Sculpterra Technology

SCULPTERRA™ TECHNOLOGY

KEYSTONE 133 ELITE®

INTRODUCING

133 KEYSTONE ELITE®

Work Smarter with the Keystone 133Elite®

BIGGER. BETTER. FASTER. The forward-thinking design of the Keystone 133Elite® combines great looks with increased efficiency. In addition to conventional textures, Keystone's Sculpterra™ Technology can produce units with specially-designed natural textures.

The Keystone 133Elite® is perfect for large wall applications. Its 8" x 24" (200 x 600 mm) 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. 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.

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 Sculpterra™ Technology can produce units with specially designed natural textures – in combination with the wide variety of colors available in most Keystone manufacturing territories.

Keystone 133ELITE® Hewnstone

8"h x 24"w x 11.25/12"d
(200 x 600 x 285 mm)
Approx. • 95 lbs (43 kg)

Keystone 133ELITE® Random Score*

8"h x 24"w x 11.25/12"d
(200 x 600 x 285 mm)
Approx. • 95 lbs (43 kg)

*Note: Units shown have chamfer on three sides.

133Elite® 90° Hewnstone Corner*

8"h x 18"w x 6"d
(200 x 150 x 450 mm)
Approx. • 55 lbs (25 kg)

Hewnstone Universal Cap

4"h x 18/12"w x 13"d
(100 x 330 x 455/305 mm)
Approx. • 60 lbs (27 kg)

Hewnstone Linear Cap

4"h x 24"w x 8"d
(100 x 205 x 610 mm)
Approx. • 60 lbs (27 kg)

Keystone Fiberglass Pins

*Note: Availability of Keystone's Sculpterra™ Technology, unit colors, dimensions, weight, and availability varies by manufacturer and location.

Key Features

Structural Integrity

- Design capabilities for all types of wall applications.
- High strength pins ensure each unit is securely interlocked within the wall face.
- Mechanical connection with geogrid soil reinforcement ensures proper tension and maximum efficiency of geogrid.

Ease of Installation

- The unique 133Elite® design allows more square feet to ship per truck load.
- The mid-range block weight allows one-person installation, maximizing man-hours.
- Unit tail design provides easy handling for installers.
- Innovative unit design allows for a 33% reduction in the number of pins required.

Aesthetics

- Keystone's Sculpterra™ Technology allows units to be produced with a variety of high-quality textures including Hewnstone, Ashlar, and Random Score.
- Larger-scale dimensions complement the look and feel of tall walls.
- Specially-designed natural textures embossed on the units offer flexibility in creating different appearances.
- Wide variety of colors produced in various manufacturing areas.

Design Versatility

- Convex and concave curves as well as 90° corners can be constructed.
- Embossed 90° corner unit also available.
- Near vertical setback option available.

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, 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.

Product Design

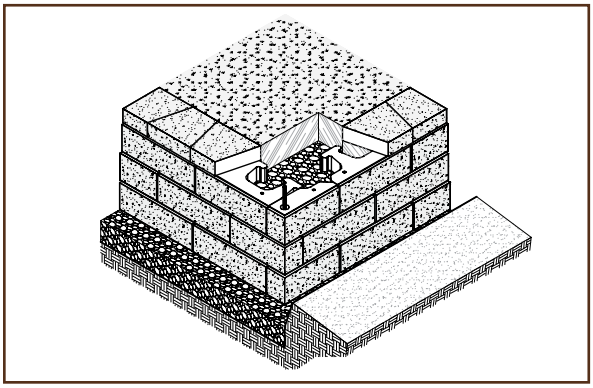
Efficiency is the bottom line for the Keystone 133Elite®. Its design provides a number of forward-thinking innovations that make it easy to use on a wide variety of projects. For example: The tail section of Keystone 133Elite reduces the weight of the unit and also makes an excellent carrying handle 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.

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.

