

Secutex®

Nonwoven Heavyweight Geotextile Range

Polypropylene Geotextile for Speciality Applications

Geotextiles for protection of liners in
landfill construction

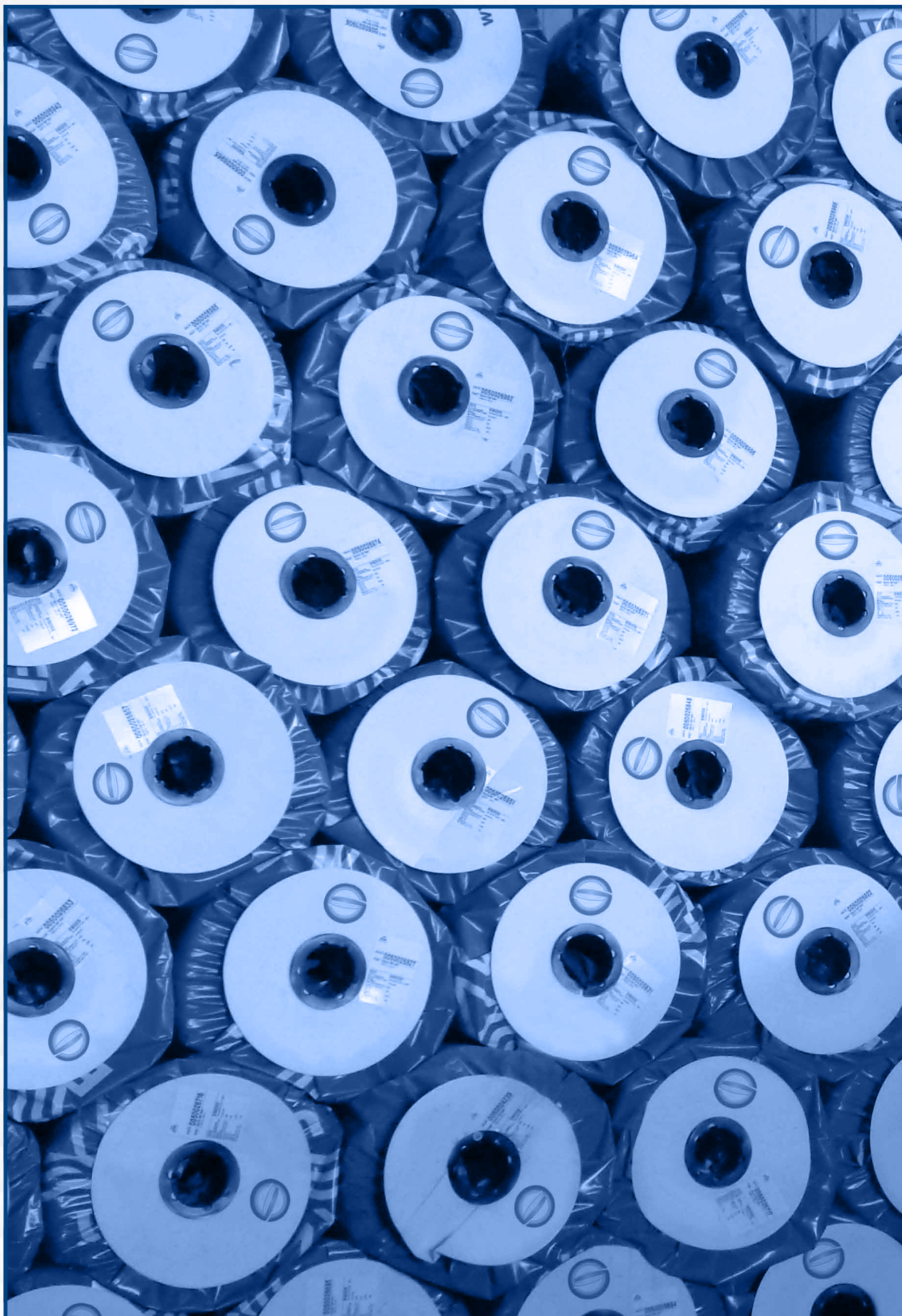
Geotextiles for rock revetments

Geotextiles for Secutex® Soft Rock
sand containers in coastal protection



Global Synthetics

Australian Company – Global Expertise



Global Commitment to Quality

Global Synthetics with their German partner, Naue GmbH, have strong commitments to quality and transparency in all our dealings with our suppliers and customers.

Global Synthetics is a 100% Australian owned company that is totally committed to providing the Australian market with the best possible range of geosynthetics products to suit the widest possible range of engineering applications.

Naue GmbH are a German specialist geosynthetics manufacturing company that has a commitment to product development and engineering innovation in their field of engineering.

CE Markings

Global Synthetics with their German partner, Naue GmbH, are now able to offer the heavyweight nonwoven geotextile, Secutex® into the Australian market. Secutex® geotextile is manufactured in a range of fabric mass from 600g/m² to 4000g/m² for the most demanding coastal, environmental and transportation applications.

Secutex® is CE marked, ensuring that the property values quoted are in compliance with legislative requirements of the European Union and that the necessary checks on assessments of property values have been made.

CE markings and the provided data allows the purchaser to make informed decisions about the statistical variance of data provided by the manufacturer and provides for a basis of fair comparison between products.

