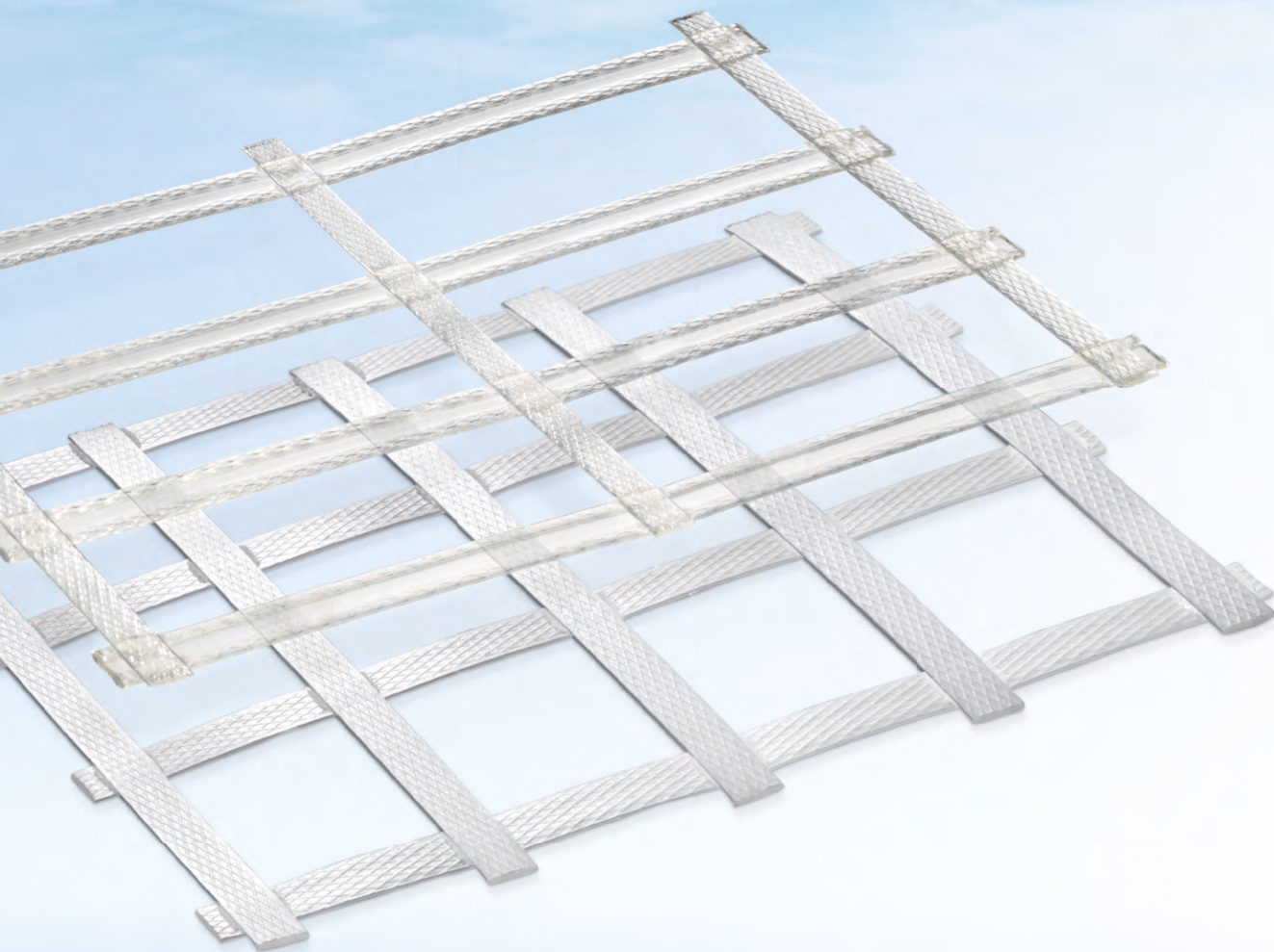


Advantages of PET/PP
SECUGRID®



The Inventor of structurally sound and stable welded geogrids.
Material science - Engineering - Innovation

SECUGRID® - The Original!



