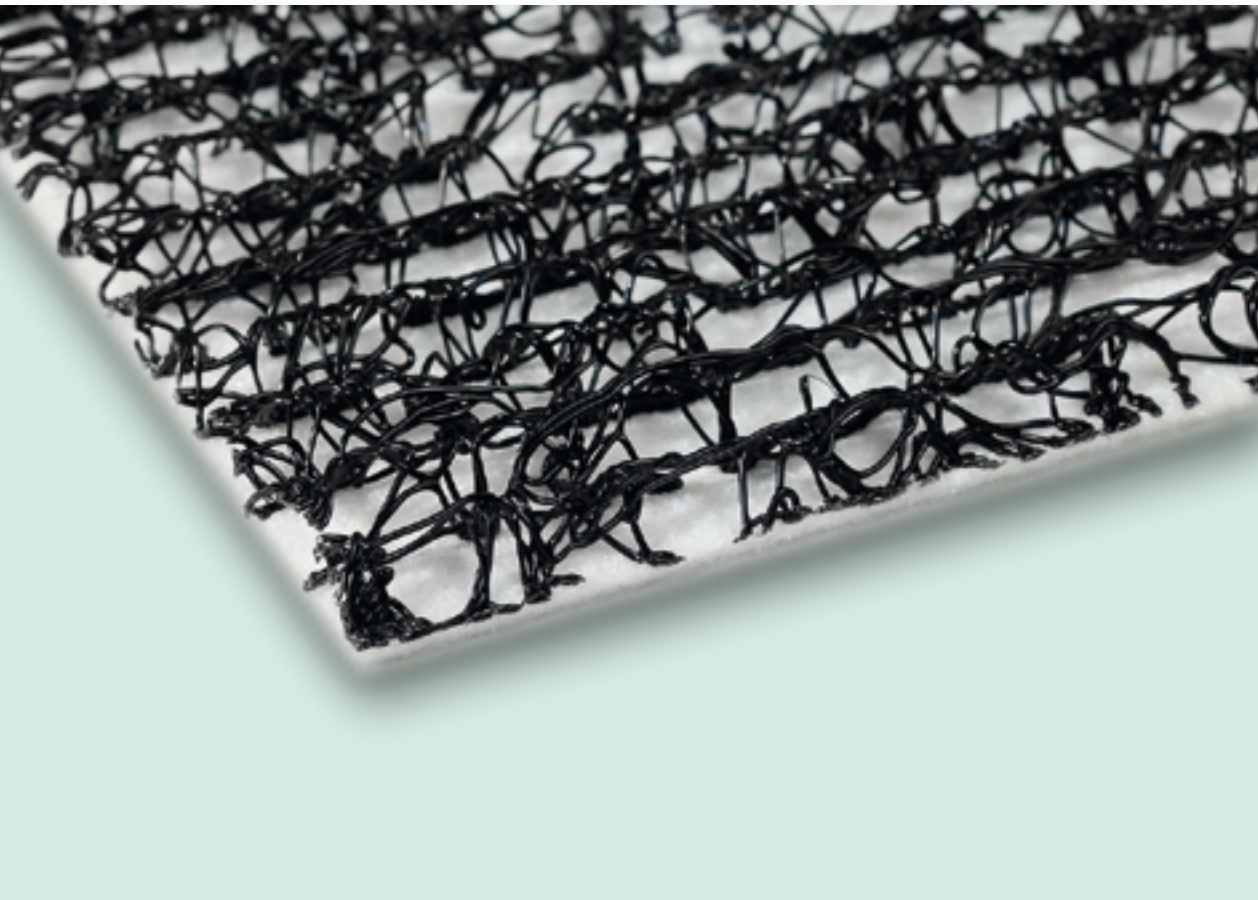


Secudrain®

 Naue

Geosynthetic drainage elements



naue.com

Building on sustainable ground.

