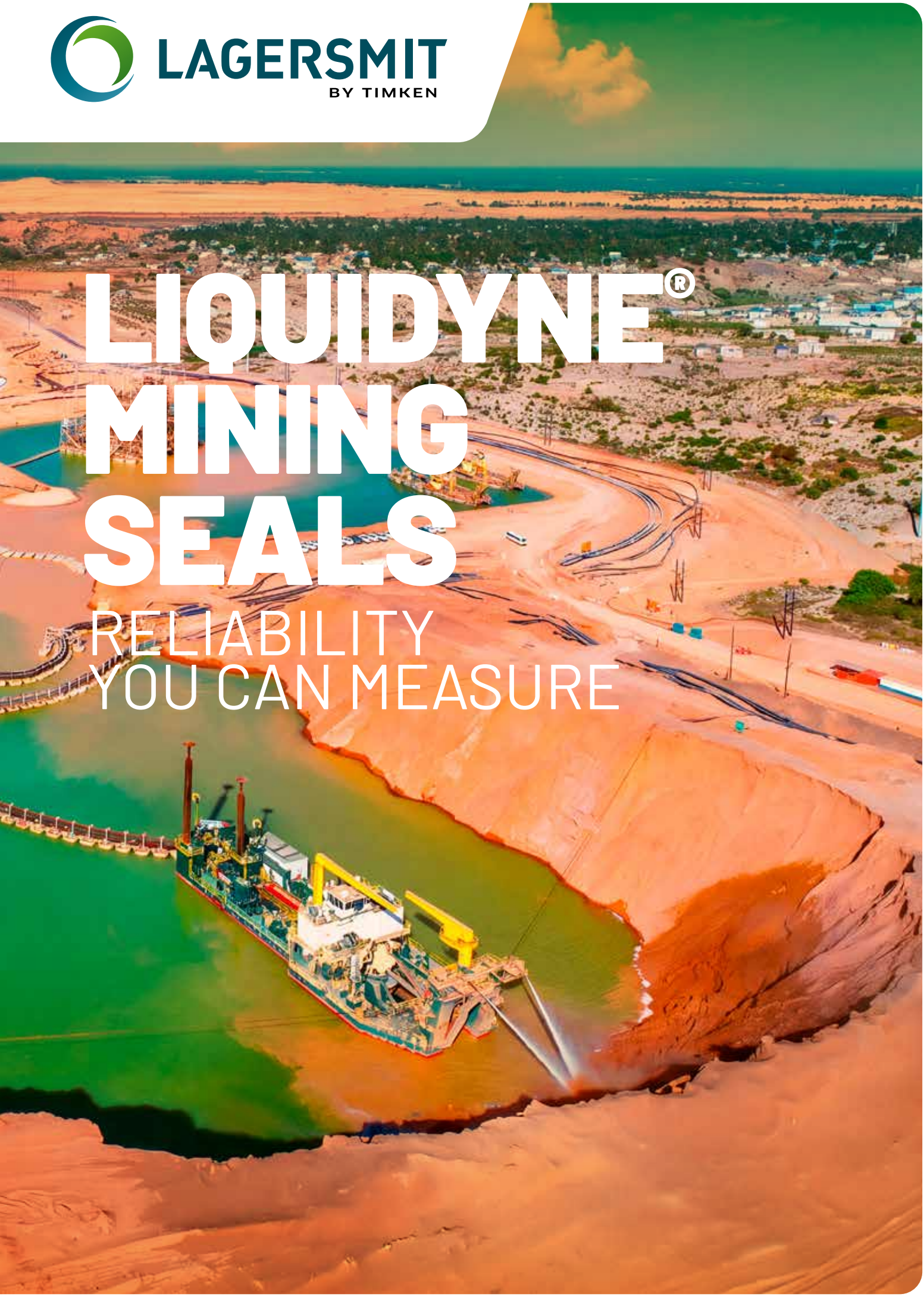
LAGERSMIT
BY TIMKEN

LIQUIDYNE® MINING SEALS

RELIABILITY YOU CAN MEASURE



UPTIME UNDER PRESSURE

THE PROBLEM IS THE UNEXPECTED

MINING OPERATIONS PUSH EQUIPMENT TO THE LIMIT. ABRASIVE MEDIA, FLUCTUATING THROUGHPUT, AND CONTINUOUS OPERATION IN HARSH ENVIRONMENTS PLACE CONSTANT STRESS ON PUMPS AND THEIR SEALING SYSTEMS.

In today's market, operators are forced to choose between two established solutions, each with its own limitations. Gland packing remains widely used due to its simplicity and low upfront cost, but it requires continuous manual adjustment, consumes large volumes of water, and accelerates shaft wear through leakage. Maintenance becomes unpredictable, and performance depends heavily on operator intervention.

Mechanical seals offer tighter control, but demand precision. They require exact installation and alignment, and in mining conditions they are highly sensitive to contamination and dry running. This often leads to costly inspections, replacements, and sudden downtime.

For maintenance teams, this is a constant trade-off between labor-intensive reliability and precision-based vulnerability. In both cases, the result is the same: higher life-cycle costs, increased maintenance, and reduced uptime.

There is another way. Not by choosing between these solutions, but by removing the uncertainty that causes unplanned maintenance and downtime.

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FROM THE UNEXPECTED TO COMPLETE CONTROL

MEASURE, PREDICT, SAVE.

MINING PUMPS RUN CONTINUOUSLY UNDER DEMANDING CONDITIONS. UNEXPECTED FAILURE IS NOT AN OPTION. CONDITION MONITORING ALLOWS YOU TO MOVE FROM UNCERTAINTY TO CONTROL BY MAKING SEAL PERFORMANCE VISIBLE.

The Liquidyne® pump shaft seal uses drain flow as a direct indicator of seal condition. By measuring this flow, you can track wear over time and establish a clear performance trend from the moment of commissioning. As the grooved bush gradually wears, the flow decreases in a predictable pattern.

