



MINING SOLUTIONS

ACHIEVE MORE, FASTER

Mining costs. To scale operations, ensure economic feasibility, environmental soundness and profitability, mines need innovative, reliable solutions. Solmax's range of geosynthetic systems are designed to deliver.

Economical, high-performing and environmentally safe, our geosynthetic systems are used globally by leading organizations to improve recovery of valuable materials, isolate contaminated waste

and make closure a more efficient and less costly endeavor. Our no-compromise approach to quality and reliability allows you to achieve more, faster.



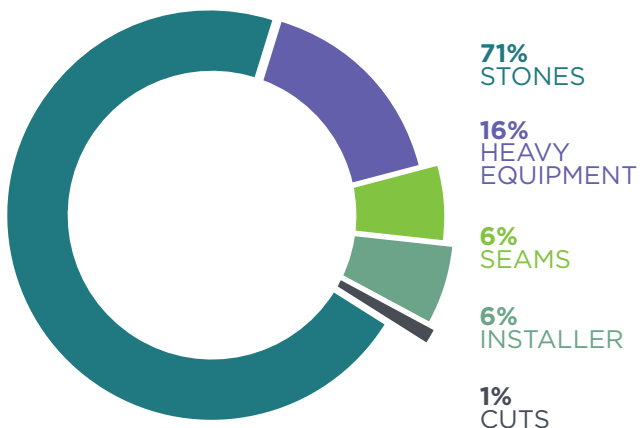
RECOVER MORE METAL

Solmax’s range of geosynthetic systems offer containment systems that let your project get underway and keep going. **Because if you can’t stack ore, you can’t make money.**

On average, geomembranes experience 4 holes per hectare after they are installed. Estimated leakage through these holes ranges from 340 to 3,400 liters per hectare per day (LPHD). (1)

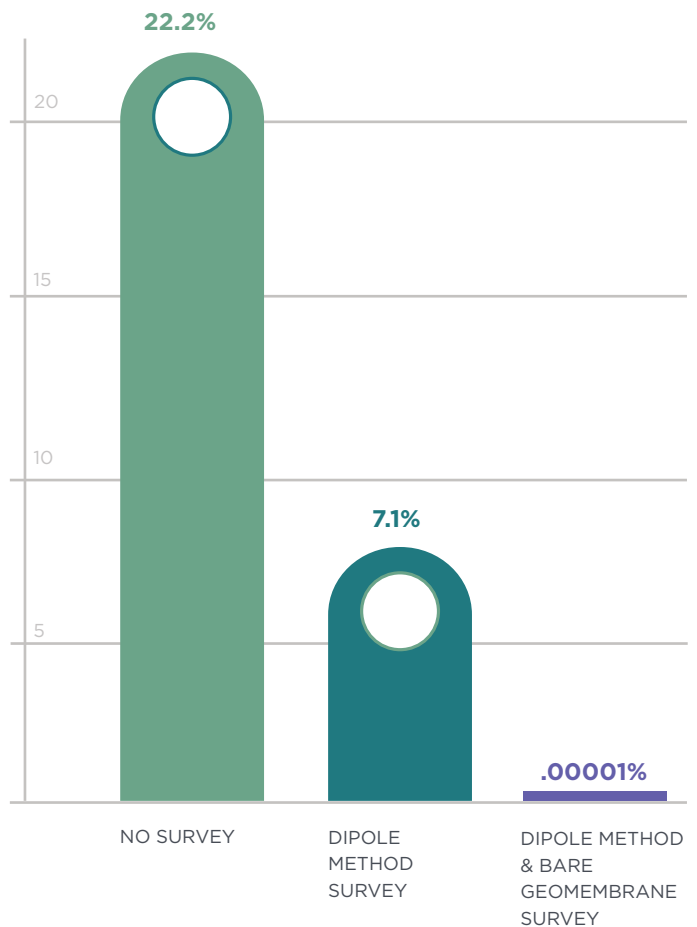
In the absence of a leak detection survey, geomembranes experience an average of 4 holes per hectare after installation. “By performing a leak detection survey before leach pad operation, the PLS would not be lost through holes that would otherwise go undetected.” (2)

WHAT CAUSES LEAKS? (1)



87%
OF DEFECTS OCCUR DURING COVER SOIL PLACEMENT.

