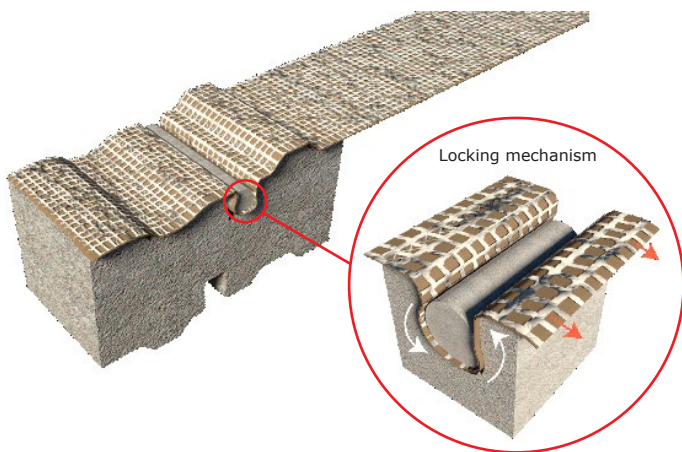


## 1 - Bosun VFC Retaining Wall System

The Bosun VFC retaining wall system is an innovation in the segmental retaining wall market. The VFC retaining wall system is designed to construct 90° concrete block retaining walls. In addition, the VFC system meets SANRAL's requirements for vertical retaining walls outlined in *South Africa COTO specification for roads 2019*.

The system uses a positive mechanical interlock connection between the geogrid and the block through an oval shaped interlocking pin (Figure 1). In addition to the fixed connection, the VFC uses a double nib system, resulting in increased shear resistance than what a single nib system can offer.



**Figure 1:** Cut section illustrating the interaction between the positive mechanical connector and the geogrid

### Benefits:

- Construct 90° walls, creating more usable ground space - ideal for projects with space constraints.
- No concrete infill or cutting of blocks on curves.
- Fixed connection system ensures less movement behind the wall.
- Castellated base block simplifies levelling of the foundation.
- Compatible with both imported and locally manufactured geotextiles available in South Africa.
- VFC blocks are easy to handle and can be placed manually, promoting hand labour.



**Figure 2:** 2m radius on concave and convex curves. No infill or cutting of blocks required.

### Features:

- Positive mechanical connection (locking mechanism) – meets requirements outlined in *SANRAL COTO 2019 Specifications*.
- Double nib system – increased shear resistance.
- Interchangeable face facilitates the construction of concave and convex geometries.
- The base block can be inverted and used as capping on the top of the wall.

## 2 - Bosun VFC Block Geometry

### VFC Block

Dimensions 300mm x 300mm  
Height 140mm  
Mass per Block ±26kg



### VFC Base Block

Dimensions 300mm x 250mm  
Height 80mm  
Mass per Block ±13kg

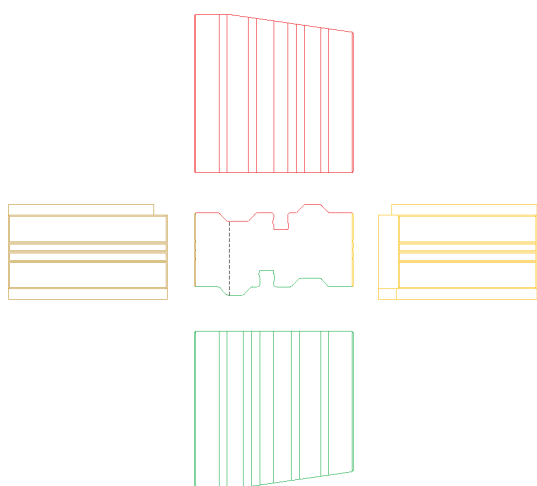


Figure 3: VFC block Multiview projection. The top nib is always at the back of the block when placed into the wall.