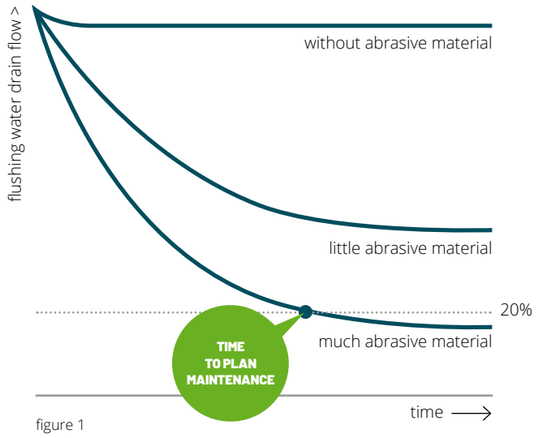
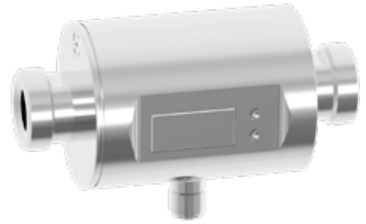


figure 1

This trend provides a clear signal for action. When flow reaches approximately 20% of its original value, maintenance can be planned in advance, avoiding sudden failure and unnecessary downtime.

An optional flow meter enables accurate and continuous monitoring. Installed in the drain line, it records flow without interrupting operation. Data can be stored locally or integrated into your control system, allowing for centralized monitoring and analysis.



By connecting the system to a PLC, monitoring becomes fully automated. Alerts can be generated, data logged, and maintenance aligned with actual condition rather than assumptions. This shifts your operation from periodic checks to condition-based control. The approach is applicable across all Liquidyne installations, from mining sites to dredge pumps and industrial water systems. Wherever the Liquidyne is used, performance can be measured, tracked, and managed.

The result is a shift from periodic checks and guesswork to real control, measurable performance, timely action, and reduced downtime across all Liquidyne installations: measure, predict, save.



LIQUIDYNE® PUMP SHAFT SEAL VS. GLAND PACKING.

THE LIQUIDYNE TRANSFORMS SEALING FROM A MAINTENANCE BURDEN INTO A PREDICTABLE PART OF YOUR OPERATION. IT GIVES YOU THE CONTROL TO PLAN AHEAD INSTEAD OF RESPOND UNDER PRESSURE.

PREDICTABLE LIFETIME

Compared with traditional gland packing, the Liquidyne introduces a new level of operational control. Drain flow provides insight into the seal condition, allowing you to verify performance at any time and predict its remaining service life. Maintenance is no longer triggered by failure, but scheduled based on actual condition. This increases the time between interventions, reduces the risk of sudden pump failure, and lowers total cost of ownership.

BEARING PROTECTION

By making seal condition visible through simple drain flow measurement, the Liquidyne enables early intervention before contaminants or lubrication loss reach the bearings. This timely action prevents abrasive wear and overheating, significantly reducing bearing damage and extending bearing lifetime.

ENERGY SAVINGS

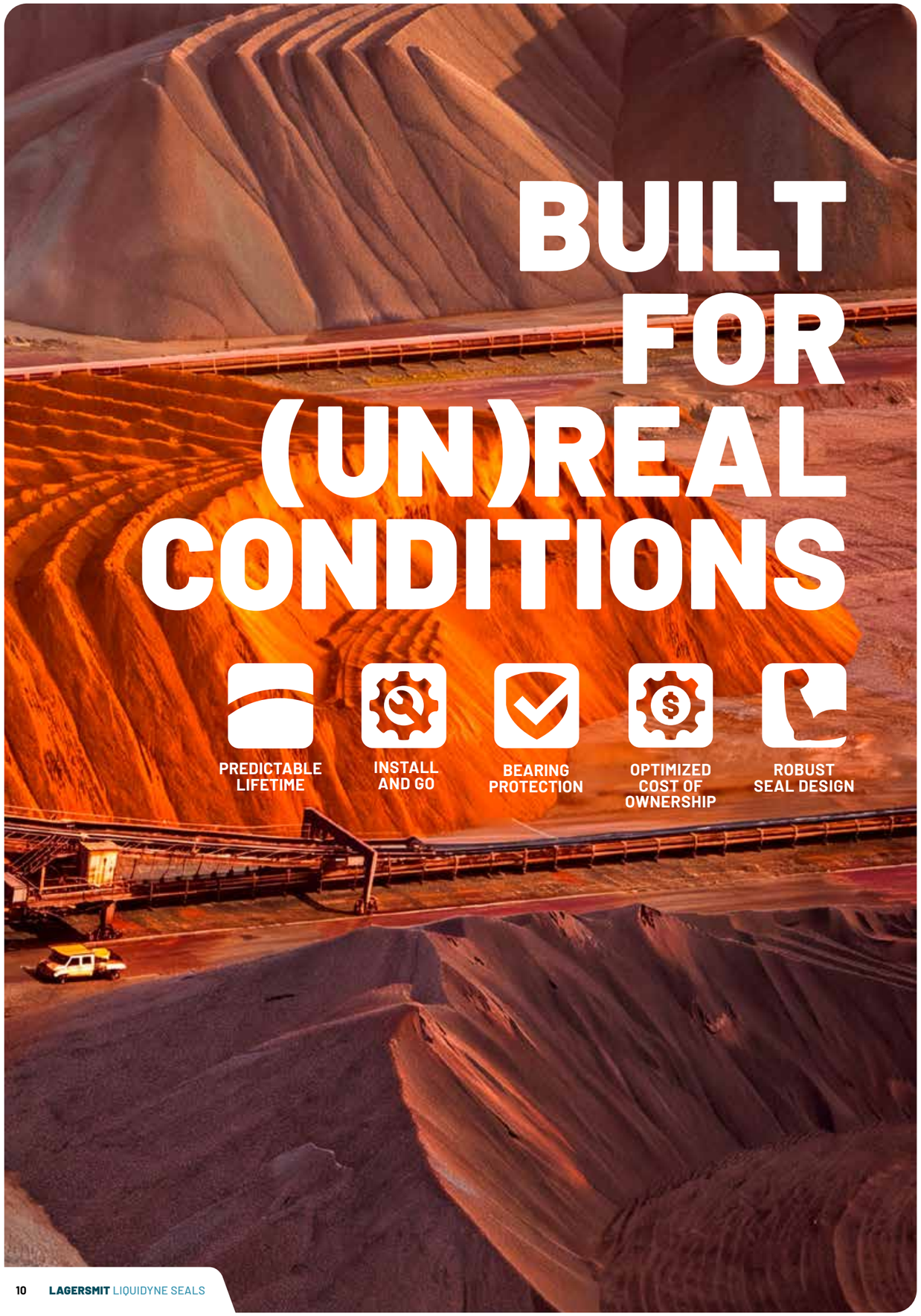
The sealing concept operates with minimal friction. A lubrication film between the lip seals and shaft sleeve limits heat generation and reduces energy consumption, supporting efficient operation over time.