PROBABILITY OF SIGNIFICANT LEAKAGE (3)



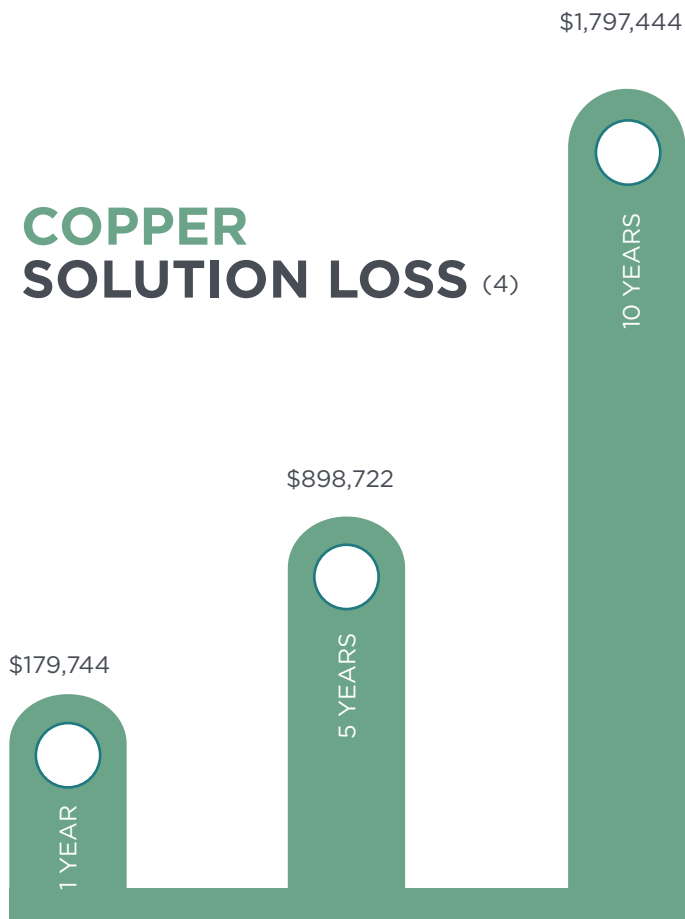
REFERENCES

1. Forget, Benoit et al., 2005. “Lessons Learned from 10 Years of Leak Detection Surveys on Geomembranes,” Sardinia Symposium, Sardinia, Italy.
2. Richard Thiel, Abigail Beck, Mark E. Smith. February 2005, “The Value of Geoelectric Leak Detection Services for the Mining Industry,” Geofrontiers.
3. Beck, Abigail, 2012. “A Statistical Approach to Minimizing Landfill Leakage,” SWANA, Washington D.C. Conference Proceedings.

WHAT DO LEAKS COST YOU?



ASSUMPTION:
40 HECTARE LEACH PAD - GOLD \$1,200 OUNCE



ASSUMPTION:
40 HECTARE LEACH PAD - COPPER \$3.00 LB

REFERENCES

4. Touze-Foltz Giroud, 2005, "Equations for Calculating the Rate of Liquid Flow through Geomembrane Defects of Uniform Width and Finite or Infinite Length," Geosynthetics International, Vol. 12, No 4, pp 194-196.

PROTECTING VALUABLE RESOURCES HEAP LEACH RECOVERY

Heap leaching, done right, can contribute substantially to the economic viability of mining projects.



With millions of square meters installed in mining operations around the world, Solmax's geomembranes have proven to be the most durable, dependable and cost-effective containment solution in heap leach pads.

Our liners are made from the highest quality resins and exhibit superior resistance to punctures, stress cracking, and harsh chemicals. Available in a variety of width rolls, our geomembranes require fewer welds, so they install faster and leave fewer opportunities for leaks.

Our **LLDPE Series** has high flexibility, multi-axial deformation, and extended lifespan.

These characteristics make it an ideal solution for containment in areas with craggy landscapes and high differential settlement.

For applications requiring placement on steep slopes, Solmax offers a **textured finish** to increase the frictional resistance between natural soils and other geosynthetics in contact with the liner.

