SOLMAX

GSE Leak Location Suite

Our GSE® Leak Location® Suite addresses many of the challenges associated with traditional solutions.

Electric leak location (ELL) survey is a field-proven technology and currently the only economically practiced method of locating leaks in installed geomembranes both before and after water or soil placement. Various ELL methods are available, but all operate on the principle that geomembranes are electrically isolative. Thus, when electricity is applied to the surface of the geomembrane and grounded to the layer beneath it, the path of electricity can be directly traced through any leaks present in the geomembrane.

GSE customizable conductive liner combined with innovative tools makes testing easier, more cost-effective and more dependable.

Building a better leak detection system

A challenge for traditional ELL surveys is the conductivity of the material beneath the geomembrane, such as gravel, sand, drainage net, and air voids that can exist underneath wrinkles. Another challenge is that intimate contact between the geomembrane and conductive substrate is required for successful leak detection. This can be difficult to achieve with frozen, dry or low moisture subgrades, and is not possible where the geomembrane is wrinkled.

These limitations drove Solmax to develop the leak location conductive geomembrane, which allows the entire surface of the liner to be spark tested. However, during installation, electrical pathways could form during fusion welding of seams and negatively affect the ability to perform an ELL survey.

In response, Solmax designed the comprehensive Leak Location Suite comprised of:

- A conductive leak location geomembrane that allows for leak detection on exposed and covered applications
- The Solmax Spark Tester S-100 to identify leaks with high accuracy on exposed liners
- A patented Iso-wedge welder that securely joins conductive liners for large applications
- A patented installation technique that allows for electrical leak surveys on covered applications.

Benefits of using a conductive geomembrane

Our **GSE Leak Location** conductive liner allows leaks to be found in lined systems, with high levels of accuracy and without the need for a separate conductive substrate. It makes leak detection easy on primary and secondary liners, wrinkles, and geomembranes placed on vertical surfaces.

- The electrically-conductive bottom layer allows for leak detection on exposed and covered applications, accommodating both Spark and Dipole testing, and significantly reducing the probability of exceeding the action leakage rate (ALR).
- The co-extruded conductive layer eliminates the need to use soil and water to create a conductive layer underneath the geomembrane for testing.
- Leaks can be detected on wrinkles.
- The Iso-wedge allows for the proper preparation and testing of the geomembrane by isolating the upper seam flap and eliminating time-consuming false positives during the ELL survey.
- In many applications, the liner can be retested as often as necessary to ensure its integrity over time.
- The optional white surface reflects sunlight, lowering the liner temperature, reduces wrinkles and improves visual inspection.
- The combination of a white surface and black base makes it easy to visually detect scoring and other impact damage.
- An optional textured surface is available to provide slip resistance and improved shear performance in soil covered applications.
- Testing can be performed on the entire surface of the installed liner including the panel and underneath the exposed flap at the seam of the geomembrane, which are common locations for holes to be found.

Leak Location Suite Components

Our GSE Leak Location conductive liner is designed for use in applications where you can't afford a leak.

GSE Leak Location conductive liner is a co-extruded geomembrane that features a bottom conductive layer. The conductive layer allows for a wide variety of electrical leak surveys to be performed on exposed and covered applications, with greater reliability than surveys using non-conductive geomembranes.

These high-performance, high density polyethylene (HDPE) and linear low-density polyethylene (LLDPE) geomembranes are designed for use in applications where you can't afford a leak, and where rapid, accurate, reliable testing is a priority.

GSE Leak Location Conductive continues our legacy of innovative product development, providing the maximum protection against leaks, to help ensure that the environment and surrounding communities are safe and your investment is secure.

Layers of reliability

GSE geomembranes are designed to enable exceptional elasticity, environmental stress crack resistance, and excellent multi-axial elongation performance.

With proper testing and maintenance, **GSE** Leak Location Conductive delivers resilience against extreme temperatures and harsh conditions, providing extended ground protection against hazardous waste and chemicals, year after year.

A textured finish is available on one or both sides of the geomembrane for applications that require increased frictional resistance.

For the highest installation quality, white conductive liner decreases wrinkling and improves visual inspection.

Developing the Iso-wedge

To improve test accuracy and reliability, Solmax collaborated with industry experts to develop a revolutionary installation technique. By isolating the upper seam flap from the bottom conductive flap in a fusion-welded seam, the nuisance of false positive signals for leaks over seams, and of a complete conductivity break, is eliminated. This technique is enabled by an innovative, easy-to-use tool, the Iso-wedge, which is fitted onto a typical fusion welding machine.