SECUGRID®

Secugrid® is a structurally sound and stable geogrid for soil reinforcement, manufactured of extruded and drawn polypropylene (PP) bars, laid and welded solid together.



- ✓ Very good stress strain behavior (PET and PP)
- ✓ High tensile stiffness
- ✓ Strong torsional rigidity
- ✓ Low creep tendency (especially PET)
- ✓ Robust against installation damage, chemical, and biological attack
- ✓ High (cyclic) tensile stiffness
- ✓ Biaxial geogrid strengths up to 140 kN/m
- ✓ Uniaxial geogrid strength up to 500 kN/m
- ✓ BBA-certified products (PET)
- ✓ All products available as Combigrid® (composite product of Secutex® non-woven firmly integrated between the Secugrid® bars)
- ✓ Quick and easy to install due to 4.75m wide rolls

Secugrid geogrids benefit from more than 20 years of NAUE's experience on reinforcement applications. Permanent improvement of the unique production process, the quality of raw materials and the engineering support ensure a safe and economic construction.

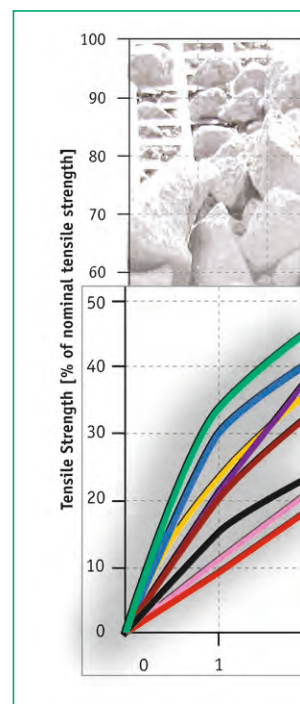
Secugrid® geogrids exemplify how geosynthetics perform best: by interacting with the soil aggregate to create something stronger or more secure.

Secugrid® Soil Reinforcement

Soil stabilisation & reinforcement is necessary in many applications to make constructions work. For example geogrid reinforcement supports granular base courses in windfarms used for highly trafficked access roads and heavily loaded crane platforms. Geogrid reinforcement enables the construction of steep and tall retaining walls & slopes, embankments on soft soil, load transfer platforms on piles, traffic routes on weak soil: reinforcement makes the infrastructure more achievable. Importantly, the selection of a geogrid reinforcement is often how the engineering becomes safer, more economical, more efficient, longer lasting and more sustainable.

Geogrids absorb stresses by interacting (friction & interlocking) with the surrounding soil to make earth structures stronger and more durable against applied loads. But, as highly engineered products their polymeric composition, manufacturing method, stress-strain behaviour (stiffness), and other product characteristics determine their suitability for a design.

Secugrid® geogrids utilise first quality raw materials for highly-oriented polypropylene or polyester flat bars that are uniformly extruded and drawn to achieve a high modulus and high strength at low strain levels. Enhanced by NAUE's patented welding technology, Secugrid® provides a structurally sound and stable geogrid for long-term performance in road and railway base reinforcement, retaining walls and slopes, veneer reinforcement, embankments, load transfer platforms over piles, and other challenging applications.

