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ROTO TECH

ISSUE NO : 3 | QUARTERLY TECHNICAL BULLETIN | JANUARY - MARCH, 2025

WHAT'S INSIDE

Operator: "My twin screw pump is like my marriage."
Technician: "Always synchronized?"
Operator: "No, always under pressure!"

EDITORIAL

Dear Stakeholders,

I am delighted to engage with you once again through this latest edition of our quarterly newsletter, showcasing our continued commitment to excellence and innovation. At Roto Pumps, our customers have always been at the heart of everything we do. Our philosophy is simple yet powerful—"Customer First". This approach drives our pursuit of delivering customised solutions that empower industries worldwide.

In this edition, we are excited to share the remarkable progress we're making in enhancing our product offerings, strengthening our service capabilities, and expanding our global footprint. We've successfully addressed unique and complex industrial challenges—ranging from delivering robust solutions for heavy water treatment in nuclear reactors to supporting MSW-based biogas projects that convert waste into valuable energy. Across these diverse applications, our pumping solutions continue to optimize critical processes with precision and reliability. We've secured some remarkable major orders across key sectors, further motivating us to push boundaries and set new benchmarks.

We take pride in being a trusted partner, not just a product provider. We are committed to providing customised pumping solutions and seamless customer experiences because your success is our priority. We welcome your insights and suggestions to help us refine our approach and serve you better.

Sincerely yours,
Arvind Veer Gupta
Dy. Managing Director
Roto Pumps Ltd.

Editorial Team - Mr. Vinay Kumar Dhar | Mr. Manish Dabas | Ms. Asmita Mishra

LEADERSHIP TALK IN LEADING MAGAZINE

Mr. Arvind Veer Gupta
(Deputy Managing Director
Roto Pumps ltd.)

In today's increasingly interconnected world, businesses operating in the industrial positive displacement pumps sector are presented with unprecedented opportunities for global growth. However, capturing these opportunities requires a robust, well-calibrated approach to sales and business development—one that balances agility with strategic foresight, and innovation with customer-centricity.

The Industrial Pumps Sector: A Dynamic Landscape

The industrial pumps market plays a critical role in powering industries such as oil and gas, water and wastewater treatment, chemicals, food and beverage, and renewable energy etc.. This demand is being driven by rapid industrialization, urbanization, and a global focus on sustainable and energy-efficient solutions.

However, the market is also evolving rapidly. Companies must navigate supply chain disruptions, fluctuating raw material prices, and stringent environmental regulations, while also meeting the growing demand for customized solutions. For players in this sector, success depends on transforming these challenges into opportunities through strategic sales and business development practices.

Understanding the Market DNA

Global success starts with a deep understanding of the markets you serve. The industrial pumps market is not monolithic—each region comes with its own set of requirements, standards, and customer expectations. For example:

In developed markets like North America and Europe, there's a strong emphasis on energy efficiency, sustainability, and adherence to strict environmental standards and local laws.

Emerging markets in Asia and Africa, on the other hand, are driven by cost-effective solutions and scalability.

By tailoring offerings to align with regional priorities, businesses can position themselves as trusted partners rather than mere suppliers.

Technology and Innovation as Growth Drivers

Innovation has always been the backbone of the industrial pumps industry. To remain competitive, companies must invest in advanced technologies, predictive maintenance solutions, and energy-efficient designs.

Leading companies like Roto Pumps have embraced innovation by introducing maintenance-in-place pumps and wear compensation stators to extend product life. They have also developed industry-specific customized solutions, such as Roto Biomix Pumps for the Biogas Industry and Roto Flex Pumps for the Mining Industry.

These advanced pumping solutions deliver enhanced performance, enabling customers to optimize their operations efficiency.....

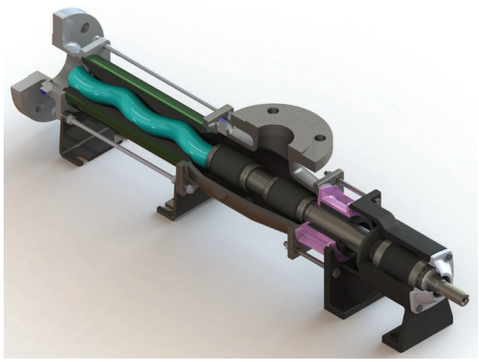
Follow the link or QR Code to Read the full article:
https://shorturl.at/x1lkw

SIGNIFICANCE OF GLAND PACKINGS IN SHAFT SEALING

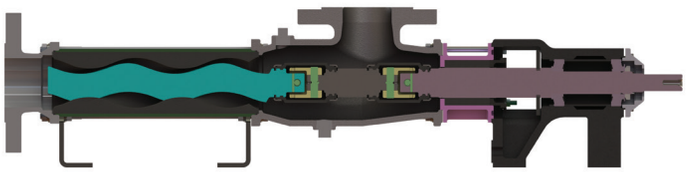
In rotary positive displacement pumps, shaft sealing plays a vital role in maintaining operational efficiency by reducing wear, friction, and potential fluid loss. Shaft Sealing is a critical mechanism designed to prevent leakage, ensure pressure-tight joints, and block the entry of air and contaminants.