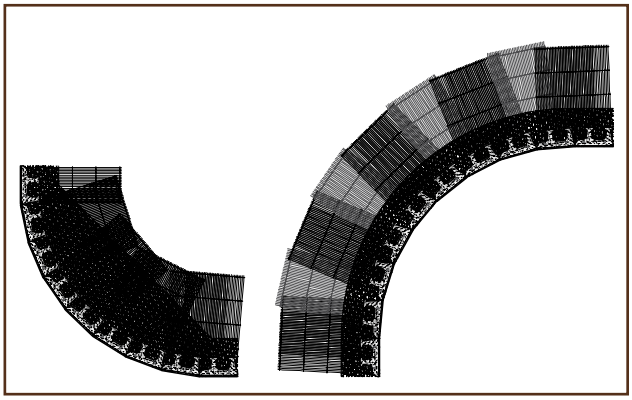
133Elite® 90º Corner Units

Trim adjoining units as necessary to keep units on bond.



Geogrid Installation on Curves

Convex and Concave Minimum Radius 16'



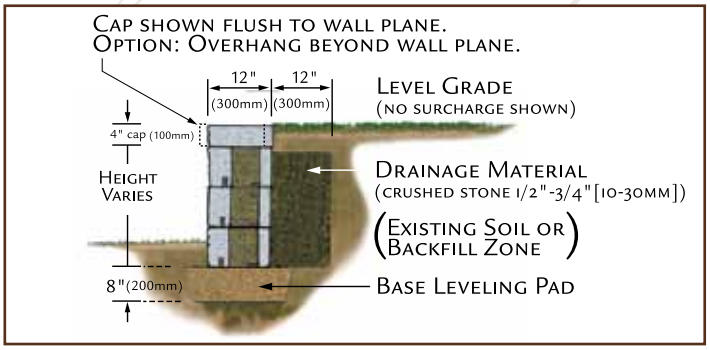
GRAVITY WALLS (maximum unreinforced wall height)

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)

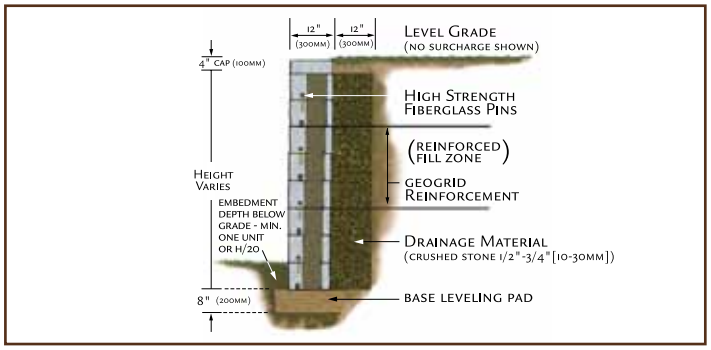
- *Friction angle (PHI) for use in earth pressure calculations of geogrid reinforced walls is evaluated at 26°, 30°, and 34° only. For other soil type analysis, refer to KeyWall® software program or consult with a qualified engineer.*
- *Moist unit weight for the three soil types used is 120 lbs./ft.^{3} (19kN/m^3).*
- *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

Gravity Wall - 2.5° batter



Reinforced Wall - 2.5° batter (2.0°+ batter)