LOWER WATER USE

At the same time, working conditions improve. Without the need for continuous adjustment or external water spray, the environment remains clean and dry. Maintenance teams are no longer required to intervene on rotating equipment during operation, reducing exposure to risk.

INSTALL AND FORGET

Once installed, the Liquidyne requires minimal attention. Monitoring the drain flow is sufficient to assess performance, eliminating ongoing adjustments and keeping pumps running reliably without interruption.



LIQUIDYNE® PUMP SHAFT SEAL VS. MECHANICAL SEAL.

MECHANICAL SEALS ARE DESIGNED FOR PRECISION. MINING ENVIRONMENTS ARE NOT.
THE LIQUIDYNE IS ENGINEERED TO PERFORM WHERE PRECISION ALONE IS NOT ENOUGH.

PREDICTABLE LIFE TIME

By continuously monitoring drain flow, the Liquidyne provides direct insight into seal condition and wear. Instead of sudden failure, performance follows a predictable pattern, allowing maintenance to be planned at the right moment. This removes uncertainty and gives operators confidence in day-to-day operation.

INSTALL AND FORGET

Once installed, the Liquidyne requires minimal attention. Monitoring the drain flow is sufficient to assess performance, eliminating ongoing adjustments and keeping pumps running reliably without interruption. Installation is straightforward and quick, so you can have the system up and protecting your equipment with minimal downtime and effort.

BEARING PROTECTION

By making seal condition visible through simple drain flow measurement, the Liquidyne enables early intervention before contaminants or lubrication loss reach the bearings. This timely action prevents abrasive wear and overheating, significantly reducing bearing damage and extending bearing lifetime.

OPTIMIZED COST OF OWNERSHIP

Cost of ownership is reduced by design. Unlike mechanical seals, which often require full replacement, the Liquidyne allows for targeted maintenance by replacing only the actual wear parts. Combined with low friction and minimal heat development, this reduces both energy consumption and service costs over time.

ROBUST SEAL DESIGN

Proven in heavy-duty dredging applications, the Liquidyne is built to perform under demanding conditions. It operates reliably in abrasive media and remains stable under misalignment, pressure fluctuations and vibration. Its radial sealing principle ensures consistent positioning on the shaft sleeve, even with above-average axial and radial play.

The result is a sealing solution that delivers consistent performance in environments where conventional solutions struggle to maintain reliability.



FASTER INSTALLS, FEWER ADJUSTMENTS, SIMPLE CHECKS.

The Liquidyne® pump shaft seal is designed for real mining environments, not ideal conditions. Installation is straightforward and fits within standard maintenance routines, without the need for specialized tooling or complex alignment. This allows maintenance teams to install and commission the seal efficiently and return equipment to operation without unnecessary delay. Moreover, the Liquidyne has been designed to fit most existing stuffing box applications, which makes retrofitting a breeze.

Compared to conventional mechanical seals, the Liquidyne is less sensitive to installation precision and more tolerant to typical field conditions. Installation time is reduced, downtime during change-outs is minimized, and pumps are returned to service faster.

LOCAL SUPPORT WHEN IT MATTERS

Support is available where and when needed. Lagersmit works with The Timken Company and local partners such as Hagler Systems to provide experienced engineering support. They assist with commissioning, troubleshooting and optimization.
This reduces response times and helps ensure a smooth transition from installation to operation, even in demanding environments.

FROM INSTALLATION TO OPERATION

From installation through operation, this combination of simplicity, support, and fast commissioning enables maintenance teams to reduce both planned and unplanned downtime without adding complexity.
It also provides a practical starting point for pilot installations and step-by-step implementation in real operating conditions.



ENGINEERED FOR REAL CONDITIONS.

THE LIQUIDYNE® PUMP SHAFT SEAL IS BUILT ON A FOUNDATION OF PROVEN ENGINEERING AND REAL-WORLD APPLICATIONS. IT COMBINES THE STRENGTH OF TWO COMPANIES WITH A LONG HISTORY IN PERFORMANCE-CRITICAL INDUSTRIES.

THE TIMKEN COMPANY

The Timken Company brings over 125 years of experience in engineered bearings, supporting some of the most demanding mining applications worldwide. With a global quality system and a strong network of application and service engineers, Timken ensures consistent performance and reliability across all markets.

LAGERSMIT SEALING SOLUTIONS

Lagersmit builds on more than 170 years of sealing expertise, rooted in the dredging industry and extended across maritime, mining, energy, water and industrial applications. As part of The Timken Company, Lagersmit develops advanced sealing solutions designed to perform under the toughest conditions.

With a strong focus on zero-emission sealing and smart condition monitoring, Lagersmit supports operators in reducing environmental impact while improving uptime and extending equipment life.

From its production facility in the Netherlands, Lagersmit serves customers worldwide through its global network of offices, agents, distributors and service partners, supported by The Timken Company's network.

Together, they deliver reliable sealing solutions wherever performance matters most.





PROVEN IN MINING

LIQUIDYNE® AT A PHOSPHATE PRODUCTION SITE

PERFORMANCE CLAIMS ARE ONE THING. PROVEN RESULTS ARE ANOTHER. AT THE CUSTOMER'S PHOSPHATE PRODUCTION SITE, LIQUIDYNE DEMONSTRATES THE REAL-WORLD DIFFERENCE OUR SEALING SOLUTION CAN MAKE.

Liquidyne already makes a measurable difference across multiple mining sites. One example is the partnership between Lagersmit and the customer, where the sealing solution has become a proven part of pump operations.

At this phosphate production site, phosphate ore is mined and processed into products used in fertilizers and other phosphorus-containing applications. A Liquidyne WA220 with flushing water was installed and has proven highly successful in operation.

"KEEP THOSE LIQUIDYNES COMING," THE CUSTOMER MADE CLEAR.

Liquidyne has delivered up to 200% savings on bearing assemblies while significantly improving pump reliability. Based on these results, the customer is now evaluating which additional pumps can be upgraded with Liquidyne seals.

A sealing solution proven where performance counts.



