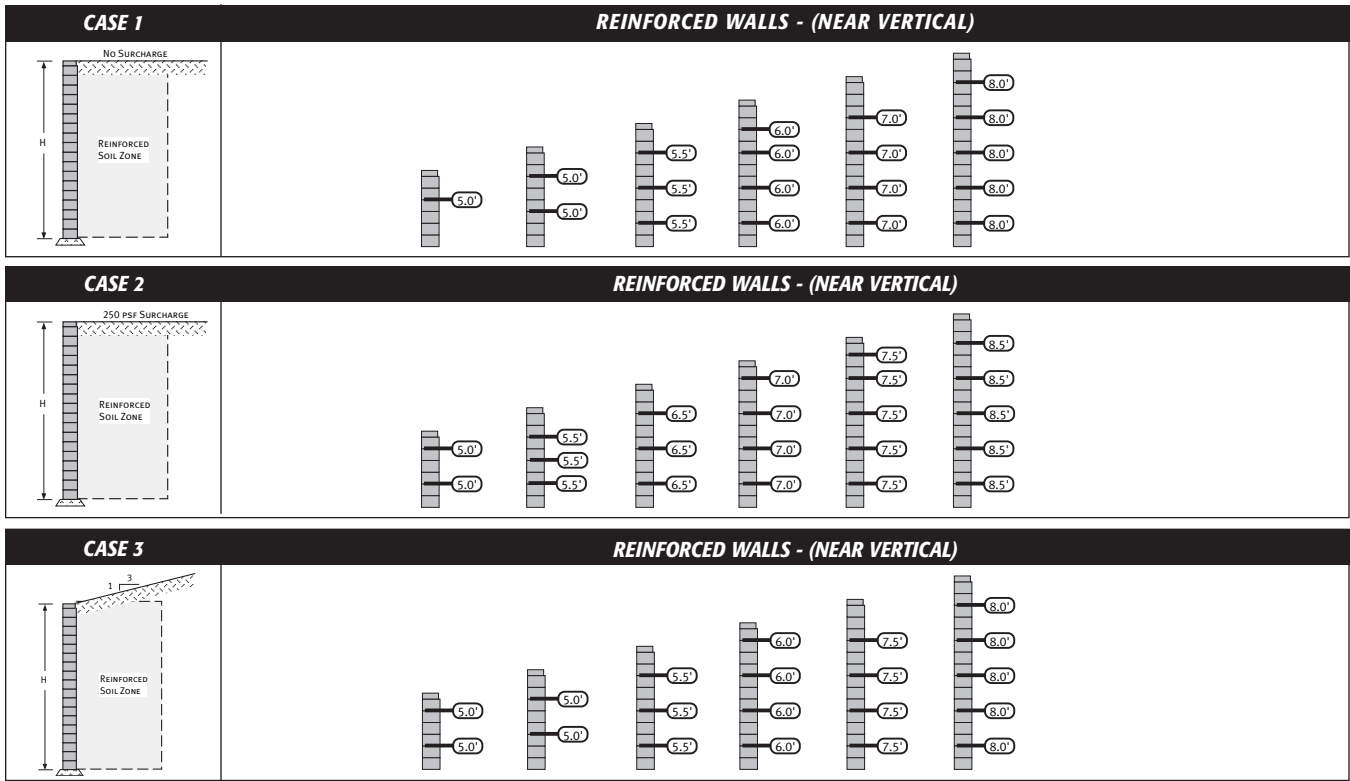
## Sand Gravel: $\phi=34^\circ$ , $\gamma=120$ pcf (19kN/m<sup>3</sup>)

The following charts assume the use of a coated polyester geogrid with a minimum allowable design strength of LTDS = 1350 plf (10.9 kN/m) or Tal = 900 plf (7.3 kN/m). Information on specific geogrids is available from the geogrid manufacturer.