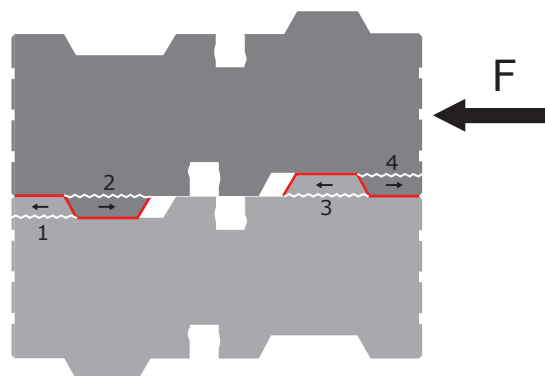
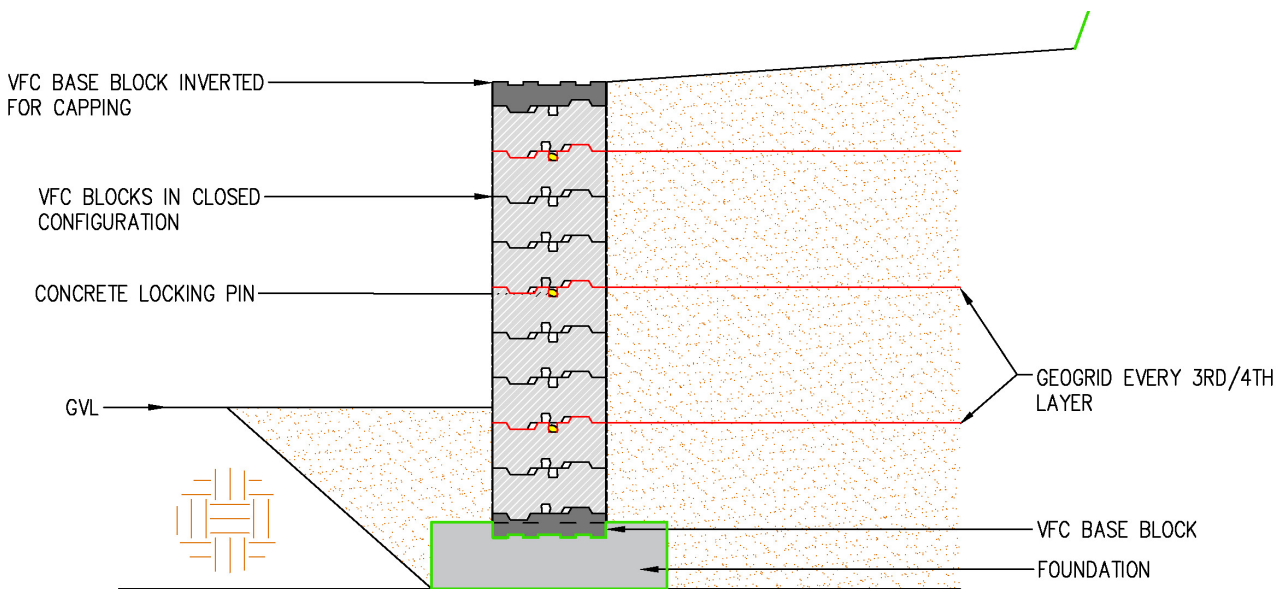


Figure 4: VFC double nib shear resistance. The block needs to simultaneously shear through one of the following combinations: 1&4, 1&3, 2&3 or 2&4. The fixed connection and strong nibs ensure that zero relative displacement occurs between blocks experiencing building surcharge.