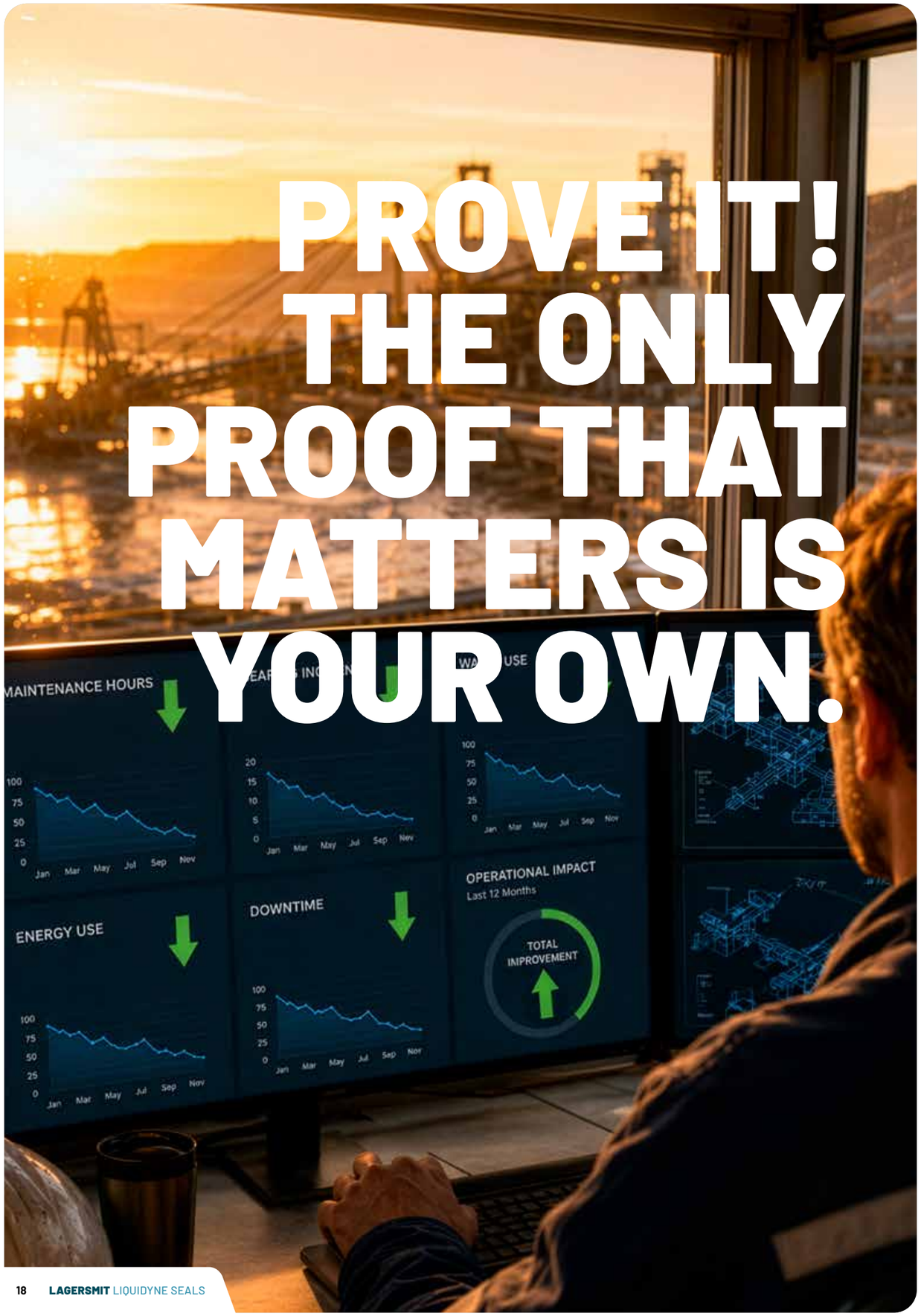
Forward flush



Inlet and outlet



Outlet with flow meter



PROVE IT! THE ONLY PROOF THAT MATTERS IS YOUR OWN.

PILOT, PROOF, SCALE.

EVERY MINING OPERATION IS UNIQUE. SLURRY CHARACTERISTICS, OPERATING CONDITIONS AND MAINTENANCE STRATEGIES DIFFER FROM SITE TO SITE. WHILE THIS BROCHURE EXPLAINS HOW THE LIQUIDYNE® WORKS, THE MOST CONVINCING PROOF COMES FROM SEEING MEASURABLE RESULTS IN YOUR OWN OPERATION.

That is why Lagersmit invites mining operators to experience the Liquidyne through an on-site pilot. Rather than asking you to rely on claims or assumptions, we work alongside your team to validate the Liquidyne under real operating conditions. Together, we measure performance, monitor seal condition and evaluate the results using operational data from your own pumps.

The outcome is more than a successful trial. It is the confidence to make future maintenance decisions based on measurable evidence instead of uncertainty.

WHAT YOU CAN EXPECT

- Professional support during installation and commissioning.
- Continuous monitoring of seal performance.
- Operational data and performance insights based on your own application.

READY TO PROVE PERFORMANCE?

If you're ready to discover what the Liquidyne can achieve under your own operating conditions, we'd be pleased to discuss the possibilities and help you take the next step.

KRISTOF PALMANS
MINING SPECIALIST
SERVICE@LAGERSMIT.COM

Visit the dedicated **mps.lagersmit.com** page, or scan the QR code. Contact one of our sealing specialists to learn more and register your interest.

LOOKING FOR THE TECHNICAL DETAILS?

Continue reading for a comprehensive overview of the Liquidyne sealing system, including the available Seal Plans.



LIQUIDYNE® 3-STAGE FOR MINING PUMP APPLICATIONS

HOW IT WORKS

The Liquidyne® 3-Stage pump shaft seal is used on pumps that process slurries in a wide range of applications.

Lagersmit developed the Liquidyne 3-stage especially to be compatible with all major slurry pump OEM's.

Optionally, a variety of extras are available, including forward flush, wear plates to protect seals from even the harshest mixtures, custom material selections and water conditioning and filtration systems.

ADVANTAGES

- Predictable maintenance.
- Safe, adjustment-free operation.
- Increased pump lifetime.
- Easy installation.
- Energy savings.
- Hard Metal Layer (HML) coating for extra durable grooved bushes.
- Settling pipe to optimize flushing medium.
- No routine maintenance required.
- Built-in forward flush capable.
- Can be fitted with a wear plate for added protection.