Shaft sealing can be classified into two main types:

Static Sealing:
It provides a seal between two relatively stationary components. Examples include compression gaskets, O-rings, oil seals, metallic gaskets, and beadings.



Dynamic Sealing:
It seals the annular gap between components with relative movement, such as reciprocating or rotary motion. Examples include O-rings, lip seals, piston rings, gland packings, and mechanical seals. A properly designed shaft sealing system prevents fluid leakage along a rotating shaft, which extends from a housing containing liquid. This not only minimizes fluid loss but also protects the internal components from contamination and enhances overall equipment reliability.

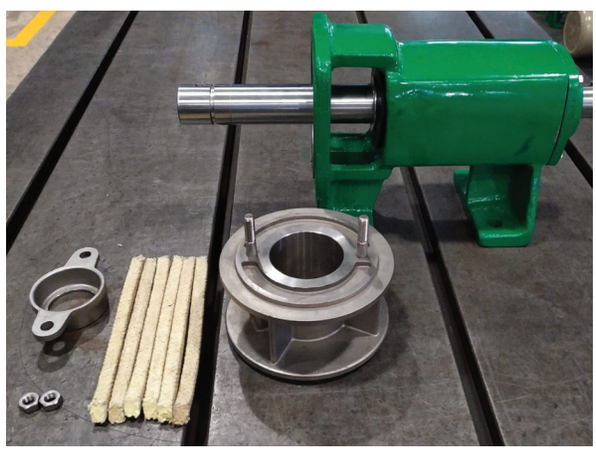


Role of Gland Packing in Shaft Sealing

Gland packings are flexible sealing materials used to control fluid leakage between moving surfaces, such as a pump's shaft and casing. They play a crucial role in ensuring the smooth and efficient operation of the Pump by preventing excessive leakage. A controlled leakage of a few drops per minute ensures proper lubrication, enhancing both performance and lifespan. They tend to last longer than seals.

What is Gland Packing

Gland packing is a square-shaped rope made from greased flax. It is tightly wound around the Pump shaft and compressed into place using a gland follower. This setup creates a seal while allowing a controlled amount of leakage-usually just a few drops per every minute, when the shaft is in motion.



Traditionally, gland packings were made from plant fibers saturated with grease, and compressed into the gland between the rotating shaft and pump casing. While modern materials have enhanced their performance, the core principle remains the same: simple yet effective sealing.

One of the key advantages of gland packings is their simple design. They not only provide a dependable seal but also offer a built-in wear indicator-an increase in leakage signals the need for adjustment or replacement,

helping to prevent unexpected equipment failures.
For pumps gland packings continue to be a practical and cost-effective sealing solution in rotary motion applications.

Types of Gland Packing

PTFE (Polytetrafluoroethylene) Packing
Chemically inert, low friction, non-stick.

Graphite Packing
High temperature and pressure resistance, good lubricity.

Aramid Fiber Packing
High mechanical strength, abrasion resistance.

Carbon Fiber Packing
Good thermal conductivity, chemical resistance.

Acrylic Yarn with PTFE Impregnation
Economical, easy to install, good chemical resistance.

Combination Packings (Hybrid)
It uses different materials in different layers as per application requirements.

Advantages of Gland Packings

Gland packings offer several benefits, making them a preferred choice for various applications:

- **Reliability:** Ensures secure sealing under diverse conditions.
- **Ease of Installation & Maintenance:** Simple to install and maintain compared to mechanical seals.
- **Tolerance to Mechanical Irregularities:** Performs fairly well even with worn-out shafts and bearings.
- **Resistant to Abrasive & Corrosive Media:** Functions effectively in challenging environments.
- **Durability:** Can withstand rough handling without breaking.
- **Predictable Leakage Increase:** Provides warning of potential failure, allowing for timely intervention.