## 3 - Construction Technical Information

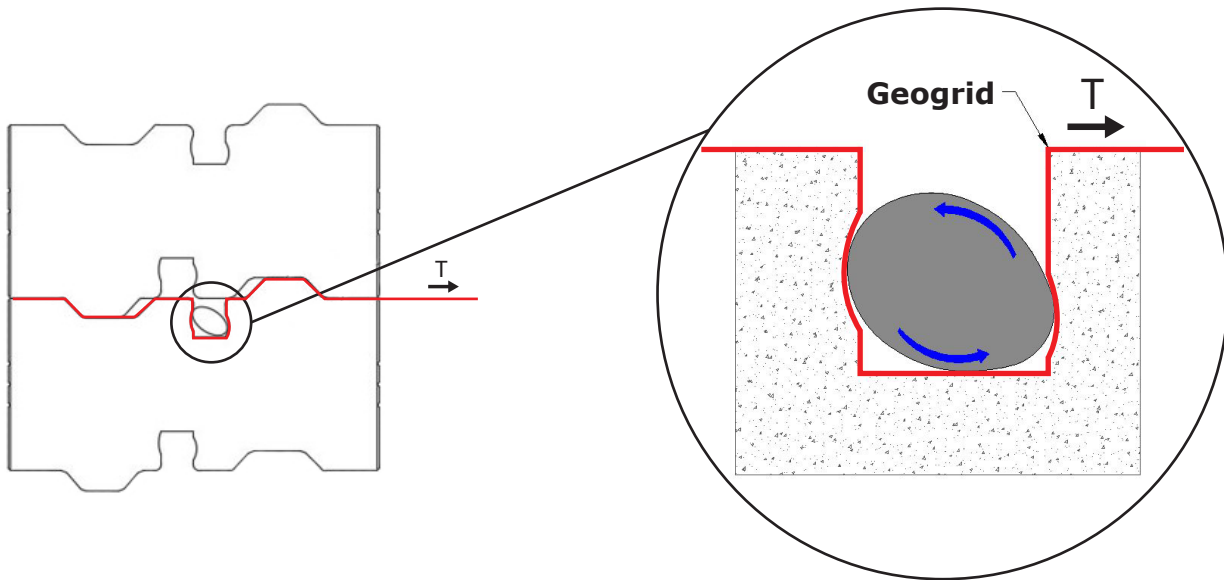
Blocks per square meter (blocks/m <sup>2</sup> )	23.8
Base blocks per running meter (blocks/m)	4
Concrete locking Pins per square meter per every 4 layers (pins/m <sup>2</sup> )	5.5
Wall construction degree for 90° wall (°)	85- 88
Minimum inner & outer curve radius (m)	2
Maximum recommended height per single tier (m)	12
Nib thickness (mm)	62
VFC blocks per pallet and weight per pallet (no., kg)	45, 1170
Base blocks per pallet and weight per pallet (no., kg)	72, 936
Maximum VFC blocks per 31T crane truck (no. blocks/truck)	1125
Maximum VFC blocks per 33T flatbed truck (no. blocks/truck)	1260

Figure 5: Typical VFC cross section



#### 4 - Geogrid interaction

Figure 6: Illustrates the interaction between the VFC block and the geogrid. Figure 6 also shows the interaction between two VFC blocks.



#### 5 - Summary of Test Results:

The blocks are manufactured in accordance with SANS 508:2012 and have the characteristics shown in the following table:

Characteristic	Manufacturers performance value
Dimensional tolerance (mm)	±3
Weight of VFC block (kg)	±26
Gross dry density (kg.m <sup>-3</sup> )	2150-2250
Compressive strength (MPa)	26
Nib shear strength mean (kN/m)	225
Nib shear strength statistical inferior value (kN/m)	196

\*Higher compressive strength concrete blocks can be manufactured on request

## VFC ASTM D6638 pull-out resistance testing:

ASTM D6638 testing on the VFC system has been conducted by an independent laboratory. A number of local geogrids were tested in combination with the VFC system. The following types of grids were tested:

