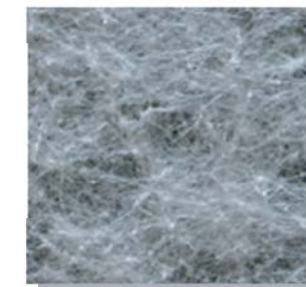
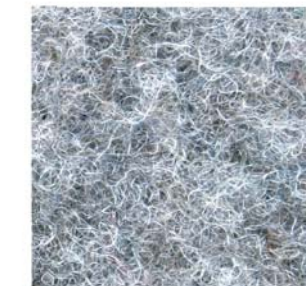


NON-WOVEN GEOTEXTILES



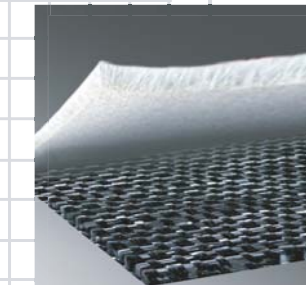
■ **NW: Thermally Bonded Non Woven Geotextiles**
Produced using mechanical and thermal bonding processes, the NW range is primarily used for lightweight separation and filtration. Their excellent hydraulic properties result in their preferred use in filtration applications. Typical uses include as a filter to encapsulate a trench drain or a granular drainage blanket.



■ **SNW: Superior Needle punched Nonwoven Geotextiles**
Made from white high tenacity fibres the SNW range offers maximum performance per unit weight and is ideal for use in applications where both strength and elongation are key parameters of the geotextiles' performance.

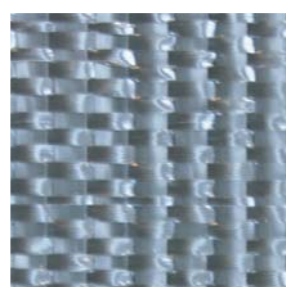


■ **VNW: Coloured Needle punched Nonwoven Geotextiles**
Produced using multi-coloured staple virgin fibres, products range from 200 to 1800g/m². VNW grades offer a felt like appearance and are used in the functions of protection, drainage and erosion control. Areas of application include membrane protection in landfill and reservoirs, or for erosion control on riverbanks and coastlines.



■ **LG: Geocomposites**
Produced via a combination of woven and nonwoven technology, the LG range offers the best of both product types in a single layer. The resulting products are ideally suited to uses where a high demand is placed on the geotextiles' strength, protection and physical robustness.

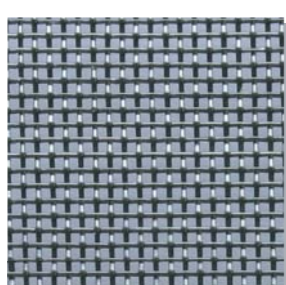
WOVEN GEOTEXTILES



■ **SG: Standard Grade Light weight Woven Geotextiles**
Increasing from 70 to 200g/m² SG lightweights are used primarily for separation to prevent good quality granular fill intermixing with the poorer soil below. Typical uses include in new highways, car parks, airport runways, under stone foundation layers for new buildings etc.



■ **SG: Standard Grade Heavy weight Woven Geotextiles**
With possible tensile strengths in excess of 200kN/m, SG heavyweight geotextiles are used in applications where the loadings are severe. Uses include short term basal reinforcement, coastal erosion schemes or areas requiring general soil stabilisation.