Secudrain® 131 C WD 401 (131 C) and **Secudrain® 201 WD 601 (201)** are three-dimensional, filtration and pressure-stable synthetic drainage elements. They consist of an extruded wave-shaped, UV-stabilised monofilament core with a mechanically bonded, UV-stabilised Secutex® filter nonwoven fully bonded to one (or both) side over the entire surface. All components are made of polypropylene and are permanently bonded together.

Secudrain® WD is used as a safe, cost-effective and resource-saving surface drainage system for collecting and draining leachates or outgassing in a wide range of applications. Secudrain® WD fulfils several functions in multi-layer sealing systems.

Typical applications of Secudrain® WD

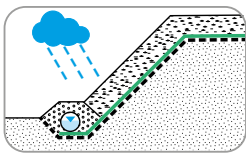


Figure 1:
Secudrain® used for
surface drainage

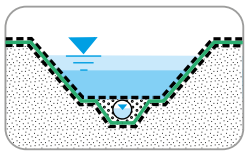


Figure 2:
Secudrain® used for
control drainage

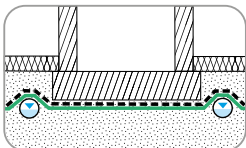


Figure 3:
Secudrain® used for
gas drainage

1. Drainage layer for recultivation soils or topsoils above sealing systems

Secudrain® WD is used above sealing systems to reliably drain leachate caused by infiltrating precipitation. It prevents waterlogging and drains water from the overlying soil layer in a controlled manner. The synthetic drainage element replaces a gravel layer several decimetres thick – with significantly reduced material usage and transport costs. This conserves resources and reduces expenses (Fig. 1).

2. Control drainage within multi-layer sealing systems

In multi-layer sealing systems, Secudrain® WD serves as intermediate drainage: it safely removes any leakage from the primary seal – before it can reach the secondary seal. This enables early leak detection and targeted remediation (Fig. 2).

3. Gas drainage beneath sealing systems in buildings

Secudrain® WD is used as surface drainage layer underneath structures with sealing systems where rising gases are to be expected. These can be safely collected and discharged. Thanks to the highly chemically resistant polypropylene material, the drainage function remains unaffected even in chemically demanding environments (Fig. 3).

Application advantages of Secudrain® WD

- The long-term performance of Secudrain® WD has been verified through numerous laboratory and field investigations. The waved-shaped structure of the drainage core provides high long-term water drainage capacity (Fig. 16)
- Secudrain® WD completely replaces mineral gravel or crushed stone layers that are several decimetres thick – saving material, reducing transport costs and significantly simplifying installation, all while maintaining equivalent drainage performance
- The welding of the carrier and cover nonwoven to the drainage core gives Secudrain® WD a high internal peel strength, resulting in a shear-resistant bond that facilitates installation
- Secudrain® WD drainage elements with nonwoven on one side can be ideally combined with geosynthetic clay liners such as Bentofix®



Figure 4: Secudrain® 201 WD 601



Figure 5: Secudrain® used for football pitch drainage

Secudrain® RZ 331 WZ 701 RZ 201 is a three-dimensional, filtration and pressure-resistant synthetic drainage element. It consists of a wave-shaped, UV-stabilised random-laid core with a mechanically bonded, UV-stabilised Secutex® filter nonwoven applied at points on both sides. All components are made of polypropylene and are permanently bonded together. The product is certified by BAM.

This BAM-certified Secudrain® type is used as a safe, durable and resource-efficient surface drainage system for collecting and draining leachates or gas in a wide range of applications. The BAM-certified Secudrain® type performs multiple functions within multi-layer sealing systems.

Typical applications of Secudrain® BAM

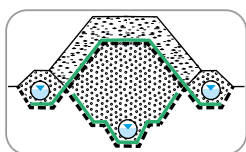


Figure 6:
Secudrain® used for
landfill drainage

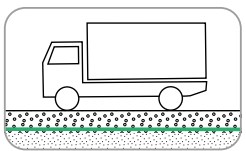


Figure 7:
Secudrain® used for
transport infrastructure
drainage

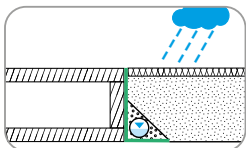


Figure 8:
Secudrain® used for
structural drainage

1. Drainage of landfill bodies

Secudrain® RZ 331 WZ 701 RZ 201 provides a particularly safe solution in landfill construction. It serves as surface drainage beneath the recultivation layers to safely remove leachate while also protecting the sealing system from mechanical loads. It can also be used as gas drainage below the surface seal for controlled degassing (Fig. 3), or as part of the base sealing system (Fig. 6).