Secutex® Geotextile Grade			R 601		R 801	
Property	Standard	Unit	Mean	Deviation	Mean	Deviation
Wide Width Tensile Strength MD	EN ISO 10319	kN/m	30.0	-3.0	45	-4.5
Wide Width Tensile Strength CMD	EN ISO 10319	kN/m	45.0	-4.5	70.0	-7.0
Elongation MD	EN ISO 10319	%	50	-5.0	50	-5.0
Elongation CMD	EN ISO 10319	%	40	-4.0	40	-4.0
Static Puncture Behaviour	EN ISO 12236	kN	7.0	-0.7	9.0	-0.90
Dynamic Perforation Resistance	EN ISO 13433	mm	5.0	+1.0	4.0	+0.8
Protection Efficiency & Thickness	EN ISO 9863-1	mm	4.2			
300 kPa	EN ISO 13719	%	1.3	+1.3	1.1	+1.1
600 kPa		%	2.3	+1.2	2.0	+1.0
1200 kPa		%	4.0	+2.0	3.4	+1.7
Characteristic Opening Size (O ₉₀)	EN ISO 12956	mm	0.08	+0.024	+0.07	+0.021
Permeability Normal to Plane (V _{H50})	EN ISO 11058	m/s	3.0 E -2	-9.0 E-3	2.5 E-2	-7.5 E-3

Secutex® Geotextile Grade			R1001		R 1201	
Property	Standard	Unit	Mean	Deviation	Mean	Deviation
Wide Width Tensile Strength MD	EN ISO 10319	kN/m	50.0	-5.0	55.0	-5.5
Wide Width Tensile Strength CMD	EN ISO 10319	kN/m	80.0	-8.0	100.0	-10.0
Elongation MD	EN ISO 10319	%	50	-5.0	50	-5.0
Elongation CMD	EN ISO 10319	%	40	-4.0	40	-4.0
Static Puncture Behaviour	EN ISO 12236	kN	11.5	-1.15	13.0	-1.3
Dynamic Perforation Resistance	EN ISO 13433	mm	2.0	+0.4	2.0	+0.4
Protection Efficiency & Thickness	EN ISO 9863-1	mm	6.8		7.5	
300 kPa	EN ISO 13719	%	0.9	+0.9	0.8	+0.8
600 kPa		%	1.7	+0.9	1.5	+0.8
1200 kPa		%	3.0	+1.5	2.7	+1.4
Characteristic Opening Size (O ₉₀)	EN ISO 12956	mm	0.08	+0.024	+0.07	+0.021
Permeability Normal to Plane (V _{H50})	EN ISO 11058	m/s	1.8 E -2	-5.4 E-3	1.5 E -2	4.5 E-3

Secutex® Geotextile Grade			R1701		R 2001	
Property	Standard	Unit	Mean	Deviation	Mean	Deviation
Wide Width Tensile Strength MD	EN ISO 10319	kN/m	67.0	-6.7	85.0	-8.5
Wide Width Tensile Strength CMD	EN ISO 10319	kN/m	110.0	-11.0	160.0	-16.0
Elongation MD	EN ISO 10319	%	50	-5.0	60	-6.0
Elongation CMD	EN ISO 10319	%	40	-4.0	40	-4.0
Static Puncture Behaviour	EN ISO 12236	kN	19.0	-1.9	21.0	-2.1
Dynamic Perforation Resistance	EN ISO 13433	mm	0.0	+0.0	0.0	+0.0
Protection Efficiency & Thickness	EN ISO 9863-1	mm	9.5		11.5	
300 kPa	EN ISO 13719	%	0.5	+0.5	0.4	+0.4
600 kPa		%	1.2	+0.6	1.0	+0.5
1200 kPa		%	2.1	+1.1	1.8	+0.9
Characteristic Opening Size (O ₉₀)	EN ISO 12956	mm	0.07	+0.021	0.07	+0.21
Permeability Normal to Plane (V _{H50})	EN ISO 11058	m/s	1.1 E-2	-3.3 E-3	1.0 E-2	-3.3 E-3

Note: 1. Other grades are available upon request.
2. One deviation corresponds to 95% confidence that the values quoted will be met or exceeded. Where the value is critical the minimum or maximum relevant value is shown only.

Why this Approach?

Global Synthetics has a strong commitment to Australian Standards and test methods. Unfortunately, in the application areas of coastal and landfill works using geosynthetics, there is little formal guidance in this Australian market particularly with respect to appropriate test methods and formal specification values appropriate to these specific applications.

Global Synthetics has proactively decided that by providing a data sheet with property values determined by appropriate ISO test methods and CE marked product, designers can best make use of the recommendations of European environmental and coastal engineers and researchers in a direct and unambiguous manner.

Global Synthetics has a range of alternate geotextiles that are fully compliant to local specifications for traditional applications of drainage, separation and filtration.

Explanation of Data Sheet Values

Data sheet values are quoted as mean values with “the deviation” noted for each test property and for each grade of Secutex® geotextile quoted. One deviation either subtracted from the mean value noted (or in the case of Characteristic opening size-added to the mean value noted) implies that a statistical probability of 95% exists, that the calculated value will be achieved.

This approach is consistent with CE marking requirements. It also provides both the designer and contractor with an increased level of confidence in the use of such products when appropriately CE marked and can allow a fair comparison of property values between competing products.

Note: 1 ISO denotes International Standards Organisation.
2 CE denotes Committee European and is the marking system used to demonstrate a product compliance with that scheme of Quality.

Secutex® for geomembrane protection

Landfill Geotextiles-Needle Detected Secutex®

Geomembranes are often used in civil engineering applications to create a hydraulic barrier. Their basic function is to remain impervious over the design life of the project. However, mechanical stresses induced by confined materials could produce a deformation of the geomembrane and in critical situations, could ultimately puncture the geomembrane causing leakage of potentially harmful contained contaminants into groundwater.

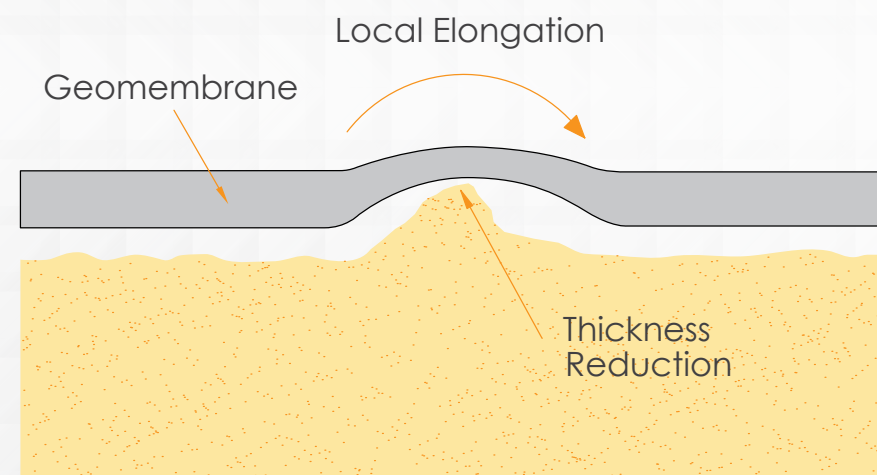


Fig.1 Effect of surface conditions on geomembrane without geotextile cushioning layer.