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

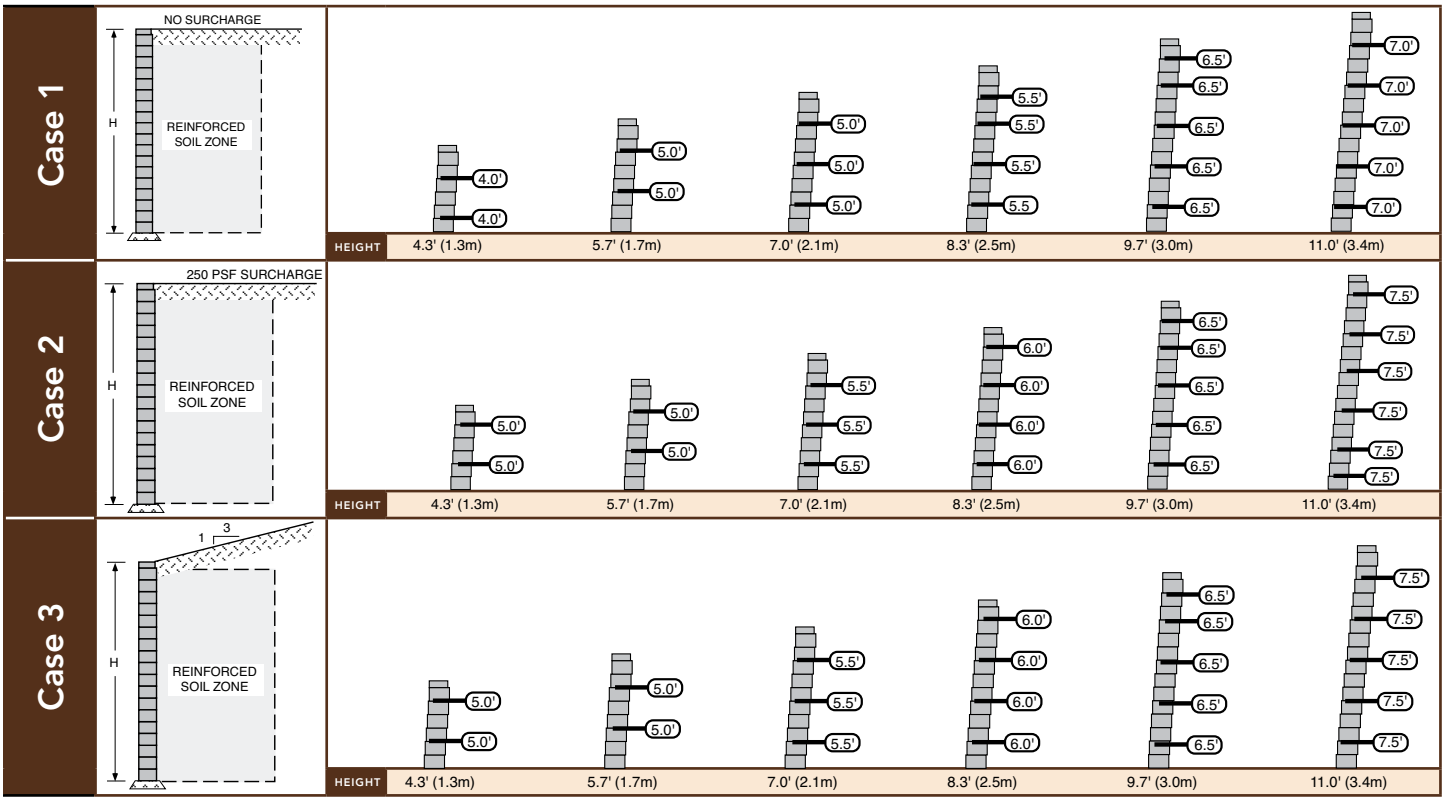
Geogrid Chart Notes

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.

