Advantages of PET/PP Combigrid®

- reinforcement, filtration, separation and drainage in just one product, reducing aggregate thickness
- firmly bonded composite product
- very high strength at low strains
- immediate interlocking with cover aggregate
- high resistance against installation damage
- nonwoven geotextile firmly bonded between uniformly extruded PP or PET bars
- high resistance against biological and chemical degradation
- 4.75 m wide rolls
- quick and easy to install
- ISO 9001 certified
- CE marked
- very high radial secant stiffness values
**Combigrid®**

Combigrid® geogrids are the next generation of geogrids produced with state-of-the-art manufacturing technology, unlike any other geogrid on the market today. The reinforcement element is a highly oriented polypropylene or polyester bar that is uniformly extruded and drawn to achieve a high modulus and strength at low elongations.

The Secutex® nonwoven geotextile is placed between the Secugrid® bars during the manufacturing process and is firmly bonded between the reinforcement bars with the NAUE patented welding technology to provide a structurally sound and stable geogrid. Combigrid® geogrids are mainly used in conjunction with soft and low CBR soils where soil reinforcement in combination with separation and filtration is needed, such as in base reinforcement, embankment reinforcement and pile cap platforms.

**Advantage: Stress/strain behaviour**

Geogrid composites like Combigrid® are used wherever a high strength is required at low elongation. The stress/strain behaviour (also known as strength/elongation) of the geogrid is important when selecting which type of geogrid is to be used or specified. Geogrids will typically have a maximum elongation at break of 6% to 15%. However, the internal angle of friction of medium to densely compacted soils, in realistic design conditions, is reduced when the soil is subjected to an elongation of less than 2%. It is necessary to align the stress/strain behaviour of the installed geogrid to the elongation behaviour of the soil.

The performance of the geogrid at a stress/strain ratio in the range of 2% is therefore important and here Combigrid® shows its strength. Combigrid® has excellent tensile strengths at low elongations (figure 2) and demonstrates its advantages in the critical required elongation ranges.

**Advantage: Soil separation**

The three-dimensional fibre matrix of the needle-punched Secutex® nonwoven, that is firmly secured between the Secugrid® bars during the manufacturing process, acts as a separation layer between different grain size soils and ensures long-term separation and filter stability. Such a separation layer is typically recommended in base course applications for subsoils with a CBR less than 3% or in applications where fines should be prevented from moving into the reinforced aggregate above.

Tests in the U.S. to simulate the traffic passages on an unreinforced base course resulted in 3 inch (75 mm) deep traffic ruts after 20 load cycles, and it took 540 load cycles when geogrid reinforcement (Secugrid® 20/20 Q1) was used. However, when Combigrid® (see picture) was used, the corresponding traffic rut depth was not reached even after 100,000(!) load cycles. Using a composite product of geogrids with a nonwoven geotextile firmly bonded between the long and cross bars in the boundary layer to less-portative, soft subsoils worked really well. Combigrid® - not just a geogrid - is the solution for all infrastructure projects to be carried out on less-portative subsoil.
APPLICATION

SUBGRADE IMPROVEMENT WITH COMBIGRID®

The bearing capacity of the subgrade at the 56th and Plum project near Hutchinson was deemed much too low to support the expected traffic load. A significant amount of fill was thought to be needed, and there were more than 7,500 cubic yards of embankments within the project zone.

The contractor and Reno County personnel found that the subgrade had root structures 6-inches down from the vegetation that had been stripped for the site preparation. From 6 inches to 3 feet, fine sands were found but very little clay. From 3 to 4 feet, gray-colored clay and fine sands were discovered. Water began seeping in at about the 2 foot mark.

They considered a very costly over-excavation scheme which would have required hauling off the unsuitable soils and then replacing them with higher CBR soils, a which would have required hauling off the unsuitable soils and then replacing them with higher CBR soils, a very little clay. From 3 to 4 feet, gray-colored clay and fine sands were discovered. Water began seeping in at about the 2 foot mark.

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INSTALLATION

Loading of Combigrid®

On-site storage

Installed Combigrid® with overlaps

Cutting of Combigrid®

Placement of min. 200 mm aggregate

Soil compaction over Combigrid®

Aggregate interlocking

Final compaction