Protection layers, typically heavy mass nonwoven geotextiles are used in geosynthetic engineering to reduce the occurrence of local stresses and thus to control potential puncture of the liner by the material installed directly above, typically an aggregate drainage layer.

Consideration needs to be given in the design of a landfill system to

- the thickness of the geomembrane.
- particle size and shape of the aggregate immediately in contact with the geomembrane.
- the stress level imposed on the geomembrane. This is typically a function of the landfill depth.
- the nature of the ground conditions on which the geomembrane is to be placed. Softer ground conditions will induce higher stresses in the geomembrane.
- the characteristics of the nonwoven geotextile and the demonstrated ability to protect and reduce stress on the geomembrane.

Design Method according to GDA € 3-9 and EN 13719-12:2002

The design is based on a performance test (as shown in Fig.2).

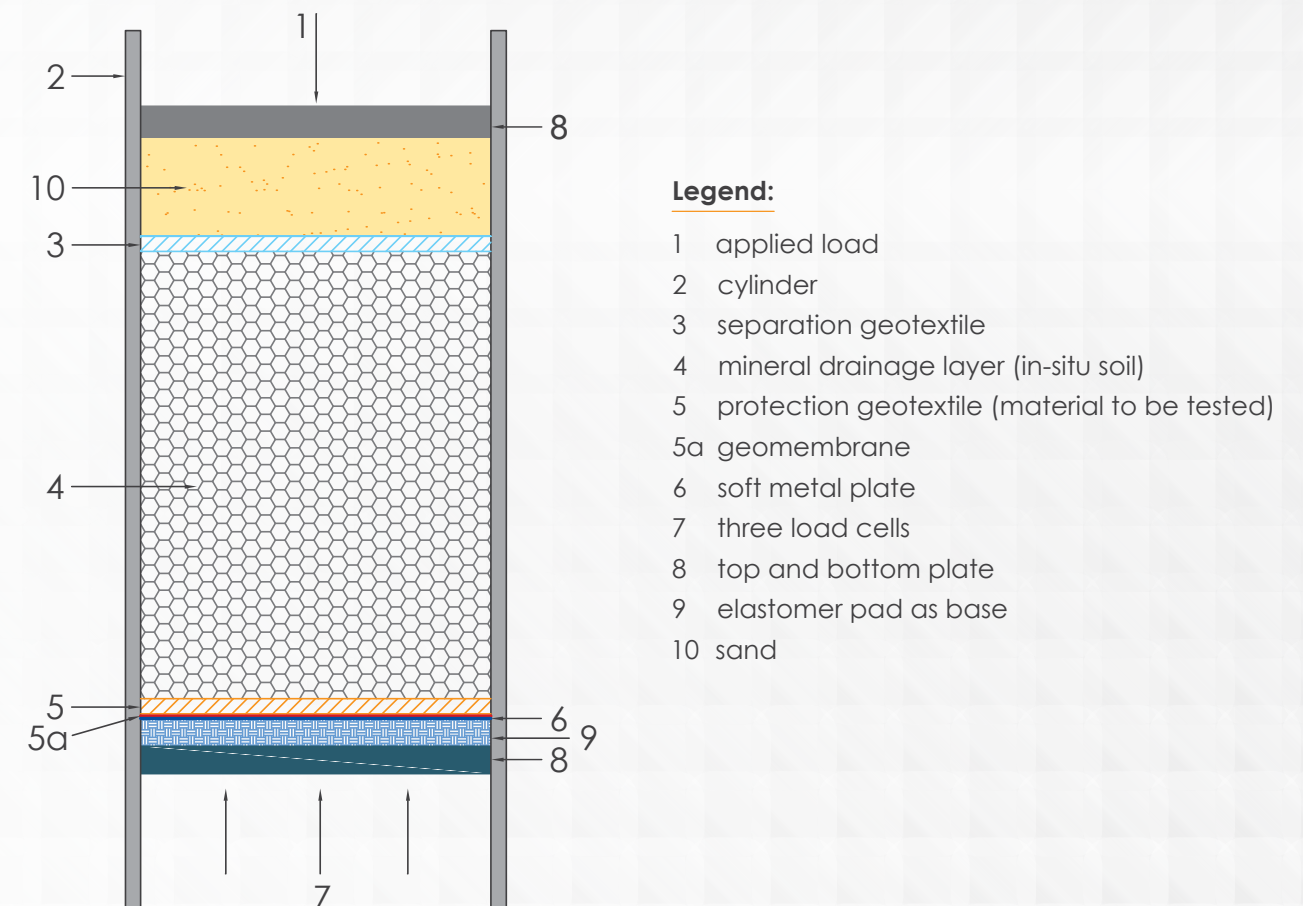


Fig.2 Schematic of cylinder arrangement

The test uses the same materials (both in situ and imported) that are planned for the site under investigation. The planned geomembrane, the protection nonwoven geotextile and the planned drainage layer are installed in the test apparatus on top of a soft metal plate and a determined surcharge applied (the surcharge is subject to a load factor related to temperature, extrapolation effects and test period).

European experience is to generally allow a load increase factor of ≥ 2.5 for test conditions of room temperature = 20° C and a test period of 100 hours.

Secutex® for geomembrane protection

Laboratory Load Test Details

The recommended test conditions follow ISO 13719 [1] and the German Landfill Association [2].