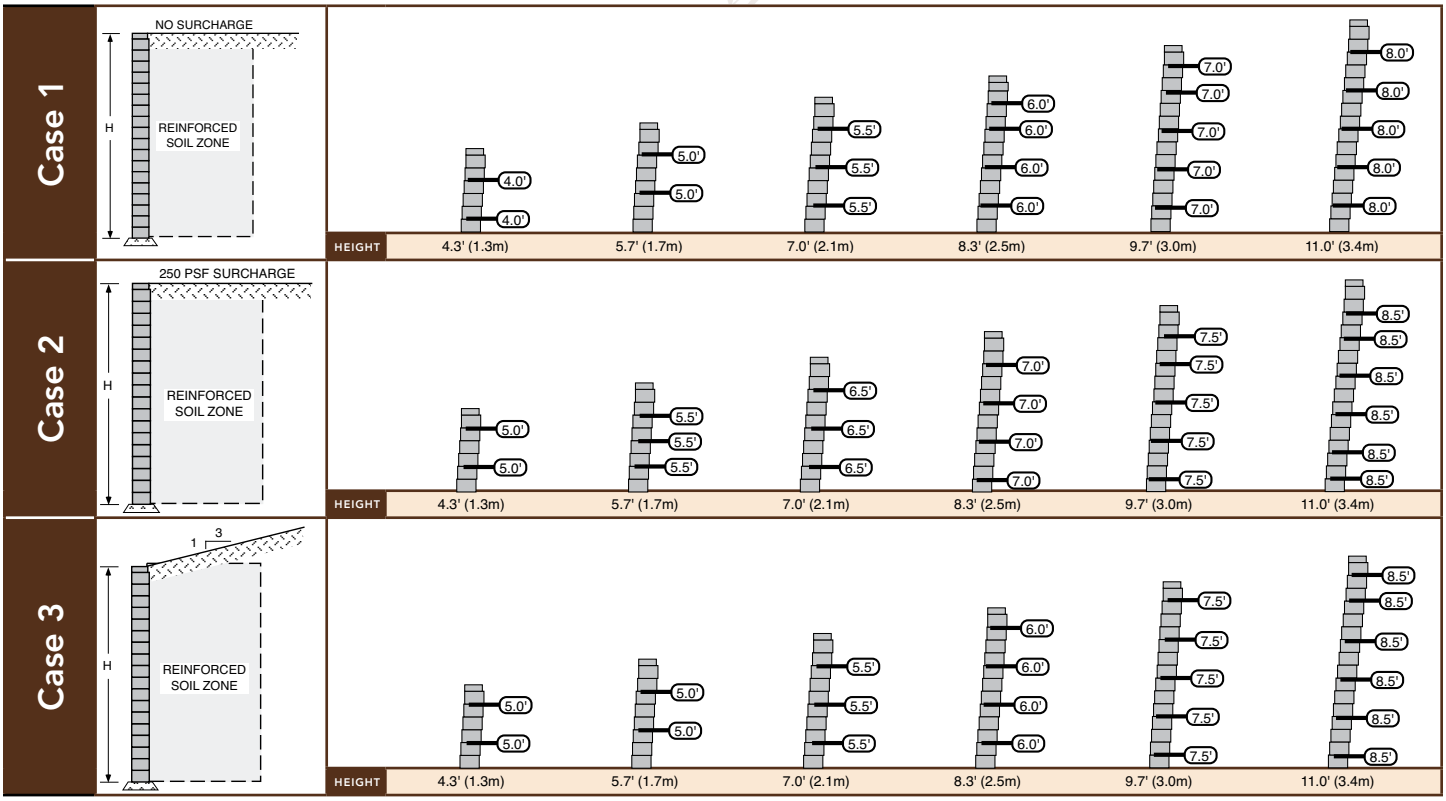
All geogrid lengths shown are the actual lengths of geogrid required as measured from the connection pins to the end of the geogrid.
Near vertical is 3/8"± setback per course.
The Design Charts assume that the walls are constructed in accordance with Keystone specifications and good construction practice. 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: ϕ=34°, γ=120 pcf (19kN/m^3)