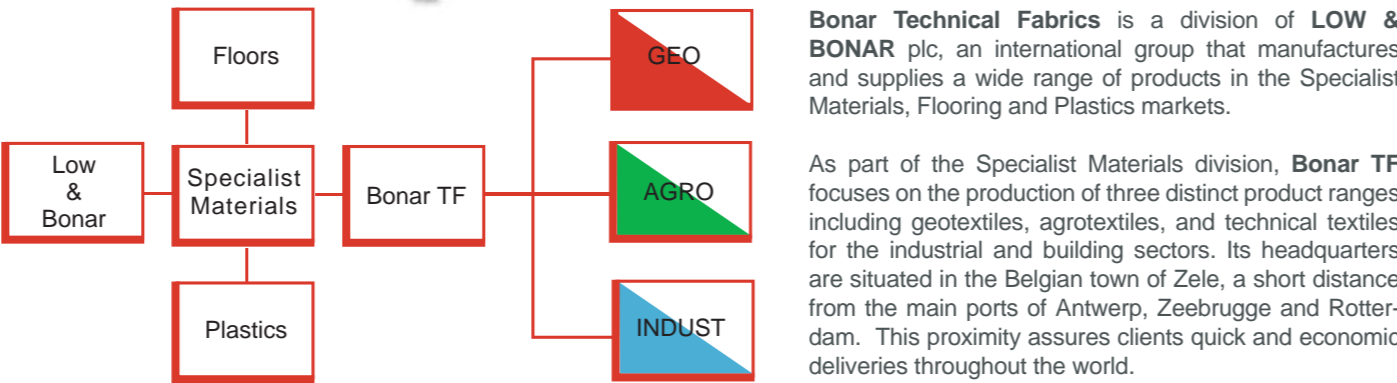
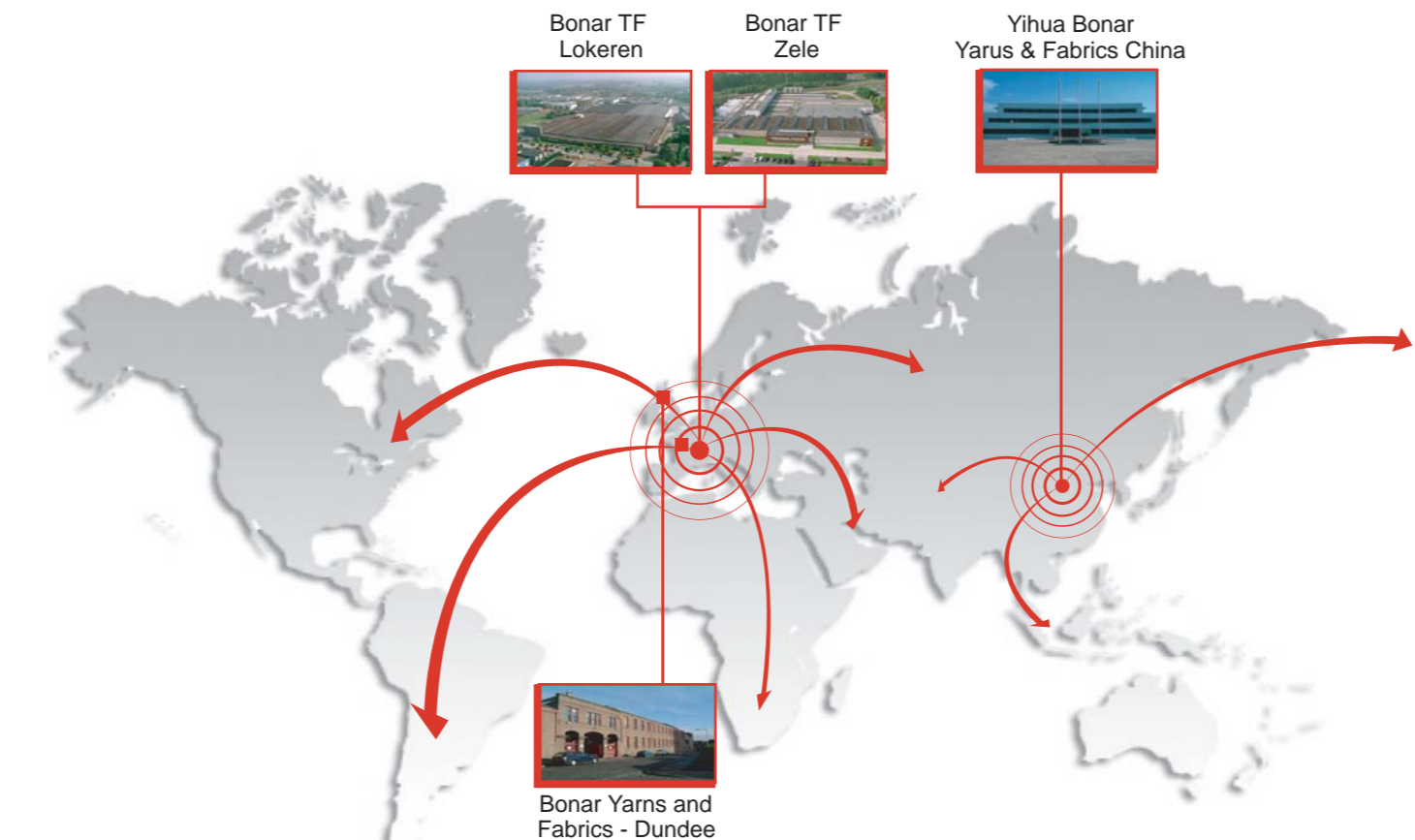


■ **HF: High Flow Woven Geotextiles**
Used where there exists a requirement for the quick escape of excess water, HF fabrics are used primarily in erosion control applications e.g. under concrete revetment blocks or between dissimilar layers of quick draining granular fill e.g. a coarse sand and rounded gravel.