Temperature	Duration	Load
40°C	1000 hours	1.50 x Design load
20°C	1000 hours	2.25 x Design load
20°C	100 hours	2.50 x Design load

Table 1: Recommended test conditions for the Cylinder Test according to [1] and [2].
[1] DIN EN 13719:2002/AC:2005; Geotextiles and geotextile-related products – Determination of the long term protection efficiency of geotextiles in contact with geosynthetic barriers.
[2] GDA – Empfehlungen, E3-9: Eignungsprüfung für Geokunststoffe;

TEST RESULTS

After the test is completed the geomembrane is inspected for damage to its upper surface (cracks or nicks), sharp angled deformation and maximum permissible local strain using the metallic plate. With the use of the soft metal plate, deformations in the geomembrane can be measured after the test procedure.

The design criteria for the choice of the protection Secutex® nonwoven geotextile is where the allowable elongation of the geomembrane (respectively in the soft metal plate) is no greater than 3%.

In general it can be stated that the thicker the protection geotextile, the better the protection efficiency.

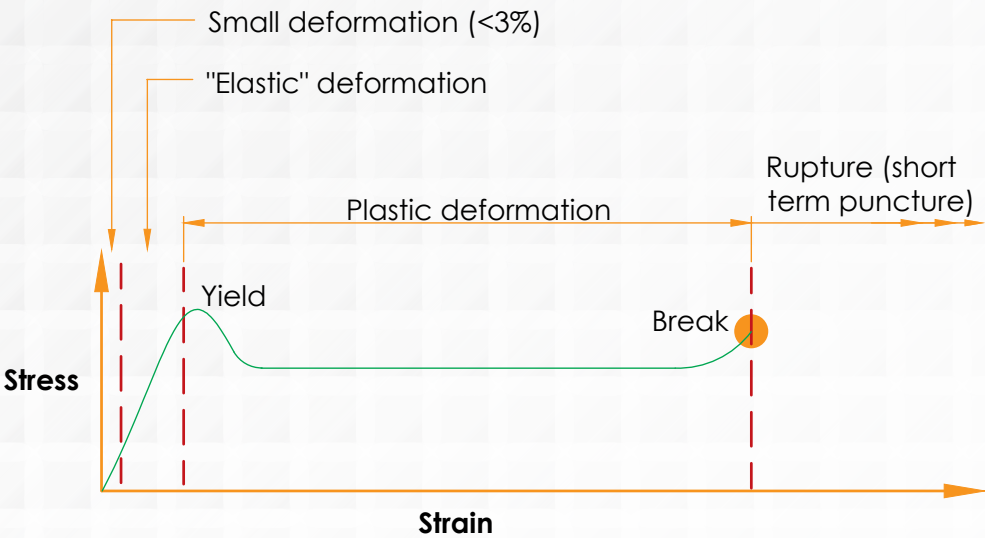


Fig.3 HDPE geomembrane stress/strain curve.

In certain situations, site specific testing should be undertaken. Global Synthetics can advise suitable test facilities.

Shown below is a general guide in the selection of suitable protection geotextiles.

Use the following suggested Secutex® protection geotextile above the geomembrane for various fill heights in the landfill.

WASTE

Height of Waste	Mass per unit area of Secutex®
15m	Secutex® R801
25m	Secutex® R1201
35m	Secutex® R2001

50m	Secutex® R3001
>50m	Contact Global Synthetics for Specialist Advice

COVER SOIL

Use the following suggested Secutex® protection geotextile above the geomembrane for various fill heights above the landfill in cover soil situations.

Depth of Cover Soil	Mass per unit area of Secutex®
Up to 1m	Secutex® R801
Over 1m	Secutex® R1201



Secutex® for rock revetment

Coastal and revetment geotextiles – Secutex®

Secutex® products are very heavy weight nonwoven geotextiles specifically designed for use in applications where large armour rock is to be placed, to prevent erosion to a structure or amenity from wave or current attack.

Typical applications would include coastal defence works, rock revetment works along waterways and bridge protection structures. Such treatments can involve the placement of large armour rock that may weigh many tonnes, being placed on soft foundation materials in quite often, difficult, marine and estuarine environments.

To ensure the survivability of these geotextiles, when large rock is placed and to avoid possible subsequent installation damage to the geotextile (such that the product can provide the intended functions of drainage, filtration and separation beneath the rock armour layer(s)) it is important that the selection of the geotextile is carefully considered such that it allows for the unique hydraulic requirements of such environments (possible reversing flows) and that damage to the geotextile is minimised during rock placement activities.

Secutex® are staple fibre, needle punched, polypropylene nonwoven geotextiles. This range of products can be manufactured to weights in excess of 3000g/m². The unique fibre geometry of the product allows for efficient hydraulic and drainage performance whilst the mass of the fabric allows for a high level of toughness and resistance to damage during rock placement.

Damage Issues

The issues associated with damage to a geotextile are generally excessive drop heights of the rock during placement onto the geotextile and/or the use of an inappropriate fabric. Rock placement should be carefully controlled and supervised.

The choice of fabric mass can be assessed on the basis of work undertaken by the German Federal Waterways Engineering and Research Institute (BAW) that carried out significant field trials that evaluated drop height to rock mass and subsequent required geotextile properties. Generally the minimum extension requirement will be 40% at ultimate tensile strength.

This will be a nonwoven needle punched product. For coastal and estuarine works it is preferable that a nonwoven geotextile constructed from staple fibre be used. This staple fabric construction type has been demonstrated to show improved abrasion resistance compared to a geotextile type made from continuous filaments. In situations of dynamic flows and the likelihood of particle movement against fabric faces resistance against abrasion is important for long term service performance.