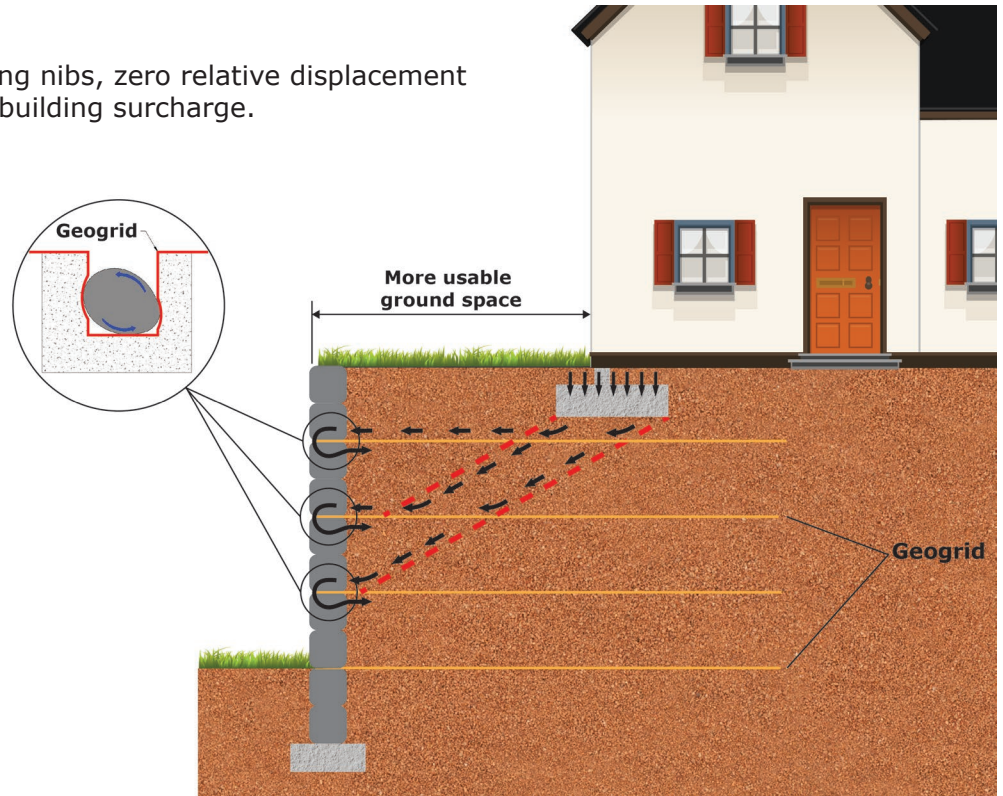
- 1.) Kaytech rockgrid PC
- 2.) Kaytech X-grids
- 3.) Maccaferri Paragrids
- 4.) Maccaferri WG grids
- 5.) Fibertex secugrids

[Click here to view the test results](#)

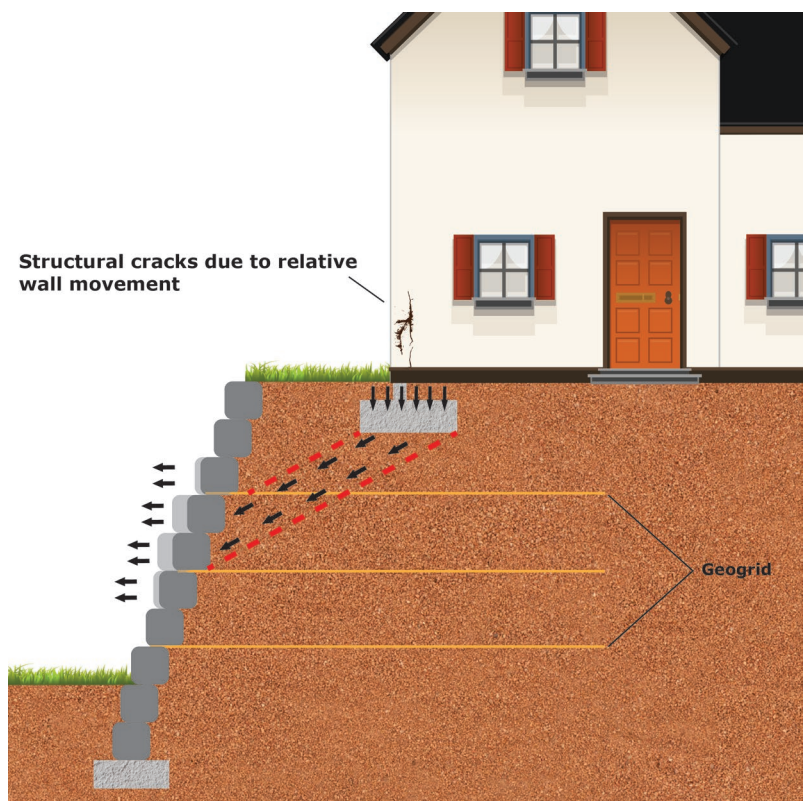
## 6 - Practical Advantages:

Due to the fixed connection and strong nibs, zero relative displacement occurs between blocks experiencing building surcharge.