The Iso-wedge allows for the proper preparation and testing of the **GSE** Leak Location Conductive geomembrane, by isolating the upper seam flapand eliminating false positives during the ELI surveys.

GSE S-100 Spark Test equipment

Solmax developed the **GSE** Spark Tester S-100 to enable fast, reliable bare electrical leak surveys on exposed conductive geomembranes in applications such as landfills, basins, ponds, tanks, and waste pads. The S-100 includes a spark test box, test probe, and grounding pad.

The S-100 comes with three electrodes to allow the technician greater flexibility in detecting leaks across the varying geometry of the survey surface including:

- a cart electrode for a surface with minimum wrinkles
- a brush electrode for more challenging areas that the cart cannot reach
- a seam electrode with a small brush for use underneath exposed seam flaps and hard to reach spaces.

Finding the leaks

Electrical liner integrity testing

Traditionally, an ELL survey includes running an electric current through two conductive layers, separated by a non-conductive barrier (the liner). When the current encounters a breach in the liner, the current will flow through it, enabling detection of the leak.

Two ELL tests are commonly applied. The Spark Test is typically used on exposed geomembranes, while a Dipole Test on covered geomembranes.

With a Spark Test and Dipole Test, leakage drops significantly.

Spark Testing

Spark Testing is performed on exposed geomembrane surfaces in applications such as ponds, reservoirs, impoundments, landfills, and heap leach pads. It can be performed during or after installation and is able to detect even the smallest defect. Spark Testing can be performed quicker and is more thorough than any other exposed electrical leak technique.

How it works

A Solmax S-100 Spark Tester makes use of a high-voltage, pulsed power supply to charge a capacitor, which is formed by connecting the non-conductive layer of geomembrane and its underlying conductive layer via the grounding pad. The geomembrane surface is swept with a test electrode to locate defects. The capacitor, which stores electrical energy in an electric field, will discharge current through any breach it encounters in the liner. This is picked up by the test electrode, triggering a visual and/or audible alarm[1].

The Dipole Test

Once a liner is covered with water or soil, the Dipole test method must be used for leak location. Cover material is responsible for the most significant damage to a liner, making this method critical for effective long-term leak protection.

Photo courtesy: TRI Environmental, Inc.

How it works

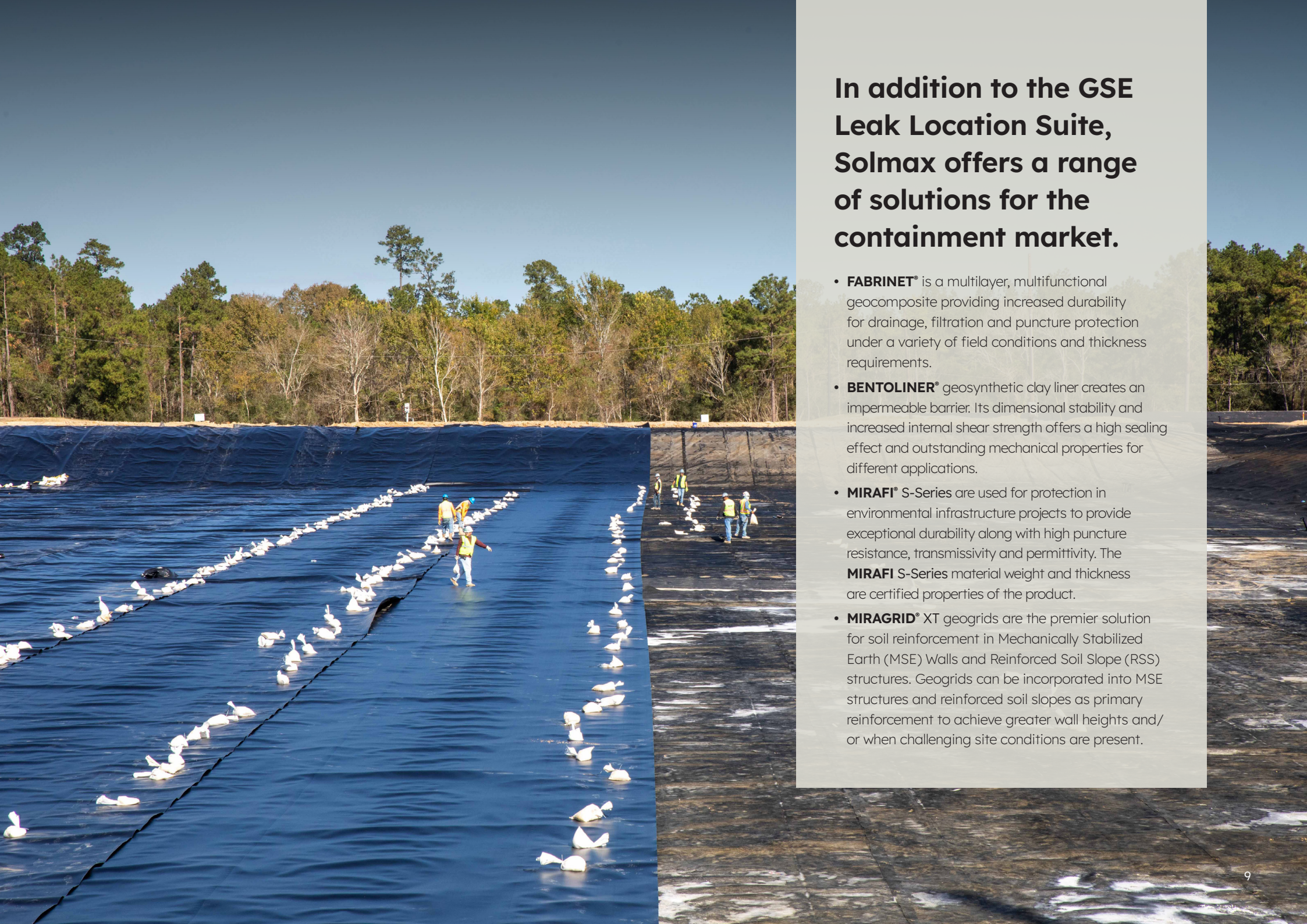
A current injector electrode is used to send a DC voltage charge through the material covering the nonconductive geomembrane, while the power source current return electrode is connected to the conductive layer beneath the geomembrane. A dipole instrument takes voltage measurements throughout the survey area in a grid pattern. Where leaks occur, a voltage drop is measured.