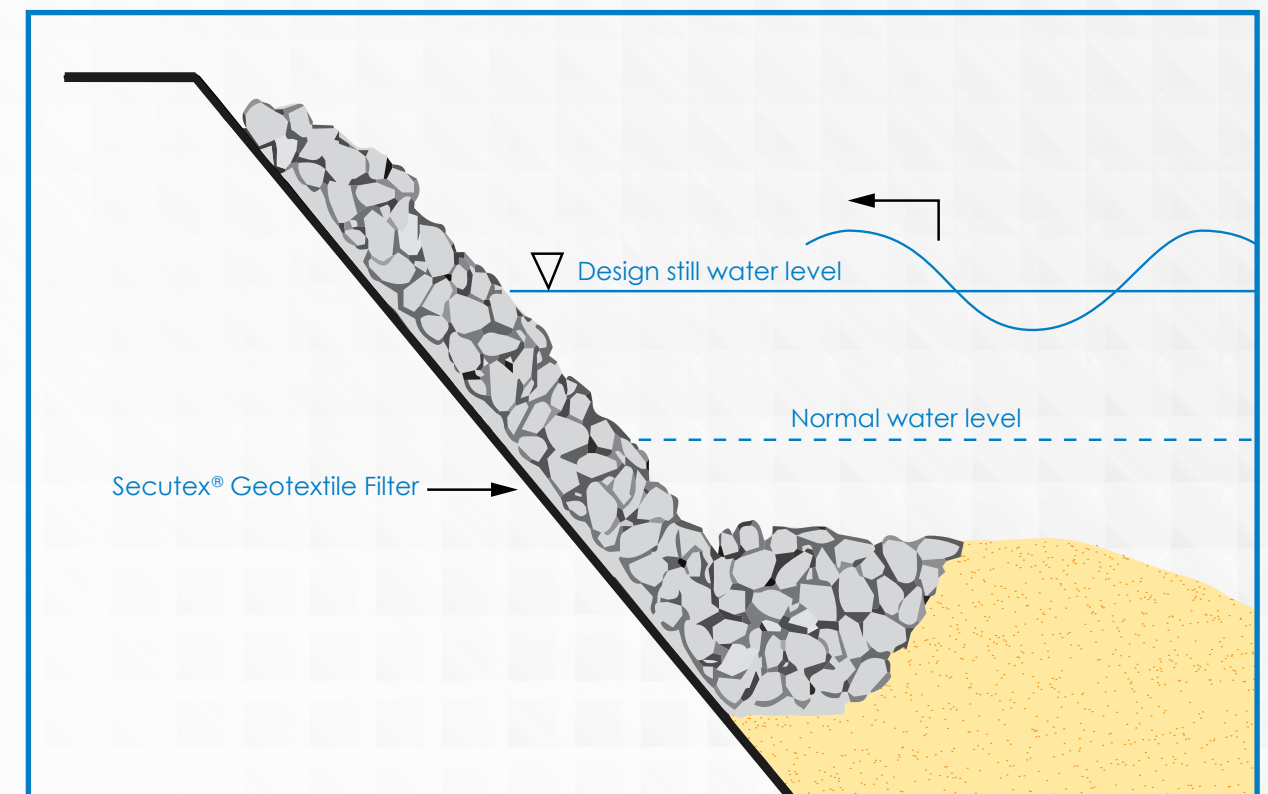
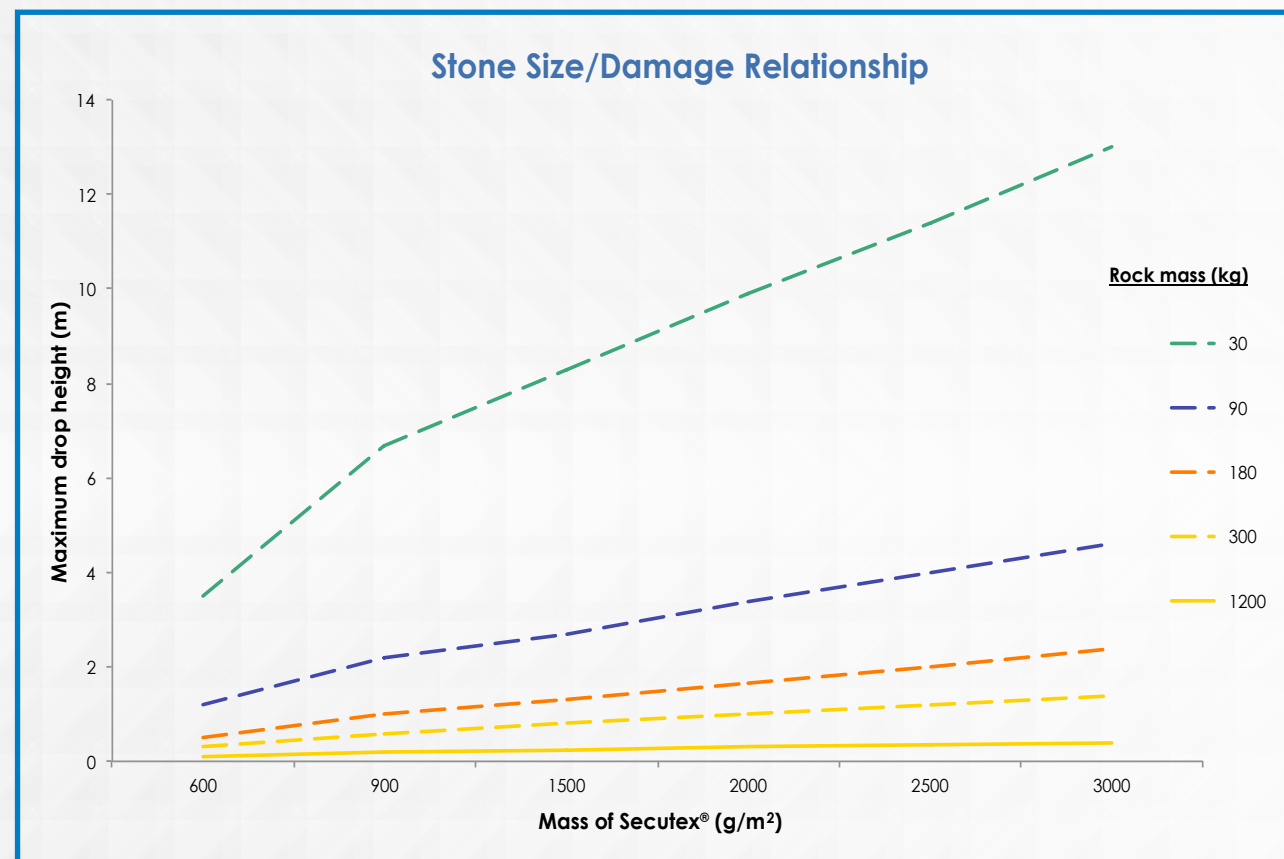


Fig.4 Secutex® Geotextile Filter for rock revetment.