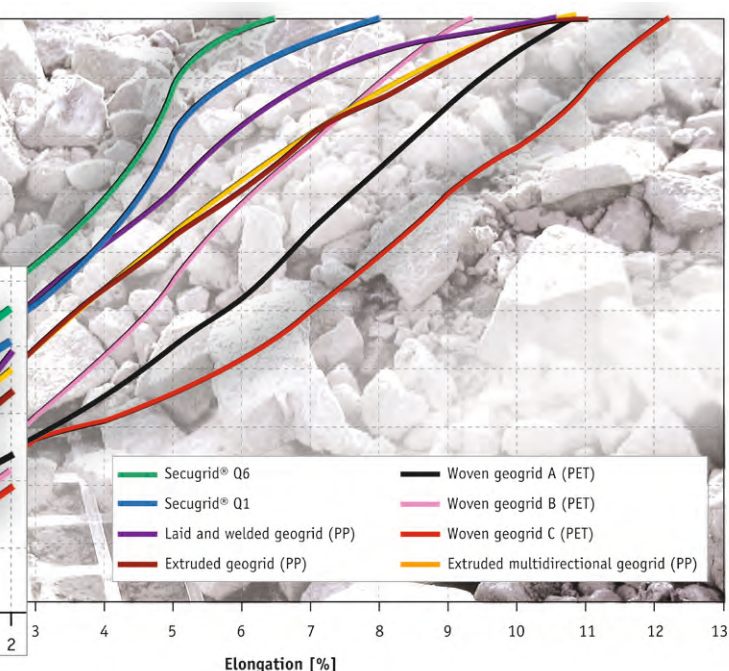




STRESS/STRAIN BEHAVIOUR

Mobilised shear stress in granular soils is substantially reduced when comparatively small axial strains ($<2\%$) are exceeded. Geogrids reduce deformation and increase the stability, safety and serviceability of soil structures. The stress-strain behaviour of geogrid reinforcement influences the available strength at low strains (Fig. 1); thus, reinforcement reduces rutting, bulging and crack formation, and other mechanisms of failure within roads, composite structures, and other reinforced soil layers and masses. Secugrid® achieves a high modulus and high tensile strength at low strains, as well as exhibit low creep tendency. This is essential for safe, economical durable engineering work and high serviceability.

Figure 1
Stress/strain curves of Secugrid® and selected geogrids



INTERLOCKING

Secugrid® absorbs tensile forces induced into the soil and distributes the stresses via its flat, stiff bars. This transfer of stresses takes place by two distinct mechanisms: interlock of the granular soil with the grid apertures (which physically restrain lateral movement of the granular material) and friction between the soil and the textured Secugrid® bars. The Secugrid® apertures allow for strike-through of the cover soil material which then interlocks with the ribs (flat bars) providing confinement of the overlying granular/soil material due to the stiffness and strength of the ribs. Furthermore the high torsional rigidity — an indicator of junction efficiency — provides the essential durability for long-term interlocking performance. The combined effect of the interlocked aggregate and the high tensile stiffness of the geogrid minimises soil deformation and ensures the integrity of the reinforced structure.

ROBUSTNESS

Secugrid® is a very robust geogrid, perfectly suited for soil reinforcement applications. The homogeneous flat bars in combination with high-quality raw materials ensure long-term durability and resistance not just to chemical/biological attack but to installation damage, which is an important factor in a geogrid beginning its engineered service life in optimal condition. The exposed surface area of Secugrid® is less than that of geogrids made from thin multifilament yarns. This engineering advance increases the robustness of Secugrid® for suitability in roads, railways, walls, construction pads, veneer stabilisation, and many other challenging reinforcement designs. (See also SPRAGUE et al., Geosynthetics '99, for a comparative analysis of robustness on geogrid longevity.)



Figure 2
Interlocking effect demonstrated by a Secugrid reinforced gravel column supporting a van (see <http://www.naue.com/en/naue-tv/geogrid-experiment.html>)

SECUGRID®

Secugrid® Soil Stabilisation & Reinforcement Applications:

- Base course stabilisation & reinforcement
- Retaining walls and slopes
- Bridge abutments
- Veneer reinforcement
- Basal reinforcement for embankments
- Load transfer platforms over piles
- Bridging of mining voids and sinkholes
- Reinforced foundations
- Airport runways and graded portions
- Working platforms, crane hardstandings
- Pipe trenches



BBA certificate for reinforced
Secugrid® PET geogrids
(Q6+R6) for reinforced soil
embankments



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