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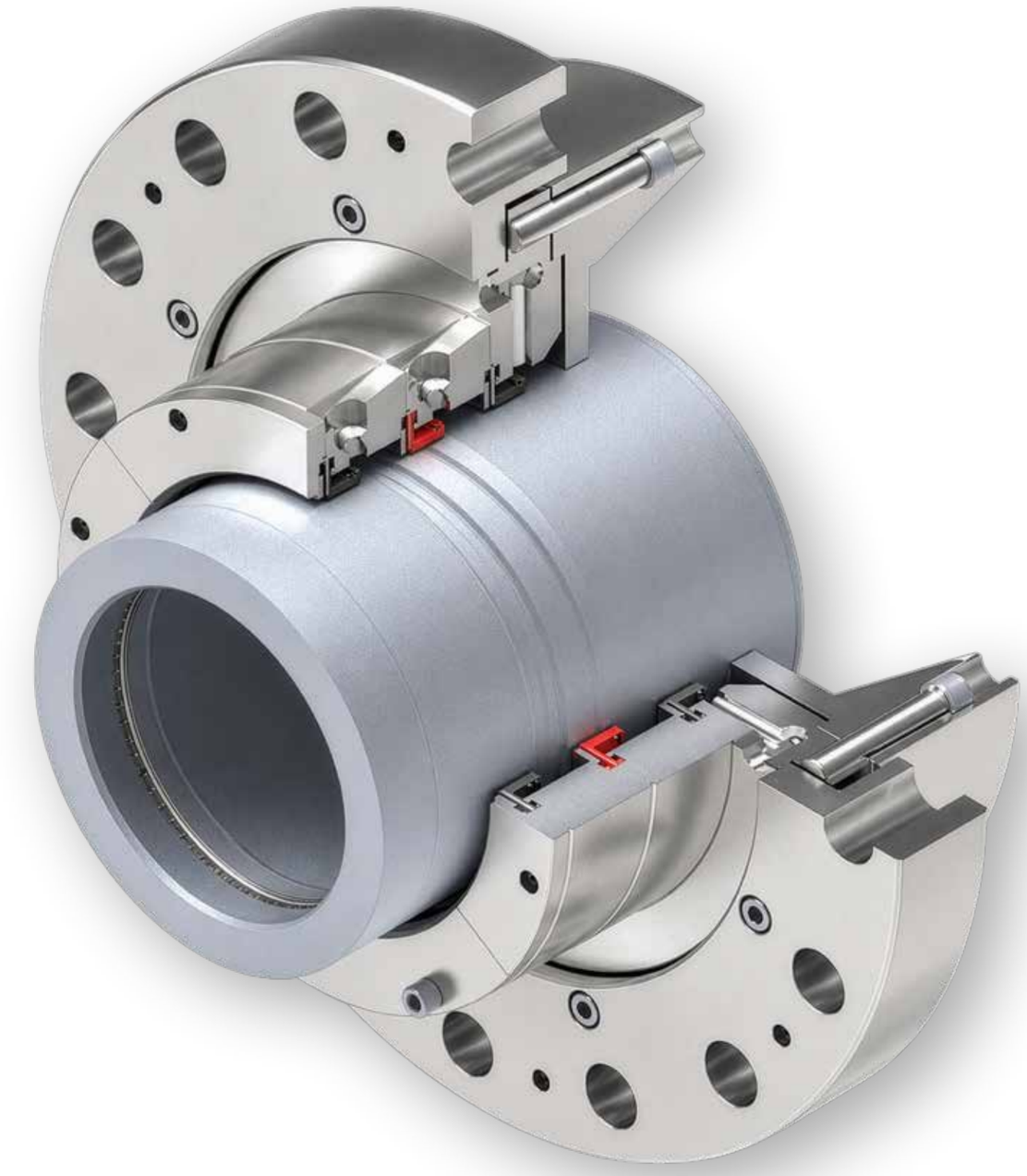
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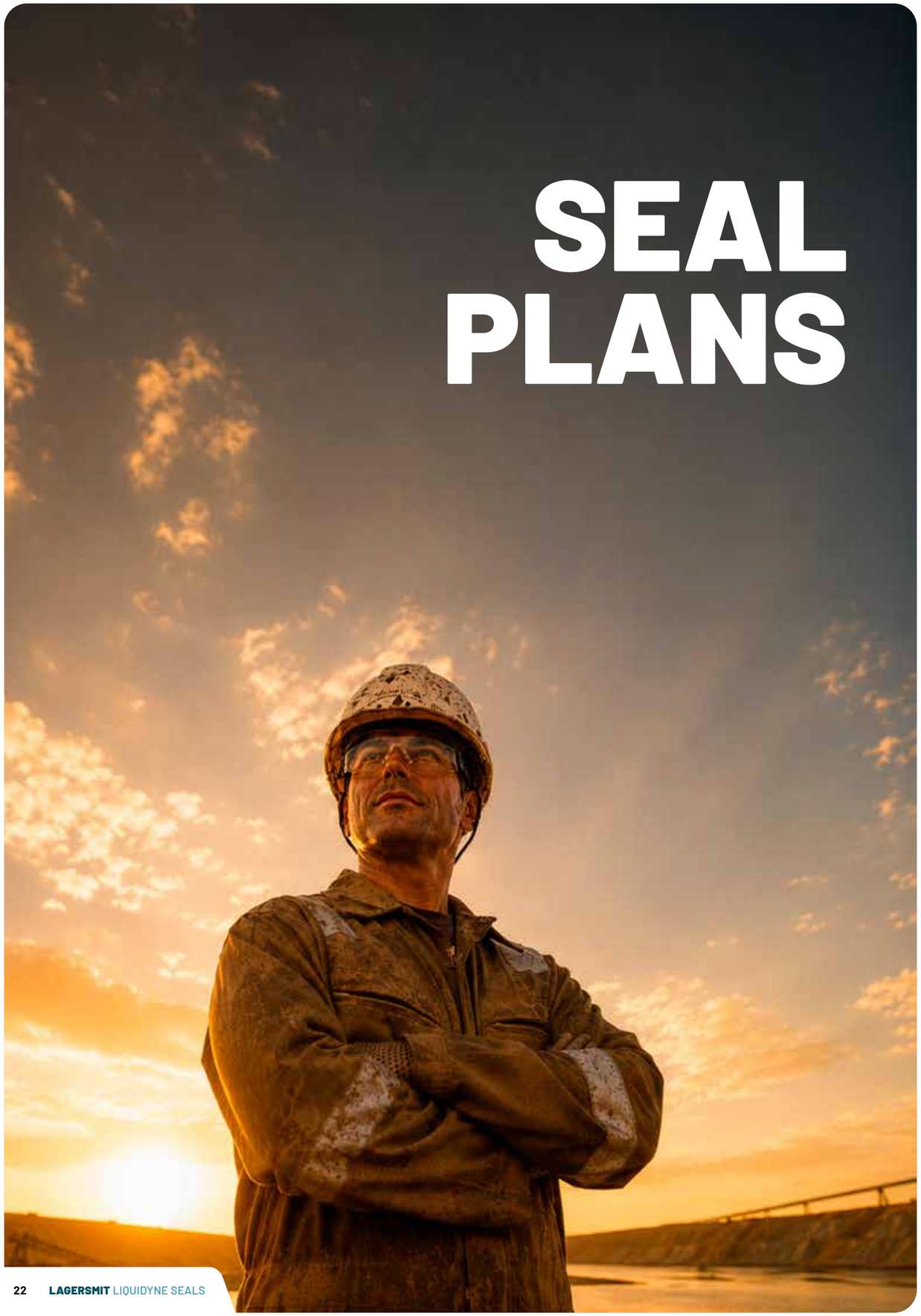