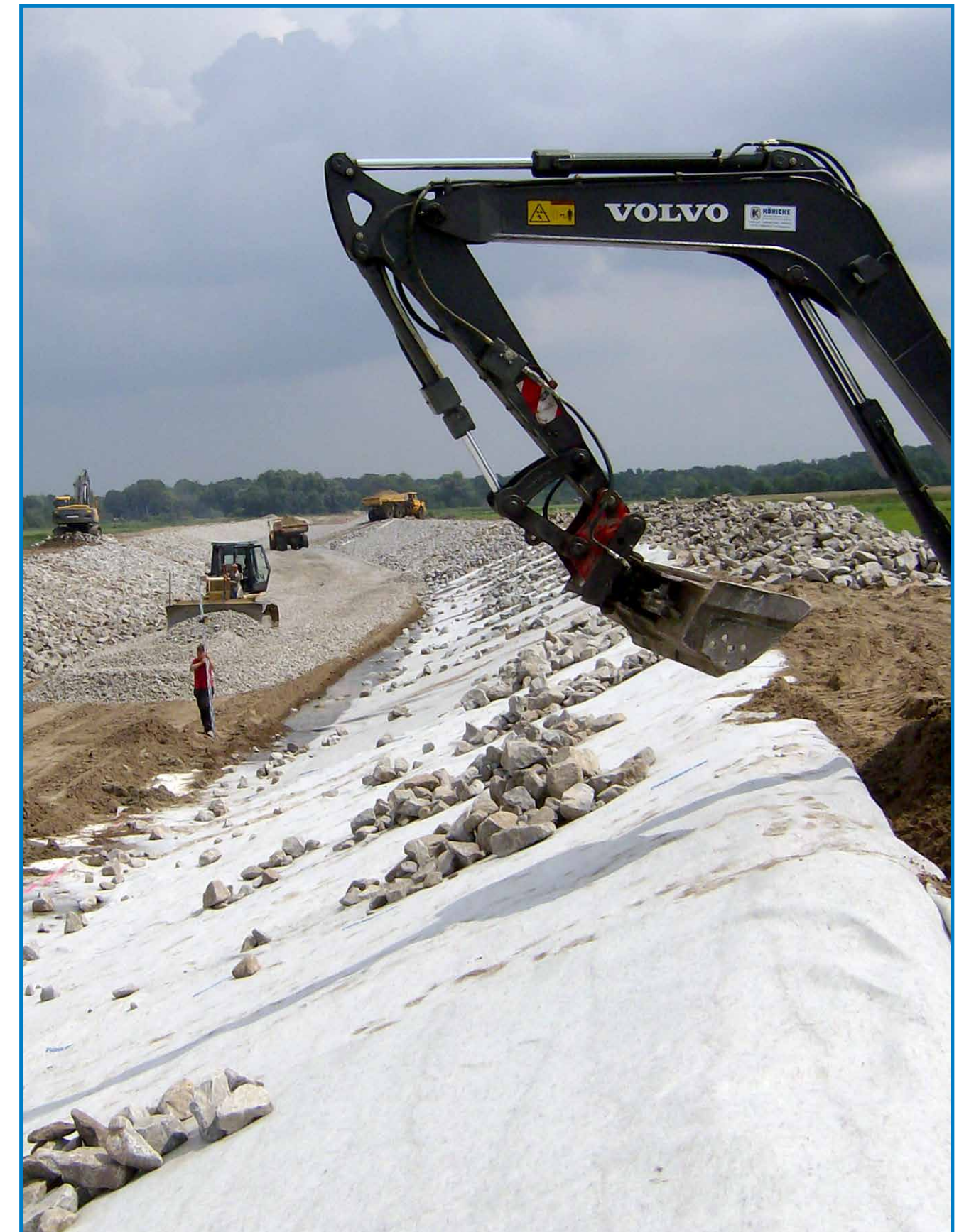
Secutex® for rock revetment



Secutex® mass per unit area

Secutex® Grade	Secutex® Product Mass (G/m²)
Secutex® R601	600
Secutex® R801	800
Secutex® R1001	1000
Secutex® R1201	1200
Secutex® R1701	1700
Secutex® R2001	2000

Heavier grades of Secutex® are available. Contact Global Synthetics for further details.



Secutex® for Soft Rock sand containers

Coastal and revetment Secutex® Soft Rock (GSC*) sand container bags

Secutex® nonwoven geotextile fabricated into geotextile sand containers have been proven around the world as an efficient engineering treatment for the construction of:

- artificial reefs, groynes and breakwaters.
- the stabilisation of beach nourishment measures.
- immediate protection against erosion.
- the construction of invisible back beach sand dunes for back of beach protection measures.

The major advantage of Secutex® Soft Rock construction techniques is their flexibility and adaptability and thus their advantage over massive construction elements made of concrete, steel or rock.

Flexibility of Secutex® Soft Rock

- coasts without rock faces.
- adaption to the morphologic conditions.
- no shielding of natural morphologic processes (longshore and cross-shore sediment transportation).
- possible variations to the size and shape of the Secutex® Soft Rock units.

Robustness of Secutex® Soft Rock

- proven long term stability under saltwater conditions and UV conditions for decades.
- resistance to abrasion from sand because of the open pore size of the fabric plus additional coatings possible.
- elongation capacity of the Secutex® as a superior property during installation and service.