When the hot sun threatens to interrupt installation, Solmax's **White Reflective Finish** reflects the light and keeps the liner cooler, resulting in fewer wrinkles and less chance of damage during backfill.

HEAP LEACH PADS CAN'T AFFORD LEAKS

In the event of minor damage during liner installation or while placing highly-permeable drainage stone (overliner) material on the pad,

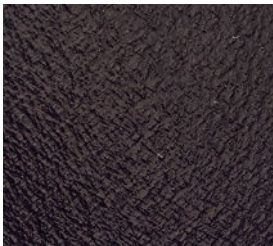
it is vital to find these leaks quickly and repair them before severe damage occurs.

HIGH-TEMPERATURE SERIES



High-Temperature Series is the choice to beat the heat. This liner is uniquely formulated to maintain its physical properties in applications with sustained temperatures of up to 100°C (212°F). Its tensile strength and superior resistance to stress cracking, punctures, and UV degradation, makes it essential for extreme temperature applications where liner integrity and long service life are required.

LEAK LOCATION FINISH

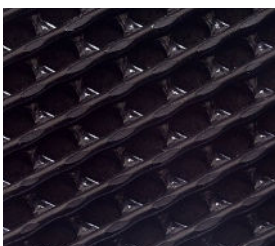


Our Leak Location Finish allows electrical liner integrity (ELI) testing on both exposed (spark method) and covered applications (dipole method), on slopes, across seams, and over wrinkles, providing the most accurate and cost-efficient leak detection method in the industry, even after installation.

In heap leach pads, it is necessary to install an excellent drainage system to keep the leachate flowing freely to the collection ponds. Our drainage systems are engineered specifically for mining applications that demand superior flow performance and filtration.

The high-flow, high-strength drainage systems can withstand high loads of overburden ore and vehicle traffic to keep the leachate flowing.

MINEDRAIN



MineDrain is a geocomposite engineered specifically for mining applications that demand superior flow and filtration.

PONDS

Solution ponds demand the most durable containment lining systems available. Pond liners are exposed to the elements and must be able to both protect the environment and protect against solution loss, so your precious metals, and profits, don't get washed away. In remote or arid regions where water is scarce, liners and floating covers are needed to preserve the supply and help prevent evaporation.

Solmax's **High-Performance HD Series** comprises the best mechanical and enhanced endurance properties of any HDPE geomembrane liner available on the market, even in the harshest conditions.

Evaporation ponds are required to recover salt from brine by taking advantage of nature's drying processes. Solmax's **LLDPE Series** is a prime choice to contain the brine within the evaporation ponds, improve salt harvesting and reduce precipitation. Our geomembrane liners provide high chemical resistance to high concentrations of salts for extended periods, provide very low permeability, and offer a high UV resistance.

TAILINGS FACILITIES

When storing mine tailings in ponds or impoundments, failure is simply not an option. Tailings are often the most significant environmental liability for a mining project and can be as large as 1 million times greater than the mineral extracted. The containment of tailings is therefore of the utmost importance; hence the use of geomembranes is a cost-effective containment solution.

Lining tailings ponds with our **HDPE Series** and **High-Performance HD Series** offers proven long-term performance. They are designed to withstand extreme acidic and alkaline solutions and create an impermeable barrier to prevent the release of mining residues into the environment.

MineDrain works as both a great geomembrane protection layer and an efficient drainage medium, reducing the potential for tears and leaks.



MINE CLOSURE AND CAPPING

The contaminating lifespan of mines may extend for long periods beyond mine closure. High-performance geomembrane liners are required in mine closure for effective waterproofing and containment of potential contaminants and as part of the land reclamation process.

Studies conducted by the US EPA have shown that a composite over system, consisting of a geomembrane and geosynthetic clay liner (GCL), performs better than compacted clay liners or store-and-release covers (Albright, Benson, & Waugh, 2010. "Water balance covers for waste containment: Principles and Practice," ASCE Press.)

Solmax's innovative GCL solutions, **BentoLiner®** and **GundSeal®**, create an impermeable barrier and are designed for superior performance in mine closure. Their dimensional stability and increased internal shear strength offer a high sealing effect and outstanding mechanical properties.