2. Drainage for roads, airfield or railway tracks

Secudrain® BAM can be used as a certified drainage layer in infrastructure projects – for example beneath transport routes such as roads, airfields or railway lines – to reliably collect and drain infiltrated rainwater (Fig. 7).

3. Drainage for technical structures

Technical structures exposed to high leachate levels can be reliably protected using Secudrain® BAM. Even under demanding conditions, the certified drainage system ensures continuous and efficient drainage – even with increasing seepage volumes due to climate change (Fig. 8).

Application advantages of Secudrain® BAM

- Three geotechnical functions are integrated in one product in accordance with DIN EN ISO 10318: filtration, protection and drainage
- Secudrain® BAM is a sustainable alternative to mineral drainage layers: saving both space and materials
- Long-term performance: consistently high drainage capacity due to excellent resistance to compression
- Slope stability: the force-fit connection between core and nonwoven ensures internal stability – enhanced by secure BAM-certified installation techniques and guidance for overlapping areas

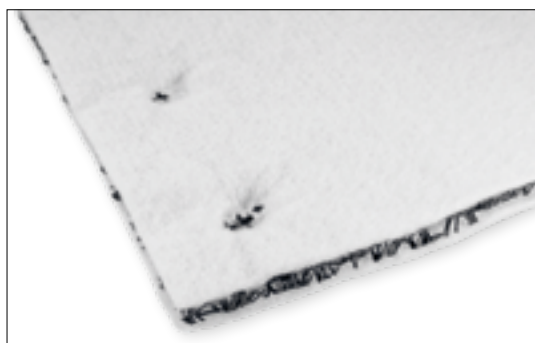


Figure 9: Secudrain® RZ 331 WZ 701 RZ 201



Figure 10: Secudrain® BAM used for structural drainage

Secudrain® WAS 7 is a three-dimensional filtration and pressure-resistant synthetic drainage element. It consists of a wave-shaped, UV-stabilised randomly laid core with a mechanically bonded, UV-stabilised Secutex® filter nonwoven applied continuously to both sides. All components are made of polypropylene and are permanently bonded together. The product has been tested as WAS 7 in accordance with German ZTV E guidelines.

Secudrain® WAS 7 is used as a safe, versatile and resource-efficient surface drainage system for collecting and draining leachates or gas in a wide range of applications. As a system, Secudrain® WAS 7 fulfils several functions in building construction.

Typical applications of Secudrain® WAS 7

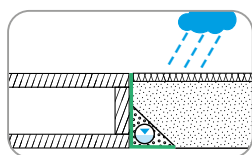


Figure 11:
Secudrain® used for
structural drainage

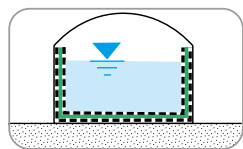


Figure 12:
Secudrain® used for
leakage detection

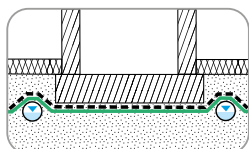


Figure 13:
Secudrain® used for
gas drainage

1. Structural drainage, e. g. on bridges

Secudrain® WAS 7 is approved as seepage water drainage on structures by German RiZ-ING in accordance with ZTV E. The 1.9 m wide drainage mat is quick and easy to install on structures (Fig. 11).

2. Leakage detection in double-sealed floors or containers

Secudrain® WAS 7 can be used for leak detection between sealed layers in a variety of structures. Depending on the requirements, it can be installed in near-horizontal floor areas or vertical walls, enabling early detection and isolation of leaks in technical facilities such as tanks, basements, etc. (Fig. 12).