Economics of Secutex® Soft Rock

- various filling and transportation and installation possibilities.
- use of locally available fill material (sand).
- fill material is contained with the Secutex® Soft Rock product.
- savings of construction material resources.
- simple economical removal of the Secutex® Soft Rock construction is possible.

* GSC - Geosynthetic sand containers. This document uses both terms interchangeably

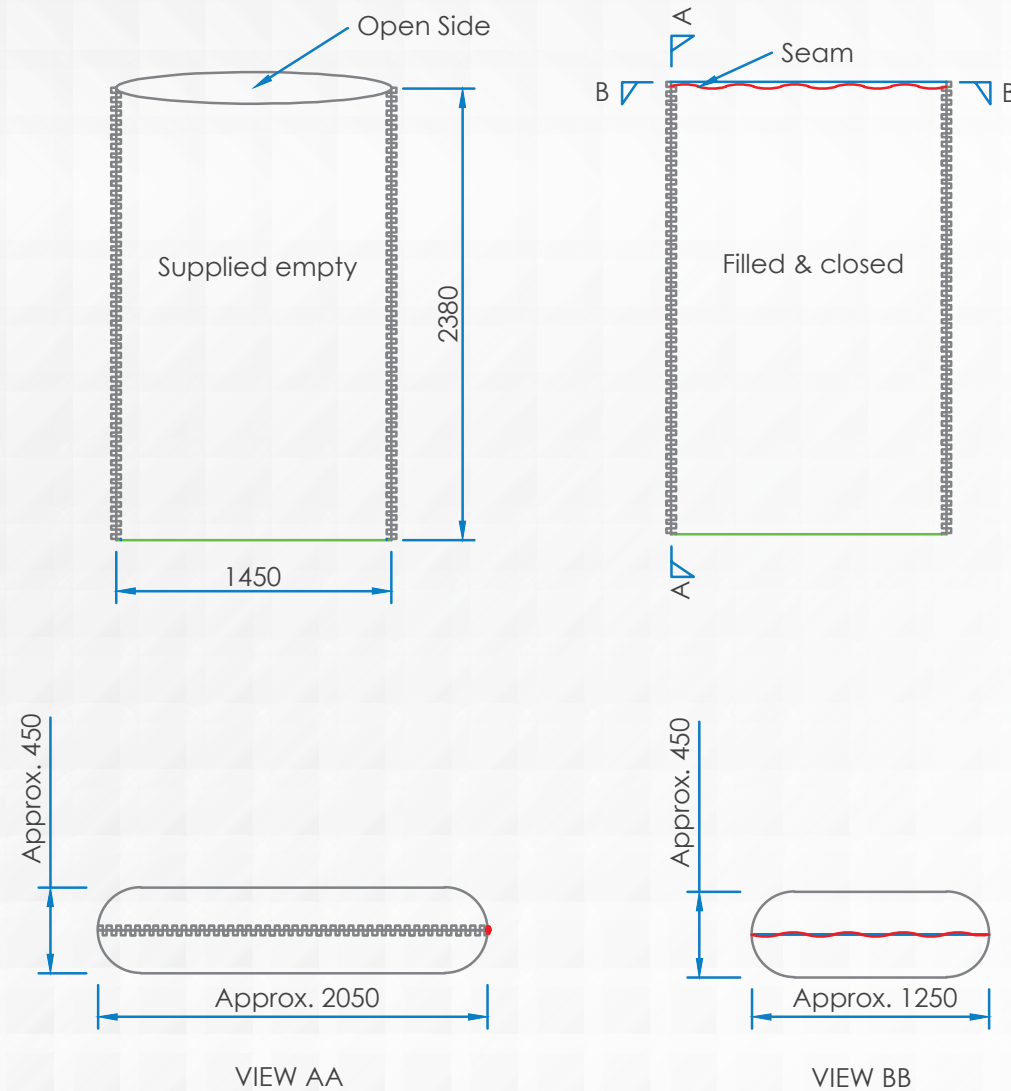


Secutex® for Soft Rock sand containers

NAUE SECUTEX® 1.0m³ Soft Rock GSC

R601 (without Protective Coating)

