SOLMAX

LEAK LOCATION SUITE

Human industry, from everyday consumption to construction and the extraction of metals and minerals, produces waste. Much of it is toxic. Geosynthetic liners are a critical component in the design of reliable containment solutions, such as landfills – but they are not infallible. The best liners can puncture. When they do, they put your investment, your reputation and the environment at risk. This makes rapid leak detection and repair an important part of ongoing containment maintenance and risk management, across the entire lifecycle of the application.

Solmax's Leak Location Suite addresses many of the key challenges that traditional leak location presents. Our advanced, customizable conductive liner, together with innovative new tools and approaches, offer significant advantage, making testing easier, more precise, reliable, repeatable.

It's time to take a new approach, building modern electrical liner integrity testing into containment design.

FACE THE CHALLENGES OF LEAK DETECTION HEAD-ON WITH SOLMAX'S **LEAK LOCATION SUITE.**

An Electrical Liner Integrity (ELI) survey applied to a conductive liner using reliable testing equipment will enable you to rapidly, precisely, and cost effectively identify liner damage, and remediate it.

Our Leak Location Liner Suite is an advanced, end-to-end offering.

It comprises:

- **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**

What sets this solution apart is its ability to address key industry challenges, from installation to leak detection and remediation, providing easy, fast, reliable, cost- and time-effective leak risk management.