3. Gas drainage on buildings

Secudrain® WAS 7 is used as a surface drainage element beneath structures with sealing systems where the occurrence of rising gases is expected. These gases be reliably collected and discharged. Thanks to the highly chemically resistant polypropylene material, the drainage function remains effective even in chemically challenging environments (Fig. 13).

Application advantages of Secudrain® WAS

- Durable and long-lasting: excellent resistance to chemical and microbiological influences
- Reliable protection: effective separation and protection layer between the seal and supporting structure
- Cost-efficient installation: quick and economical handling on site
- Consistent drainage performance: stable water drainage capacity throughout the entire service life
- 360° applicability: the 1.90 m wide drainage mat allows for flexible installation in various configurations

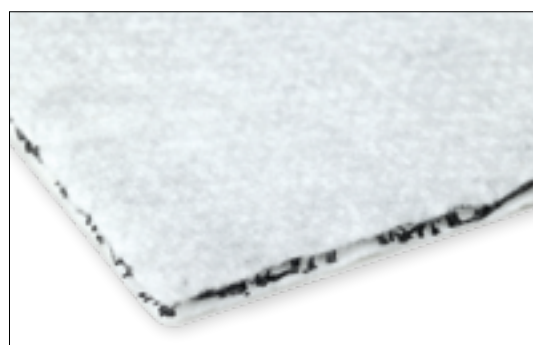


Figure 14: Secudrain® WAS 7



Figure 15: Drainage system in building applications

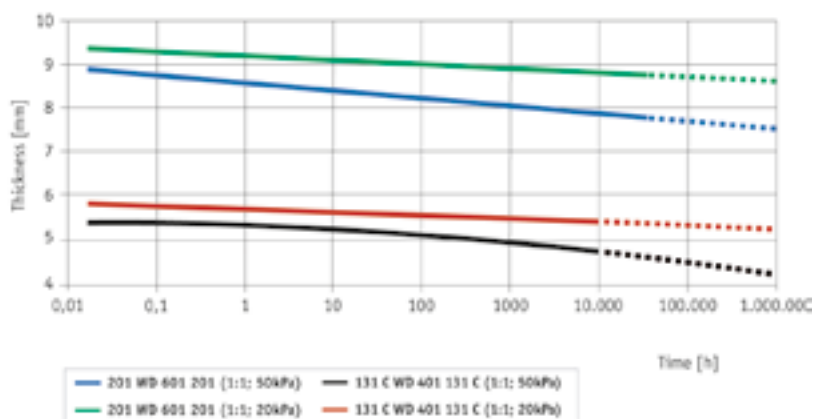


Figure 16: Creep behaviour under compressive load of Secudrain® WD types

Advantages of Secudrain® drainage elements

- Secudrain® offers more than just safe drain leachate in multi-layer sealing systems. The mechanically bonded non-woven reliably filters and separates the overlying soil layer. At the same time, Secudrain® protects sealing components (such as geomembranes or clay liners) from mechanical stresses exerted by the surrounding soil. Its potential applications range from groundwater protection to full-surface 360° use – for example in tunnel construction – through to large-scale drainage systems.

Variants of Secudrain® products

The following Secudrain® product types are available in standard roll dimensions of width x length 1.90m or 3.80m x 70m or 35m (other variants on request):

Product name	Total surface weight	Layer thickness
WD with nonwoven on one side		
Secudrain® 131 C WD 401	530g/m ²	6.5mm
Secudrain® 201 WD 601	800g/m ²	12mm
WD with nonwoven on both sides		
Secudrain® 131 C WD 401 131 C	660g/m ²	6.5mm
Secudrain® 201 WD 601 201	1.000g/m ²	12mm
Specially tested drainage systems		
Secudrain® RZ 331 WDZ 701 RZ 201	1.110g/m ²	10.5mm
Secudrain® WAS 7	660g/m ²	6.5mm



Figure 17: Secudrain® WD drainage system in stormwater retention pond



Figure 18: Secudrain® BAM used in a landfill capping system between the surface liner and the cover soil layer



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