■ **HS: High Strength Woven Geotextiles**
Produced from high tenacity polyester yarns, the HS products offer tensile strengths up to 600kN/m combined with low extension and excellent creep characteristics. Applications include the reinforcement of vertical walls, steep slopes and embankments over soft soil with long term design lives.

GROUP STRUCTURE



Bonar Technical Fabrics is a division of **LOW & BONAR** plc, an international group that manufactures and supplies a wide range of products in the Specialist Materials, Flooring and Plastics markets.

As part of the Specialist Materials division, **Bonar TF** focuses on the production of three distinct product ranges including geotextiles, agrotexiles, and technical textiles for the industrial and building sectors. Its headquarters are situated in the Belgian town of Zele, a short distance from the main ports of Antwerp, Zeebrugge and Rotterdam. This proximity assures clients quick and economic deliveries throughout the world.



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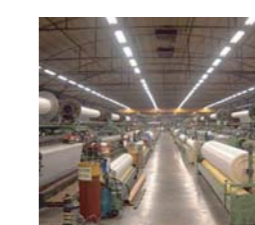
WHY CHOOSE BONTEC® GEOTEXTILES ?



Fibre Extrusion



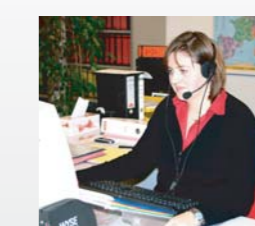
Non woven geotextiles



Woven geotextiles



State of the art laboratory



First class customer service

Bonar Technical Fabrics is Europe's premier manufacturer of woven and nonwoven geotextile products. Through our continuous commitment to **quality, product development and production improvement**, we have earned our position as a major player in our markets. Today, with over 30 years experience in the geosynthetics industry, and the full backing of our parent company, we are confident that we will continue to grow our business and remain at the forefront of our markets for many years ahead.

Manufactured under the brand name **Bontec®**, using state of the art **geotextile production technology**, our woven and nonwoven geotextile ranges offer product solutions for the functions of Separation, Filtration, Drainage, Erosion Control, Reinforcement and Protection.

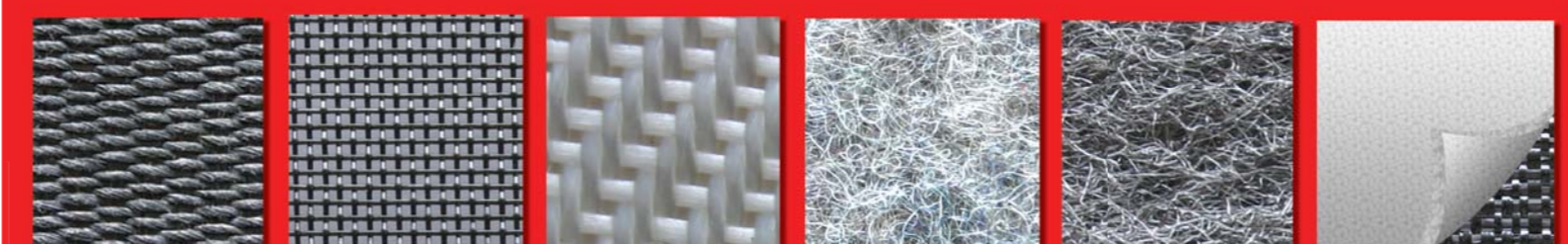
■ **In-house Fibre Production**
Fibre production involves the extrusion of continuous filaments that are then cut into short staple fibres. Through the careful identification of fibre formulation, filament density and staple fibre length, we can ensure that the mechanical and hydraulic properties are maximised for each of our different nonwoven product ranges.

■ **Nonwoven Geotextile Production**
Using ultra modern needle punching looms and a unique thermal bonding process, our nonwoven geotextile production involves the processing of a uniform web of staple fibres that are orientated and bonded to form a finished sheet product.

■ **Woven Geotextile Production**
Polypropylene tapes are manufactured in our slit film extrusion department prior to being woven on Sulzer looms. The warp tapes (machine direction) are beamed into the loom and the weft tapes (cross-machine direction) are threaded over and under alternate elements. The woven product that emerges offers very high mechanical strengths per unit weight.

■ **Quality and the Environment**
All plants operate in accordance with an ISO 9001:2000 Quality Assurance System and ISO 14001 Environmental Management System. Products are tested internally in our fully equipped geosynthetics laboratory in accordance with the latest European and International standards.

■ **First Class Customer Service**
At Bonar we believe the customer should be able to purchase the most appropriate product for his task. As such our staff are readily available to offer a full service package from the initial product selection phase, through to final delivery and the provision of after sales support.