### VFC System

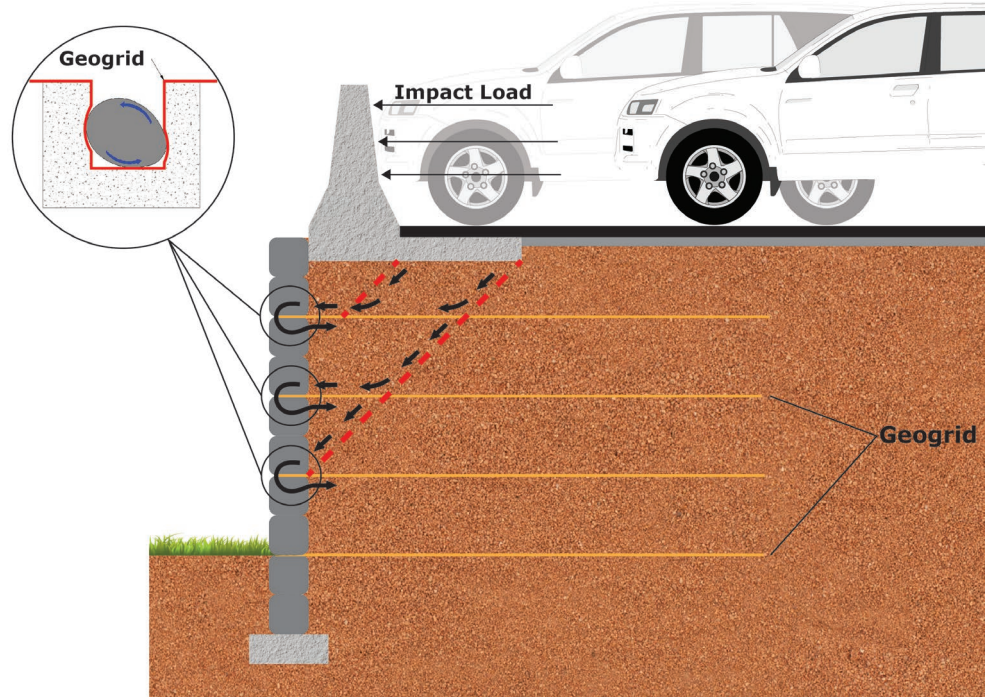


### Conventional System

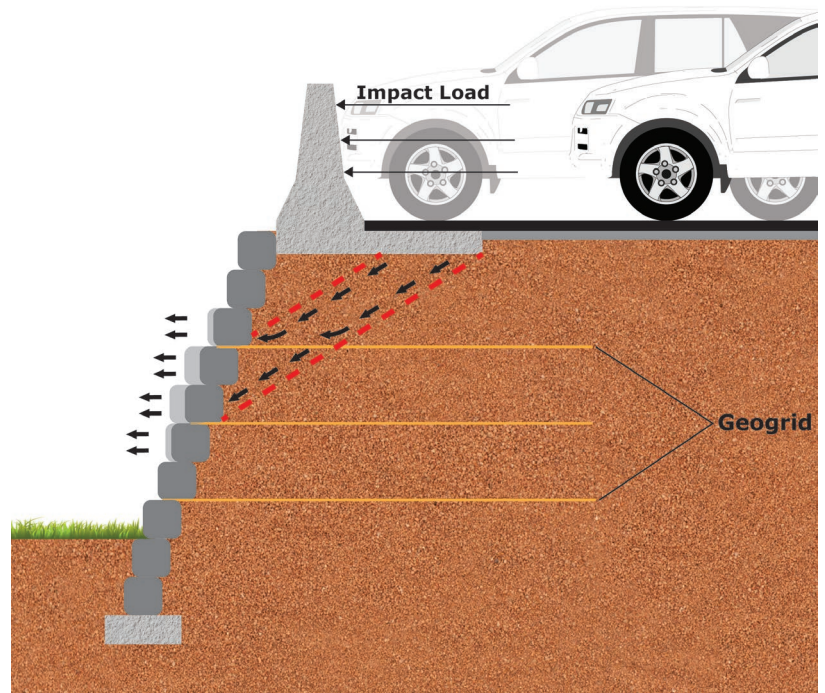


Roads built on the VFC system are better equipped to handle potential impacts on barriers. Conventional retaining wall systems using friction principles may fail as opposed to the fixed connection system used with the VFC.

### VFC System



### Conventional System



### 7 - Product Patents:

- ZA 2012/09544
- ZA 2017/08449
- ZA 2018/04934