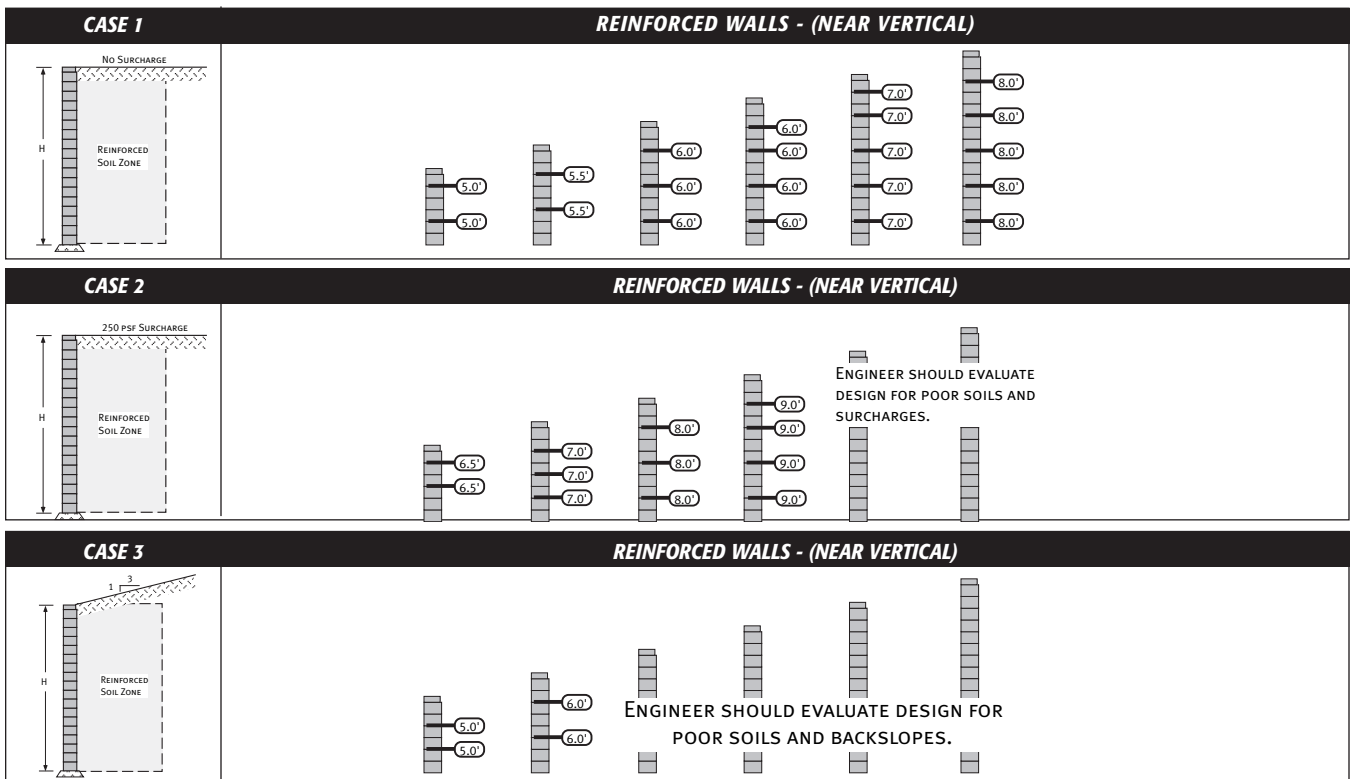


The information provided herein is for preliminary design use only. A qualified engineer should be consulted for design and analysis of structures. Keystone Retaining Wall Systems, Inc. assumes no liability for the improper use of this information.

**Silty Sand:**  $\phi=30^\circ$ ,  $g=120\text{pcf}$  (19kN/m<sup>3</sup>)



**Silt/Lean Clay:**  $\phi=26^\circ$ ,  $g=120\text{pcf}$  (19kN/m<sup>3</sup>)



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, Inc. assumes no liability for the improper use of this information.

**DISTRIBUTED BY:**



*Retaining Excellence™*

A CONTECH COMPANY

.....  
[www.kestonewalls.com](http://www.kestonewalls.com)  
.....

Keystone Retaining Wall Systems, Inc.  
A Contech Company  
4444 West 78th Street,  
Minneapolis, MN 55435

.....  
*Keystone Retaining Wall Systems, Inc. reserves the right to improve its products and make changes to its specification and design without notice. The information contained herein has been compiled by Keystone and to the best of its knowledge, accurately represents the Keystone product and how it may be used in the applications which are illustrated. Site conditions, including load pressures acting on the wall, soil types and drainage conditions, may vary. Final determination of the suitability of the product for the use contemplated and the manner of product use are the sole responsibility of the user. Good construction practices and local building codes require the use of an engineered design when constructing retaining walls or free-standing walls in many conditions. Structural design and analysis should be provided by a qualified engineer.*  
.....