WE UNDERCOVER THE WORLD



A TOTAL RANGE OF GEOTEXTILES



SEABED, COASTAL AND RIVERBANK PROTECTION



■ Tidal fluctuations can cause major damage to both the coastline and off-shore construction projects. To protect these structures from potential damaging wave action, sea defences are constructed using rock armour, placed on a geotextile filter underlayer.

To resist the installation stresses associated with rock placement, SG Heavyweight Woven and VNW needlepunched nonwoven products, offering high puncture strengths, are specified for use in this sector.

SG grades are also available with integrated loops, if required, to facilitate their placement, joining on site, or for the fixation of ballast or bundled wood fascines to the textile without causing damage to its mechanical or hydraulic properties.

On occasions, Coastal and River Bank Protection projects may use prefabricated concrete block protection systems as their primary source of armour. Here, HF Woven fabrics have been specially developed for use as a filter underlayer to prevent erosion of the subsoil and to ensure the long term performance of these highly permeable block mattresses.

RAIL MAINTENANCE AND RENEWAL



■ The pumping action generated by the passing of railway traffic over the track can cause the rapid deterioration of the ballast and the breakdown of the granular support given by the ballast to the sleepers.

In these applications Heavyweight NW geotextiles have many years of proven performance as a filtration/separation layer to help reduce track failure from pumping.

Installed between the ballast and underlying soil, the key properties of the geotextile include good puncture resistance and a small characteristic opening size.

GEOMEMBRANE PROTECTION



■ Landfill continues to provide one of the main forms of disposal for domestic and industrial waste.

Such applications require high quality densely needle-punched nonwoven geotextiles to protect the more sensitive geomembrane liners.

Through the provision of a very high puncture resistance, SNW and VNW geotextiles offer protection against both initial installation damage and longer term stress cracking. In this sector, SNW grades in particular demonstrate an extremely high performance at very competitive weights.

SNW and VNW needle punched geotextiles are also widely used in a protection function to prevent damage to the impermeable membranes used in the construction of water reservoirs, lakes and new tunnel linings.

FILTRATION/ DRAINAGE



■ Excess groundwater must be carefully controlled both during and after construction so as to ensure structural stability. Typical drainage systems include carriageway edge drains to protect the roadway, back of wall drainage to reduce hydrostatic pressure on the rear face of wall, or possibly a drainage mattress to provide the rapid escape of surplus water from the base of an artificial sports surface.

In these applications lightweight NW & SNW nonwoven geotextiles and HF woven geotextiles offering high water permeability and superior filtration characteristics provide the ideal filter layer for enclosing the drainage media.

By designing the hydraulic properties of the geotextile to the surrounding soil, the geotextile surface will provide a stable platform for the development of a natural soil filter and subsequent long lasting filtration performance.

ASPHALT OVERLAY FABRICS



■ Asphalt road surfaces crack with age and require essential repairs to extend the life cycle of the road. Placement of a new overlay offers a quick fix solution but may result in limited additional life due to the rapid propagation of the old cracks into the new overlay.

In an effort to maximize the service interval period, the inclusion of a reflective crack control geotextile, or SAMI (Stress Absorbing Membrane Interlayer), within the overlay has shown to substantially increase the service lifetime of the road.

Bonapave nonwovens have been specially designed for this application by offering an optimum combination of tensile strength, temperature resistance, bitumen absorption and flexibility.

REINFORCED SOIL



■ Traditional soil stabilization methods involving the construction of steep embankments or vertical retaining walls sometimes prove to be an expensive solution. Bontec® High Strength geotextiles now offer a new cost effective construction option. Through their outstanding tensile strength, high modulus of elasticity, low creep and excellent resistance to ultraviolet radiation, reinforcing geosynthetics offer one of the best guarantees of a durable and reliable construction.

During embankment construction over weak impervious soils, excess pore water pressures frequently develop and may lead to the formation of slip planes.

Alternatively HS geotextiles can provide a cost-saving method through the provision of a basal reinforcement layer that prevents the formation of slip planes and restricts the deformation of the embankment until such time as the foundation soil itself gains adequate stability.