NO RESTRICTION



ROBERT MOOIJMAN
SEALING SPECIALIST





A COMPLETE SEALING SYSTEM. ENGINEERED TO PERFORM

A RELIABLE SHAFT SEALING IS ABOUT MORE THAN THE SEAL ITSELF. IT DEPENDS ON COMPONENTS THAT ARE PERFECTLY MATCHED AND WORK SEAMLESSLY TOGETHER. THAT IS EXACTLY WHAT LAGERSMIT DELIVERS WITH ITS LIQUIDYNE® SEAL PLANS.

Each seal plan is pre-engineered and fully defines the complete sealing system. It includes:

- A seal type and execution selection.
- A full set of instrumentation (such as gauges, valves and sensors).
- Material grade specifications.
- A suitable selection for a seal water pump.

In mining applications, every Liquidyne seal can have its own dedicated flushing water system, supplied from a common external seal water source. A robust membrane-type positive displacement pump pressurizes the seal water and reliably handles pond or ditch water.

Before entering the seal, the water is filtered. Depending on site conditions, settling filters or cyclone separators provide an effective solution. Based on a water survey, Lagersmit helps determine the most suitable filtration system.

An integrated wear plate protects the sealing faces against abrasive slurry particles.

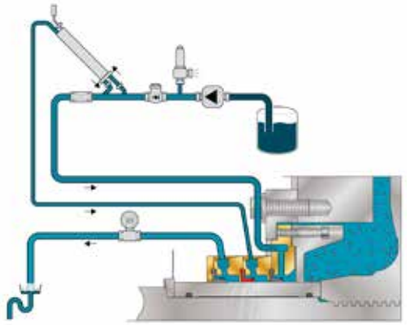
Combined with durable materials and a proven design, this ensures reliable performance and long service life.

From standard to heavy-duty applications, every Liquidyne seal plan is engineered to keep your sealing system performing at its best. Our sealing specialists are ready to help you select the right solution.



THE RIGHT PLAN

PLAN WA-101/104



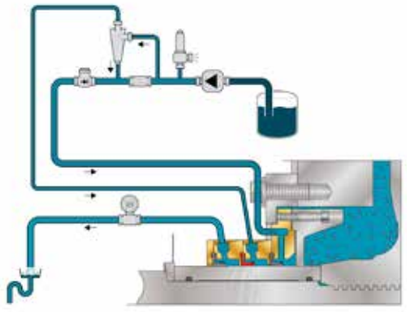
HOW IT WORKS

This open flush configuration draws its flush supply from the gland flushing line. A settling pipe filters contaminants from the flush water before it enters the seal. This is the preferred solution for dredge pump applications. The Dirt Retaining Module (DRM) provides an additional barrier against contaminants in the pumped medium.

ADVANTAGES

- Intrinsic pressure balancing.
- Robust, durable installation.
- Self-cleaning settling filter.

PLAN WA-104A



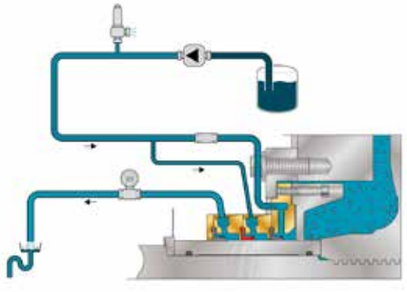
HOW IT WORKS

This open flush configuration draws its flush supply from the gland flushing line. A cyclone separator filters contaminants from the flush water before it enters the seal. This is the preferred solution for mining applications. The Dirt Retaining Module (DRM) provides an additional barrier against contaminants in the pumped medium. Its compact layout requires less space than a settling pipe arrangement.

ADVANTAGES

- Intrinsic pressure balancing.
- Robust, durable installation.
- Self-cleaning cyclone filter.