RS1201 (with Protective Coating)



- ~~~~~ Overlock stitch (made by NAUE)
- Chain stitch (made by NAUE)
- Seamless side (faces towards waves)

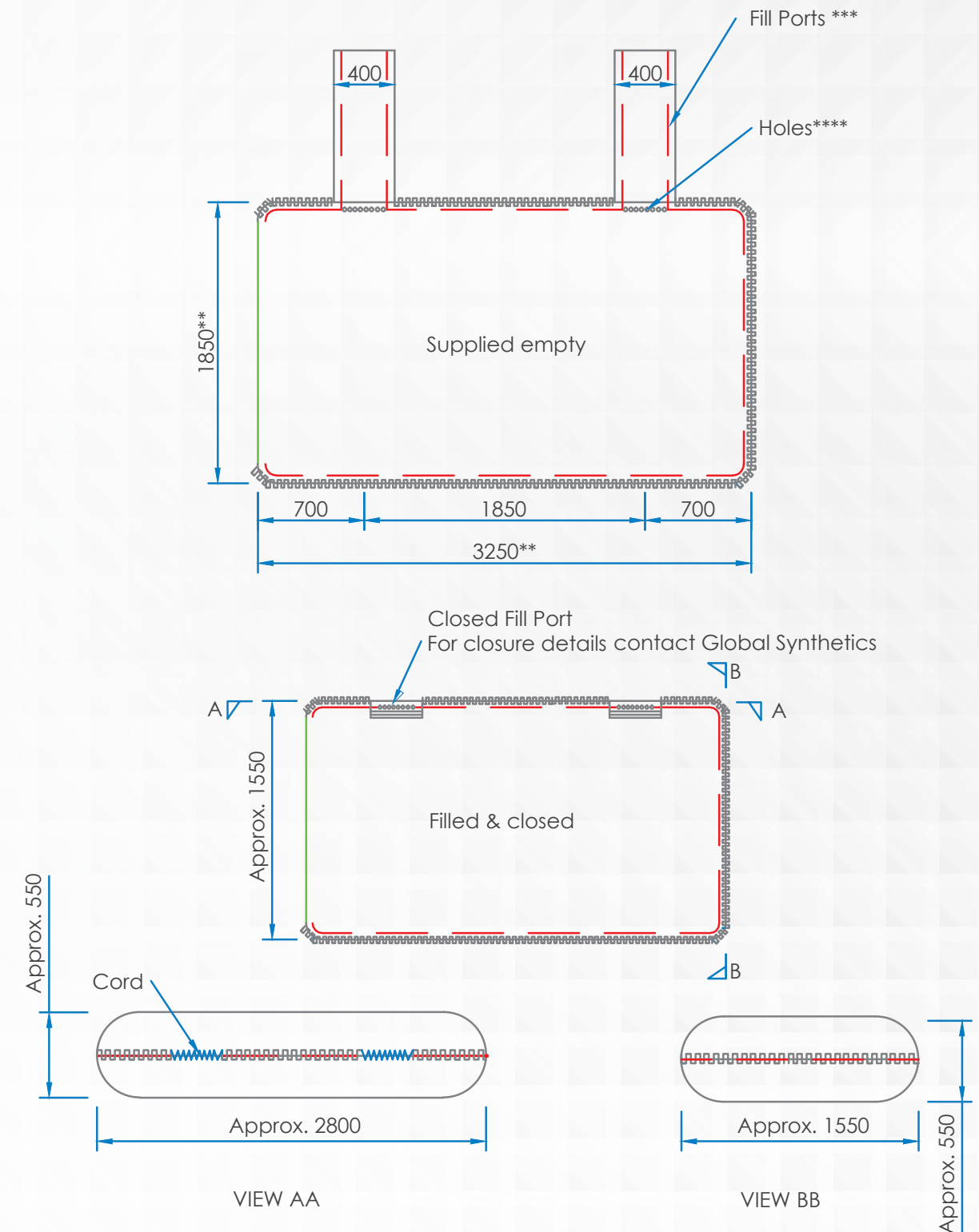
The dimensions and weight vary depending on the installation density of the filling material, method of filling, handling and installation specific operations.

** Including seam width *** Length approx 1.0m **** Lacing closure

NAUE SECUTEX® 2.5m³ Soft Rock GSC

R1201 (without Protective Coating)

RS1801 (with Protective Coating)



Secutex® for Soft Rock sand containers

Secutex® Soft Rock Sand Containers are available in standard theoretical sizes of 1m³ and 2.5m³ when filled. The exact finished volumes will depend on methods of construction, filling operations and specific material properties of the infill materials.

Detailed instructions on site closure and filling on site of the product are available from Global Synthetics. Project specific sizes are available.

Standard fabric used in manufacture of the Secutex® Soft Rock.

1m³ Sand Container is Secutex® R601.

2.5m³ Sand Container is Secutex® R1201.



Standard Secutex® fabric

Additional surface protection coatings can be added to fabrics to enhance sand retention and provide greater resistance to abrasion and damage.

Abrasion resistant fabric used in manufacture of the Secutex® Soft Rock.

1m³ Sand Container is Secutex® RS1201.

2.5m³ Sand Container is Secutex® RS1801.



Secutex® abrasion resistant fabric

Secutex® R Soft Rock 1m³ and 2.5m³ Sand Containers - Standard Manufacture

Secutex® Geotextile Grade			R 601	
Property	Standard	Unit	Mean	Mean
Geotextile	Virgin Polypropylene White			
Wide Width Tensile Strength MD	EN ISO 10319	kN/m	30.0	55.0
Wide Width Tensile Strength CMD	EN ISO 10319	kN/m	45.0	100.0
Elongation MD	EN ISO 10319	%	50	50
Elongation CMD	EN ISO 10319	%	40	40
Static Puncture Behaviour	EN ISO 12236	kN	7.0	13.0
Characteristic Opening Size (O90)	EN ISO 12956	mm	0.08	0.07
Permeability Normal to Plane (VH50)	EN ISO 11058	m/s	3.0 E -2	1.5 E -2
Abrasion Resistance (rotation drum)	According to RPG of BAW		YES	YES
Geotextile Container			Typical Properties Upon Fabrication Completion	
Tensile Strength of the Factory Seam	EN ISO 10319	kN/m	30.0	35.0
Finished Outer Dimensions	Manufacturer	m/m	1.45 x 2.38	1.90 x 3.26
Filling Volume	Typical	m3	1 m	2.5

Secutex® RS Soft Rock 1m³ and 2.5m³ Sand Containers Additional Coating for Enhanced Abrasion Resistance - Composite

Secutex® Geotextile Grade			RS 1201		RS 1801	
Property	Standard	Unit	Mean	Deviation	Mean	Deviation
Geotextile	Virgin Polypropylene White					
Wide Width Tensile Strength MD	EN ISO 10319	kN/m	52		56.0	
Wide Width Tensile Strength CMD	EN ISO 10319	kN/m	80		90.0	
Elongation MD	EN ISO 10319	%	50		70	
Elongation CMD	EN ISO 10319	%	30		40	
Static Puncture Behaviour	EN ISO 12236	kN	12.0		14.0	
Characteristic Opening Size (O90)	EN ISO 12956	mm	0.07		0.07	
Permeability Normal to Plane (VH50)	EN ISO 11058	m/s	1.5 E -2		1.5 E -2	
Abrasion Resistance (rotation drum)	According to RPG of BAW		YES		YES	
Geotextile Container			Typical Properties Upon Fabrication Completion			
Tensile Strength of the Factory Seam	EN ISO 10319	kN/m	35.0		45.0	
Finished Outer Dimensions	Manufacturer	m/m	1.45 x 2.38		1.90 x 3.26	
Filling Volume	Typical	m³	1 m		2.5	



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Australian Company – Global Expertise

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