Spark and Dipole testing methods reduce risk

A landfill leakage and quality assurance study notes that if no geoelectric survey[2] is performed, there is a 22.2% change of exceeding the allowable leakage of a landfill cell with a 20 gpad ALR. The risk is reduced to 7.1% if the Dipole method is used. If both an exposed geomembrane test (a Spark Test) and a Dipole Survey are performed, the probability of exceeding the 20 gpad ALR is reduced to 0.00001 percent.

[1] TRI Environmental, 2014, Electrical Leak Location Survey General Guide
http://www.linersurvey.net/wp-content/uploads/2013/01/LINER-INTEGRITY-SURVEY-GUIDE.pdf

[2] Beck, Abigail, 2012. “A Statistical Approach to Minimizing Landfill Leakage”, SWANA, Washington D.C. Conference Proceedings



In addition to the GSE Leak Location Suite, Solmax offers a range of solutions for the containment market.

- **FABRINET®** is a multilayer, multifunctional geocomposite providing increased durability for drainage, filtration and puncture protection under a variety of field conditions and thickness requirements.
- **BENTOLINER®** geosynthetic clay liner creates an impermeable barrier. Its dimensional stability and increased internal shear strength offers a high sealing effect and outstanding mechanical properties for different applications.
- **MIRAFI®** S-Series are used for protection in environmental infrastructure projects to provide exceptional durability along with high puncture resistance, transmissivity and permittivity. The **MIRAFI** S-Series material weight and thickness are certified properties of the product.
- **MIRAGRID®** XT geogrids are the premier solution for soil reinforcement in Mechanically Stabilized Earth (MSE) Walls and Reinforced Soil Slope (RSS) structures. Geogrids can be incorporated into MSE structures and reinforced soil slopes as primary reinforcement to achieve greater wall heights and/or when challenging site conditions are present.

About Solmax

Solmax is a world leader in sustainable construction solutions, for civil and environmental infrastructure. Its pioneering products separate, contain, filter, drain and reinforce essential applications in a more sustainable way – making the world a better place. The company was founded in 1981, and has grown through the acquisition of GSE, TenCate Geosynthetics and Propex. It is now the largest geosynthetics company in the world, empowered by more than 2,000 talented people. Solmax is headquartered in the province of Quebec, Canada, with subsidiaries and operations across the globe.

Uncompromised quality

Our products are manufactured to strict international quality standards. All our products are tested and verified at our dedicated and comprehensive laboratories which maintain numerous accreditations. We offer our partners a wide scope of testing according to published standards to ensure products delivered to sites meet specified quality requirements.

Let's build infrastructure better

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