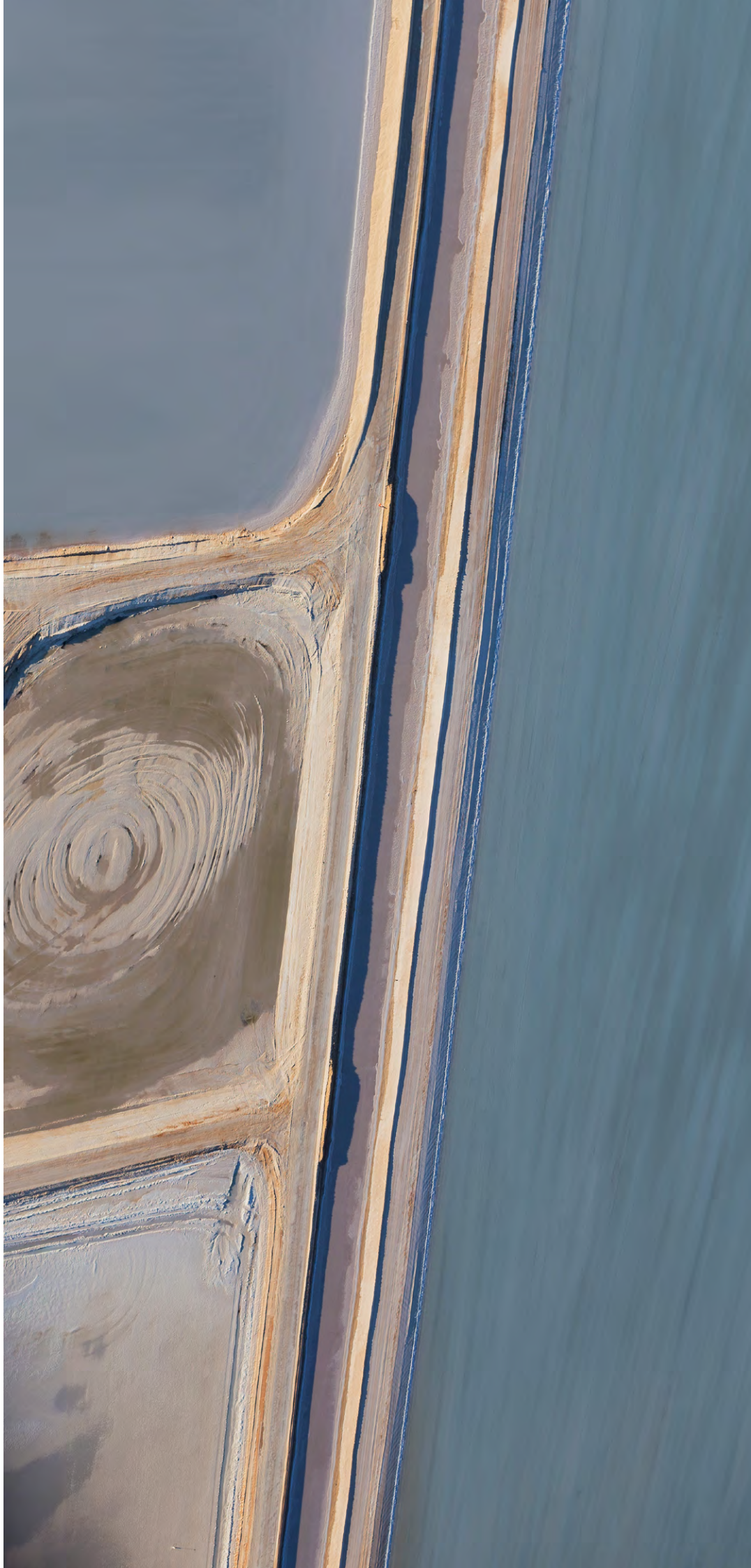
WASTE IS TOXIC **YOU NEED TO BE SURE**

Leaks can happen – no matter how careful you are during liner installation. An accidentally dropped tool, an oversized rock or poor installation technique can all cause tears and defects too small for the naked eye to see. Machinery and the impact of soil and backfill are responsible for much of the damage to covered liners, while exposed applications can be damaged by wildlife, equipment or even vandalism.

The cost of a leakage can be high. They can negatively impact the environment and communities, compromise the integrity of structures, and result in a loss of assets. Finding leaks easily and repairing them before problems develop can help mitigate the risk of a shutdown, of public scrutiny, heavy regulatory fines, legal fees, or remediation costs.

LEAKS COST YOUR COMPANY, WHETHER IT'S MONEY, TIME, OR DAMAGE TO YOUR REPUTATION.

There are several methods to detect leaks in a geosynthetic liner but they are not without challenges. Solmax, with its 40+ years of experienace in designing and manufacturing geosynthetics for use across multiple industry sectors and applications, has developed its **Leak Location Liner Suite** to directly address these challenges.



FINDING **THE LEAKS**

ELECTRICAL LINER INTEGRITY TESTING

Traditionally, an ELI 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 ELI 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 SURVEY, **LEAKAGE DROPS SIGNIFICANTLY.**

SPARK TESTING

Spark Testing is used on exposed applications, such as ponds, reservoirs, and impoundments. 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 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].

However, once the liner is covered with water or soil, a Spark Test is no longer applicable, instead the Dipole method is used.

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

THE DIPOLE TEST

The Dipole Method is critical for effective leak detection, since the placement of cover material on a liner is responsible for the most significant damage that can occur.

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.

Photo courtesy: TRI Environmental, Inc.

Photo courtesy: TRI Environmental, Inc.

SPARK AND DIPOLE METHOD TESTING REDUCE RISK

A landfill leakage and quality assurance study notes that if no geoelectric survey[2] is performed, there is a 22.2% chance 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.

THE PROBABILITY OF SIGNIFICANT LEAKAGE

When it comes to detecting leaks on traditional, non-conductive liners, quality assurance teams face some tough challenges.

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

THE CHALLENGES OF A **TRADITIONAL APPROACH**

A separate conductive substrate is needed beneath a traditional non-conductive geomembrane to enable current to flow from a source electrode through a leak in the geomembrane. When the substrate comprises non-conductive material—e.g., drainage geocomposites, mineral or recycled aggregates—an electrical leak survey cannot be accurately performed.

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, oand is not possible where the geomembrane is wrinkled. **Defects cannot be found under these conditions unless Leak Location Conductive is used.**

WITH LEAK LOCATION CONDUCTIVE LINER, RELIABILITY AND ACCURACY RISES.

BENEFITS OF USING **A CONDUCTIVE GEOMEMBRANE**

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

SOLMAX DEVELOPED THE FIRST CONDUCTIVE GEOMEMBRANE.

LEAK LOCATION CONDUCTIVE **LINER SOLUTION**

RAISING THE BAR – AN END-TO-END SOLUTION THAT'S EASY, FAST, ACCURATE, RELIABLE

Solmax set the bar by developing the first conductive geomembrane in the early nineties. This product allows the entire surface of the liner to be Spark Tested, eliminating many of the challenges associated with traditional liners. However, this too had limitations. At installation, for example, electrical pathways formed during fusion welding of seams could negatively impact the ability to perform electrical leak surveys. **So we raised the bar.**

The result: A comprehensive solution that addresses key industry challenges related to electric liner integrity testing. Our Leak Location Suite comprises our Leak Location Conductive geomembrane, our highly effective S-100 Spark Test equipment, and a revolutionary new installation technique enabled by our innovative patented Iso-wedge tool.