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LITERS OF WATER ARE REQUIRED TO INSTALL CLAY FOR A 400,000 M² LEACH PAD.

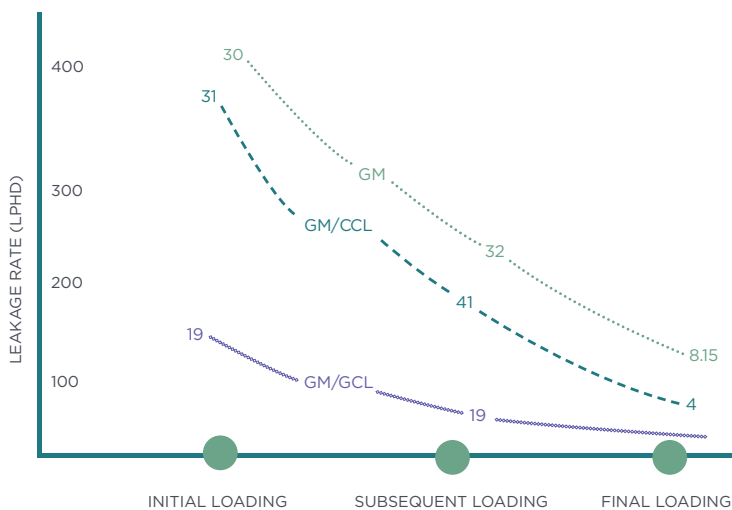


ZERO LITERS OF WATER ARE REQUIRED TO INSTALL GCL.

POLYMER-ENHANCED BENTOLINER®



Polymer-Enhanced BentoLiner® combines the performance of sodium bentonite with specially formulated polymers, encapsulated between two geotextiles, to create a reinforced geosynthetic clay liner with superior hydraulic barrier properties.



LINER SYSTEM PERFORMANCE (5)

A SOLMAX GEOMEMBRANE AND A GEOSYNTHETIC CLAY LINER (GCL) REDUCE THE POTENTIAL LEAKAGE RATE TO NEARLY 0 LPHD AFTER OVERLINER IS PLACED, SAFELY CONTAINING THE SOLUTION.

REFERENCES

5. Bonapart, Daniel and Koerner, 2002. "Assessment and Recommendations for Improving the Performance of Waste Containment Systems," US EPA.

SAFETY AND STABILITY



TRUCK TRAFFIC IS REDUCED BY **95%** WHEN USING GEOSYNTHETIC SYSTEMS, RESULTING IN A **SMALLER CARBON FOOTPRINT** AND SAFER WORK ENVIRONMENT.

MINE SAFETY

In underground mines, our **Geogrids** act as a screen on roofs and walls to prevent debris from falling on workers. Manufactured from high quality flame-retardant resin, our **Geogrids** are durable yet lightweight, corrosion resistant, and easy to handle, allowing for quick, safe installation.

SOIL STABILITY

Solmax's **Geogrids** offer reinforcement and stabilization solutions in surface and underground mining applications. Mining sites and the roads used to access them often are built on unstable soils that are not naturally suited for construction.

Our **Biaxial Geogrids** provide a quick, long-term solution to stabilizing and strengthening roads and work sites and reducing the thickness of aggregate base layers.

Our **Uniaxial Geogrids** provide the reinforcement solution to building steep slopes and tailings dams that saves valuable spacing and construction cost. The stiff, net-like structure of a geogrid confines stone and soil particles, preventing lateral shear when a vertical load is applied. Compared to traditional stabilization methods, geogrids install in any weather, offer immediate, permanent stabilization, and typically cost 20%-50% less.



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. It means faster deliveries and better service for our customers, today and tomorrow. And, 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 GAI-LAP (Geosynthetic Accreditation Institute - Lab Accreditation Program), 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% spark tested for pinholes during the manufacturing process to ensure every delivered roll is leak free.

OUR LOCATIONS



 **HEADQUARTER**
VARENNES, QC | CANADA

SOLMAX.COM

Solmax is not a design professional and has not performed any design services to determine if Solmax's goods comply with any project plans or specifications, or with the application or use of Solmax's goods to any particular system, project, purpose, installation or specification.