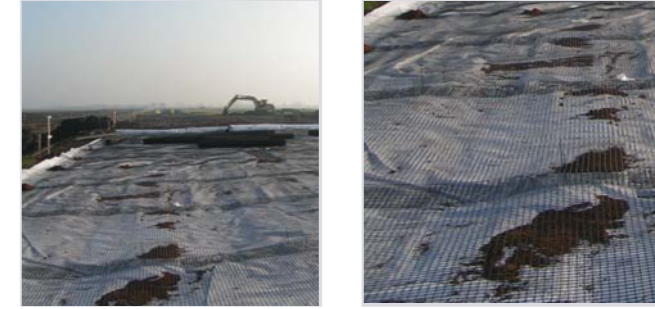
SEPARATION/ SOIL STABILISATION



■ Contamination of the road foundation by underlying subsoil material reduces the load bearing capacity and/or drainage characteristics of the granular fill material. Bontec® SG woven and NW nonwoven geotextiles offer an effective solution to this problem through the provision of a bespoke separation layer. Bontec® offers high mechanical performance per unit weight and so maximize their resistance to installation damage and ensure a long term in-situ performance.

As road foundation materials continue to get increasingly expensive, then the judicious use of an appropriate geotextile can often reduce foundation design thicknesses by a substantial margin. Rutting depth is limited by the geotextile reinforcement, which acts both as a 'sounding board' during fill compaction, and as a highly effective separation layer. This use of typically SG Heavyweight geotextiles, can produce significant savings in foundation material costs.

GEOGRID REINFORCEMENT



■ Access over, or construction on, a very soft and wet subgrade is not only extremely difficult, but also very costly. Typically, a traditional construction solution involves purchasing, transporting, placing and compacting large quantities of aggregate; a somewhat limited and increasingly expensive resource.

Today an alternative design solution exists using a reinforcing layer of E'Grid biaxial geogrid at the base of your construction. This allows you to work not only more effectively but can also reduce the required granular thickness by up to 40%. The stone and geogrid work in unison, the geogrid provides initial support for worker access and the first fill layers and mobilises the tensile reinforcing benefits of the grid, even under small vertical loads.

On site conditions where there is a concern that the underlying soil will squeeze through the apertures of the grid, then it is recommended that you use a light-weight needle punched nonwoven geotextile separator immediately below the geogrid.

INSTALLATION GUIDELINES



■ This information is offered in good faith to assist end users with the installation of our geotextiles and/or geogrids:

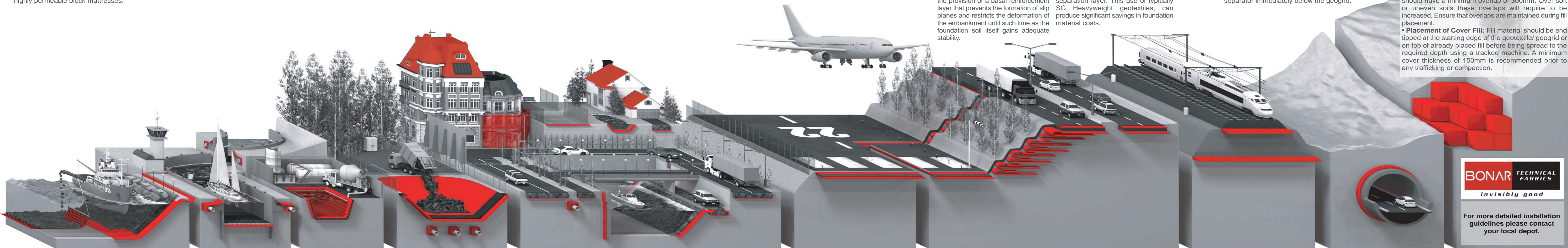
- **Subgrade Preparation:** Product may be laid directly on undisturbed vegetation e.g. grasses and reeds should levels so permit. All plant vegetation, large rocks or other similar obstacles must first be removed. On very soft ground it can be advantageous to cut the vegetation flush with the ground so as to leave the root zone and soil crust undisturbed. All voids, wheel ruts and/or other deep depressions should be filled or leveled to provide a smooth surface.

- **Installation:** The geo-product should be rolled out and allowed to follow the contours of the land. Small deposits of fill material should be placed on top of the geogrid at this time to hold it in position until the main fill placement commences. No construction traffic should travel directly on the product prior to fill placement.

- **Geotextile/Geogrid combinations:** Should the joint use of a geotextile separator and geogrid be specified over very soft ground then the geogrid should always be placed on top of the geotextile.

- **Product Continuity:** The quickest method of ensuring product continuity is to overlap adjacent layers. Rolls should have a minimum overlap of 300mm. Over soft or uneven soils these overlaps will require to be increased. Ensure that overlaps are maintained during fill placement.

- **Placement of Cover Fill:** Fill material should be end tipped at the starting edge of the geotextile/ geogrid or on top of already placed fill before being spread to the required depth using a tracked machine. A minimum cover thickness of 150mm is recommended prior to any trafficking or compaction.



For more detailed installation guidelines please contact your local depot.