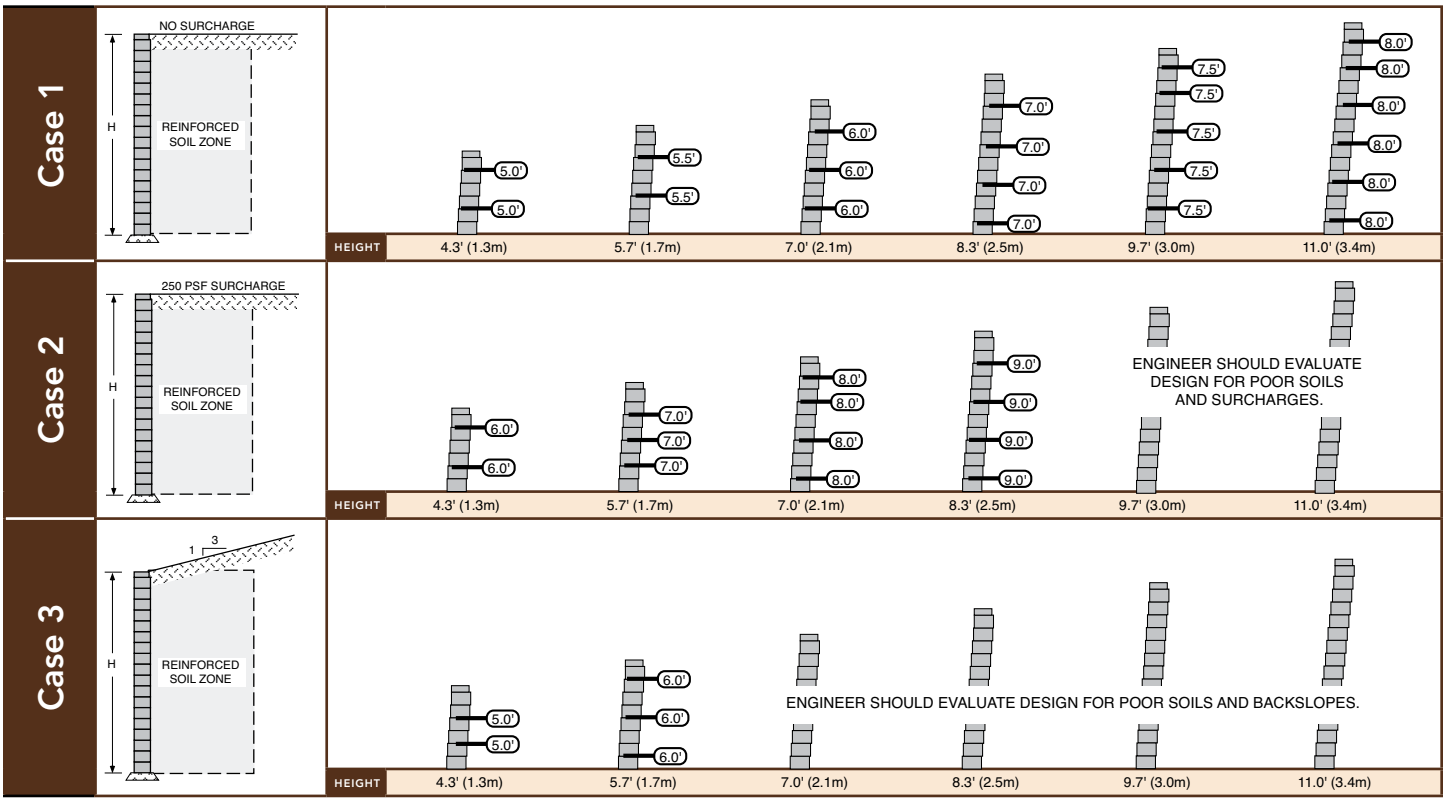
The following charts assume the use of a coated polyester geogrid with a minimum allowable design strength of LTDS = 1350 plf (10.9 kN/m) or Tal = 900 plf (7.3 kN/m).
Information on specific geogrids is available from the geogrid manufacturer.



Silty Sand: ϕ=30°, γ=120pcf (19kN/m³)



Silt/Lean Clay: ϕ=26°, γ=120 pcf (19kN/m³)



FOR MORE THAN 20 YEARS, Keystone Retaining Wall Systems, Inc. has set the worldwide standard for excellence and innovation within the segmental retaining wall industry. With cutting-edge design, performance and aesthetics, Keystone has always been a product of the passion and focus of the industry's top network of professionals. Together with premier manufacturers, product developers, engineers and sales professionals, we proudly ensure that Keystone products and services offer the best site solutions for governmental, commercial/industrial, recreational, public works and residential applications.

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KEYSTONE® GREEN SOLUTIONS

Keystone Retaining Wall Systems, Inc. is an environmentally conscious company committed to shaping the future of green building and design. As the worldwide leader for innovation and excellence within the segmental retaining wall industry, Keystone offers a wide range of site solutions that respond to green building and construction needs. Many of these solutions contribute toward the U.S. Green Building Council's LEED® (Leadership in Energy and Environmental Design) Green Building Product Rating System™ or other similar programs. Keystone products are also made of recycled materials and offer a durable, long-lasting solution, thereby reducing the impact on the environment.

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