PLAN WA-102

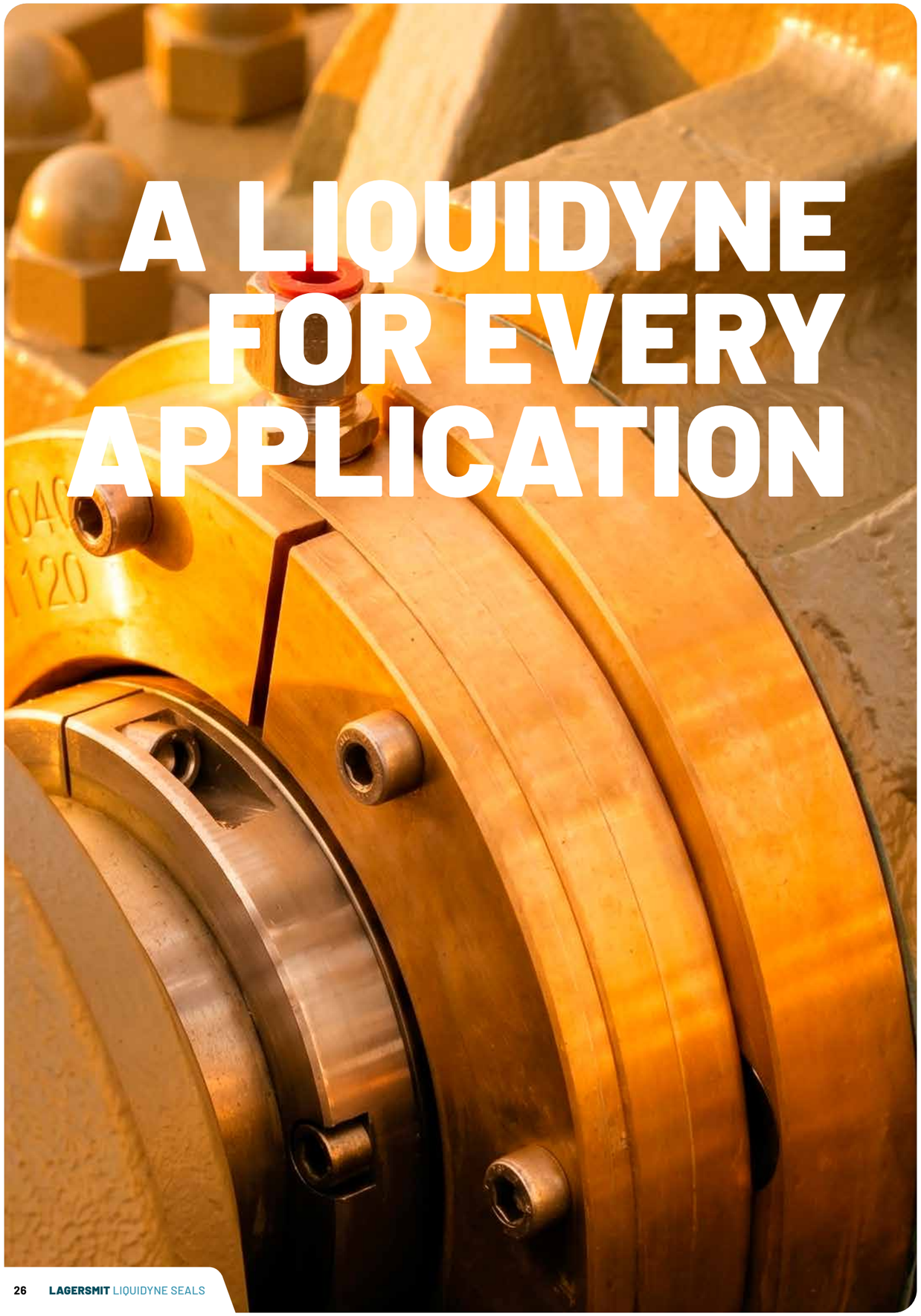


HOW IT WORKS

This open flush configuration draws its flush supply from the gland flushing line. It offers a straightforward and cost-effective solution for dredge pump applications. The Dirt Retaining Module (DRM) provides an additional barrier against contaminants in the pumped medium. Its simple design supports reliable operation with a minimum number of components.

ADVANTAGES

- Intrinsic pressure balancing.
- Robust, durable installation.

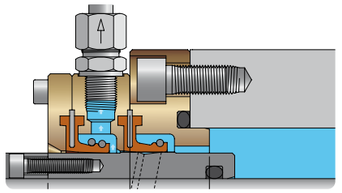


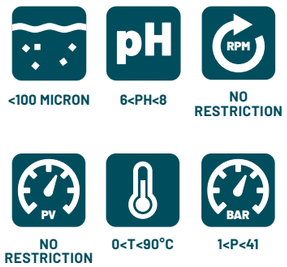
A LIQUIDYNE FOR EVERY APPLICATION

PROVEN ACROSS VARIOUS ENVIRONMENTS

PUMP	LIQUIDYNE® 2-STAGE	LIQUIDYNE® 2-TG	LIQUIDYNE® 3-STAGE	LIQUIDYNE® 3-TG	LIQUIDYNE® 3-STAGE VACUUM	LIQUIDYNE® LDS
Vertical sump pumps • Cantilever pump	✓		✓			
Deepwell pumps					✓	✓
Slurry pumps • Multistage (pipeline) pumps • Dewatering pumps • Tailings pumps • Processing pumps • Service water pumps			✓			
Self-priming centrifugal pumps	✓	✓	✓	✓	✓	✓
Diffuser pumps • Vertical • Water • Oil & Gas	✓	✓	✓	✓	✓	✓
Booster pumps	✓	✓	✓	✓	✓	✓
Split case pumps	✓	✓	✓	✓	✓	✓
Concrete volute pump • Vertical • Axial • Between Bearing	✓	✓	✓	✓	✓	✓
Sewage pumps • Waste water			✓			✓
Vertical suspended pumps • Firefighting • Cool water • Irrigation drainage	✓	✓	✓	✓	✓	✓
Axial pumps		✓	✓	✓	✓	✓
Fish-friendly pumps	✓	✓	✓	✓	✓	✓

LIQUIDYNE®
2-STAGE





HOW IT WORKS

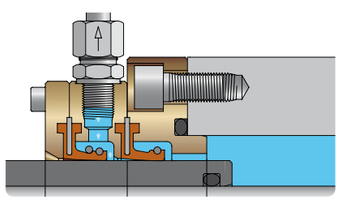
Designed as the standard configuration within the Liquidyne® range, this seal is ideally suited for pumps handling relatively clean media containing abrasive particles up to 100 microns. The process medium itself lubricates the seal, creating a simple, reliable solution without the need for an external flush.

ADVANTAGES

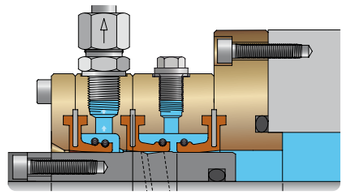
- Predictable lifetime due to condition monitoring.
- Low power consumption.
- Maximized maintenance interval.
- Hard Metal Layer (HML) coating for extra durable grooved liners.
- No external flush needed.
- Optional design: the Liquidyne can be designed with divisible housing parts. Ask for more details.

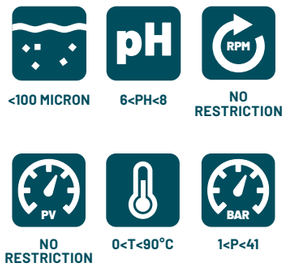
Optional Liquidyne® 2-TG

As this application is typically used on low-pressure pumps, the liner does not feature a grooved surface but a smooth, flat surface.



LIQUIDYNE®
3-STAGE VACUUM





HOW IT WORKS

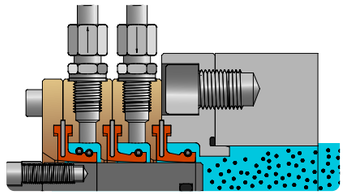
For applications operating under vacuum conditions, this configuration maintains a water column of up to eight meters while the pump is at a standstill.