SOLMAX'S LEAK LOCATION SUITE

- **Leak Location Conductive Geomembrane** allows Spark and Dipole testing
- Highly effective Solmax **S-100 Spark Test Equipment**
- **Iso-wedge** innovation for secure conductive **seaming** on large applications
- Patented Leak Location Conductive **installation method**

LEAK LOCATION CONDUCTIVE LINER

Solmax's **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, co-extruded, 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.

Solmax's **Leak Location Conductive Liner** 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

All Solmax product series are made with the finest raw materials to enable exceptional elasticity, environmental stress crack resistance, and excellent multi-axial elongation performance.

With proper testing and maintenance, **Leak Location Conductive Liner** 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.

OUR LEAK LOCATION CONDUCTIVE LINER IS DESIGNED **FOR USE IN APPLICATIONS WHERE YOU CAN'T AFFORD A LEAK.**

BENEFITS OF LEAK LOCATION CONDUCTIVE LINERS

- 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 ALR.
- The co-extruded conductive layer eliminates the need to apply water during testing in exposed applications.
- In doubled-lined applications, the conductive layer eliminates the need to apply water to the sub-grade or leak detection layer prior to testing.
- Leaks can be detected on wrinkles and other non-conductive surfaces.
- When installed as specified, false positive signals for leaks are eliminated due to the exposed seam flaps.
- 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, which reduces wrinkles.
- 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 for increased shear performance, improving the project‘s footprint by allowing steeper slopes.

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 Leak Location Conductive geomembrane, by isolating the upper seam flap and eliminating false positives during the ELI surveys.

SOLMAX S-100 SPARK TEST EQUIPMENT

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

WHY **SOLMAX?**

Our no-compromise approach to quality and reliability makes Solmax the brand of choice. As we have grown, so have our capabilities. Now represented in more regions, we have a clear competitive advantage. This means faster deliveries and better service for our customers, today and tomorrow. With some of the smartest minds in the business, Solmax brings products to market which no other company can offer.

Our key objective—to enable progress by protecting the earth—propels us forward.

WITH BETTER SUPPORT AND SOLUTIONS TO PROTECT THE GROUND, OUR CUSTOMERS CAN **AIM HIGHER, ACHIEVE MORE, FASTER.**

Our strategy to build the capacity, capability, reach, expertise, and culture to deliver innovation rapidly and at scale, is well advanced. Our people are motivated, united by a single vision: to set the pace and reshape the industry.

SETTING STANDARDS

Solmax works with governments to draw up industry regulations, collaborates with stakeholders worldwide to raise environmental requirements, and enhances technical designs for projects.

Groundbreaking products brought to market by Solmax and its wholly owned companies include the first HDPE geomembranes, textured liners, geosynthetic clay liners (GCLs), white reflective geomembranes, conductive geomembranes, and high-flow and pressure-resistant drainage solutions.

ISO AND INDUSTRY-RATED

Solmax has achieved ISO 14001 certification for environmental management, and ISO 9001 for quality assurance. Our laboratories are accredited by the Geosynthetic Accreditation Institute – Lab Accreditation Program (GAI-LAP), assuring our customers that we apply the highest standards in product testing. Solmax has also achieved BAM, Asqual, KIWA, CE, and other certifications.

QUALITY ASSURANCE

Extensive manufacturing quality assurance (MQA) testing is performed on our products at our labs. Our MQA program starts with testing and verification of specially formulated quality resins and other raw materials and extends through delivery to the project site.

Our standards are high. All Solmax geomembranes, GCLs and drainage solutions are tested for strength and durability, and against key criteria. Geomembranes, for example, are 100 percent spark tested for pinholes during the manufacturing process to ensure every delivered roll is leak free.

OUR **LOCATIONS**

HEADQUARTER
VARENNES, QC | CANADA

Solmax is the world's largest geosynthetics manufacturer with plants in North America, Europe, Asia, and the Middle East. Used in critical applications in more than 60 countries by the biggest names in mining, petroleum, waste management, water, and civil engineering, our products contain and drain - creating a layer of protection between our most precious resource, the earth, and the waste and contaminants that result from human activity, industry, mining, and the use of fossil fuels. Our mission is to enable progress with minimal damage to the environment.

AIM FOR THE SKY.
WE'VE GOT THE GROUND COVERED.

SOLMAX.COM

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