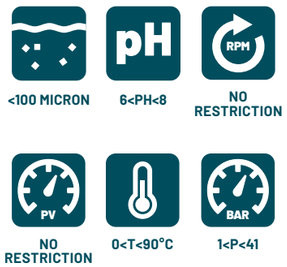
The integrated vacuum module also prevents air from entering the pump whenever internal pressure falls below atmospheric pressure, ensuring reliable sealing performance during both operation and shutdown.

THE LIQUIDYNE 2-STAGE ADVANTAGES PLUS

- Suitable for dry start-up of the pump.
- Retains pump medium up to eight meters.

LIQUIDYNE®
3-STAGE





HOW IT WORKS

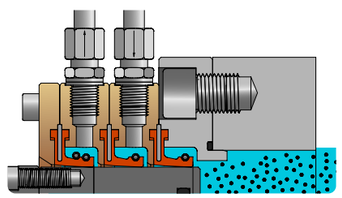
Where abrasive media require additional seal protection, an external flush continuously lubricates, cools and cleans the sealing faces. At the same time, drain flow enables condition monitoring, allowing maintenance to be planned before performance is affected.

THE LIQUIDYNE 2-STAGE ADVANTAGES PLUS

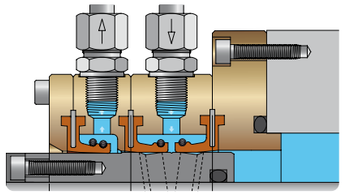
- Robust seal design.
- Dirt retaining module.

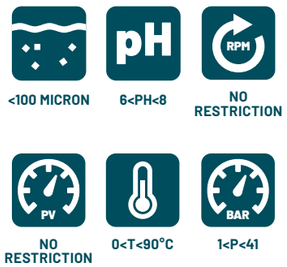
Optional Liquidyne® 3-TG

As this application is typically used on low-pressure pumps, the liner does not feature a grooved surface but a smooth, flat surface.



LIQUIDYNE®
LDS





HOW IT WORKS

When handling heavily contaminated or aggressive media, this configuration creates a continuous barrier between the process medium and the sealing faces. An external flush lubricates, cools and cleans the seal while preventing abrasive particles from reaching critical sealing surfaces. The resulting drain flow also enables reliable condition monitoring.

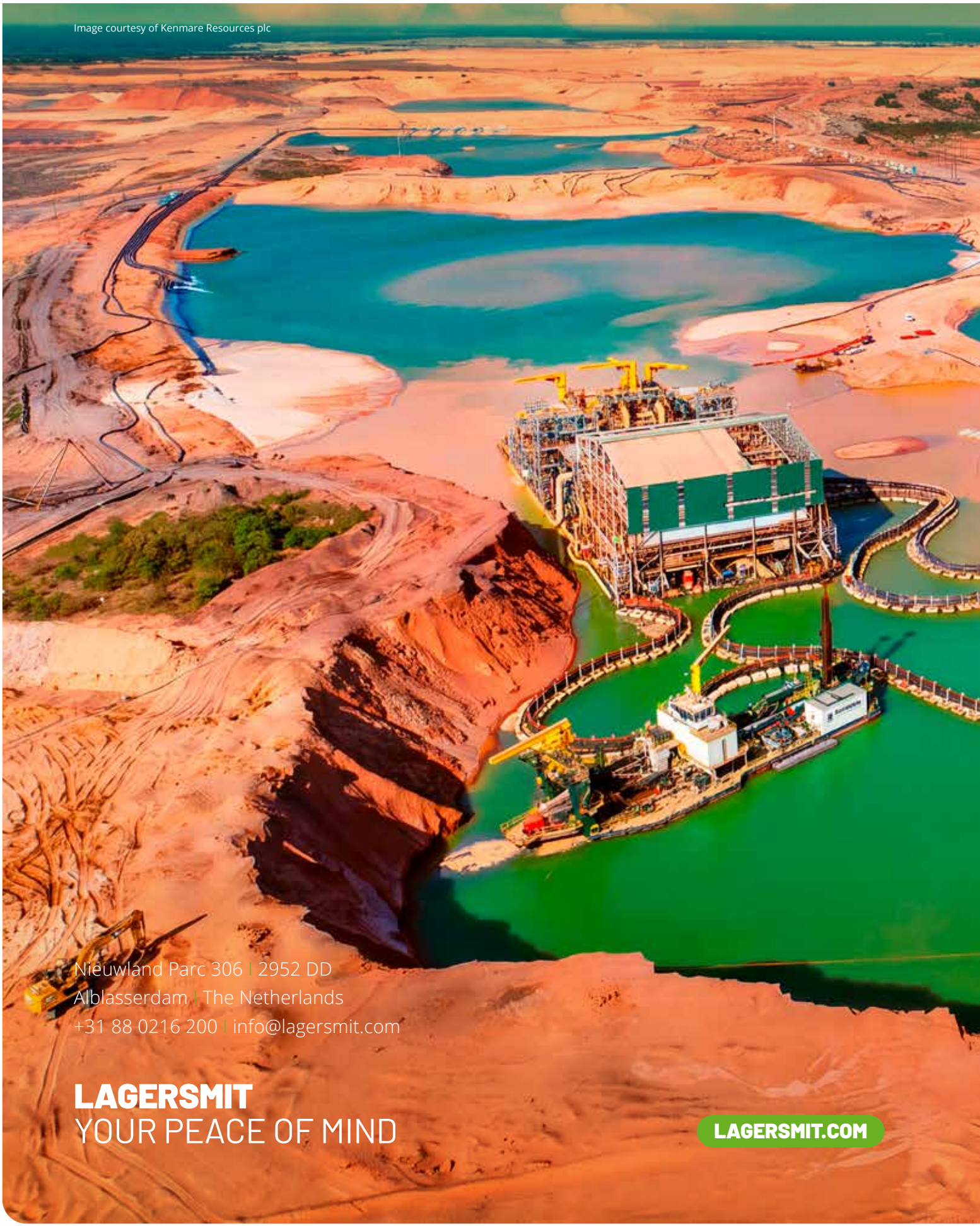
THE LIQUIDYNE 2-STAGE ADVANTAGES PLUS

- Suitable for dry start-up.
- Most durable solution.

LAGERSMIT
BY TIMKEN

LIQUIDYNE® MINING SEALS

RELIABILITY YOU CAN MEASURE



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LAGERSMIT
YOUR PEACE OF MIND

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