Disadvantages to Consider

While gland packings are highly efficient, they come with certain limitations:

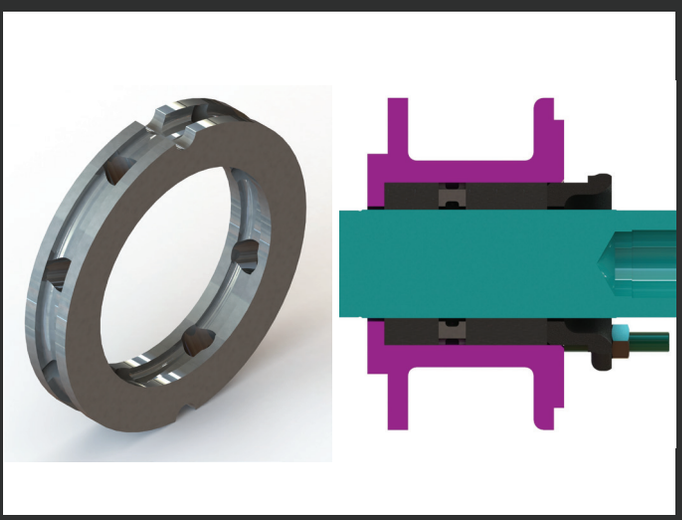
- **Minimal Leakage Requirement:** Necessary for cooling purposes.
- **Proper Installation is Critical:** Must not grip the shaft too tightly to prevent damage.
- **Leakage Collection:** Requires a mechanism to handle leakage in the gland area.
- **Shaft Wear:** Continuous rubbing may cause wear over time.
- **Skill-Intensive Installation:** Requires expertise for proper cutting and fitting.
- **Power Losses:** Friction can lead to increased energy consumption.

Enhancing Performance with Lantern Rings

In some applications, a standard stuffing box may not be sufficient. When dealing with vacuum suction, high-temperature fluids, or abrasive media, a lantern ring can be used alongside gland packings.
Care must be taken when using a gland packing lantern, as the cooling liquid must be compatible with the pumped media.
Using an incompatible fluid can alter or damage the properties of the pumped medium.

What is a Lantern Ring?

A lantern ring is a perforated, hollow ring placed within the gland packing at specific locations (e.g., 1L4, 2L4, 3L2). It distributes clean, cool liquid from an external source or the pump discharge around the shaft. This additional lubrication and cooling improve sealing performance, enhance longevity, and protect against excessive wear.



Selection Criterion for Correct Gland Packing

Selecting the appropriate gland packing is crucial for ensuring efficient sealing, minimizing leakage, and protecting both equipment and the environment. The right choice depends on the following critical factors i.e. Chemical resistance (pH level), Shaft rotation speed, System pressure and temperature.

1. Chemical Resistance (pH Level):

- To maintain the integrity and performance of the gland packing, it is essential to consider the chemical exposure caused by pumped medium or any other fluids used in the system flushing and cleaning. A critical factor in this evaluation is the pH range of packing will be encountered during operation of fibre-based materials, particularly natural fibres are highly susceptible to degradation when exposed to corrosive environments such as acidic (low pH) or alkaline (high pH) conditions.
- Without proper pH resistance, the packing can deteriorate quickly, compromising the seal and increasing maintenance requirements. The packing material must withstand the chemical composition of the working medium without degradation. Proper chemical resistance ensures durability and prevents contaminating the process fluids.

2. Shaft Speed:

- The speed at which the shaft rotates affects friction and heat generation. Selecting a packing that can handle the shaft's velocity helps maintain the seal's integrity and prevents premature wear
- The interaction at which the shaft and packing plays a crucial role in determining the longevity and the efficiency of sealing systems is shaft speed. This movement can lead to wear through two primary mechanisms i.e. abrasion of the sealant materials and the generation of the frictional heat, resulting in thermal degradation of packing. Both issues become more pronounced as the velocity of the shaft increases, making it essential to understand and control the operating conditions of the packing.

3. Pressure:

- The packing must be able to withstand the operating pressure within the system to effectively seal the gap around the rotating shaft while preventing fluid leakage. Operating pressure is a crucial factor that directly influences sealing performances and services life. The packing must effectively withstand system pressure to seal the gap around the rotating shaft, preventing fluid leakage while maintaining operational integrity.
- Although pressure alone does not determine packing durability. In dynamic sealing applications like pumps friction-induced wear is the primary cause of seal degradation. This friction arises from the combined effect of movement and pressure within the working gap.

4. Medium Temperature:

- High temperatures can significantly accelerate packing wear, compromising sealing performance and leading to premature failure. To ensure long-term reliability in demanding conditions it is crucial to choose temperature resistant packing designed to withstand the heat generated during operation. Tmax- the maximum temperature threshold is essential for seal performance.
- Most sealing materials exhibit a positive temperature coefficient of friction, meaning that once a critical temperature is surpassed, friction increases exponentially. This rapid rise in friction often results in overheating, burnout of the machine components and degradation of the seal itself.

Take Away

Gland packings continue to be a trusted and cost-effective shaft sealing solution for rotary motion applications, offering durability and adaptability across diverse industries. Their effectiveness relies on proper selection, installation, and maintenance to optimize performance, minimize fluid loss, and ensure long-term equipment reliability. With a predictable wear pattern that enables proactive maintenance, they help reduce downtime and enhance operational efficiency. By carefully evaluating factors such as chemical resistance, shaft speed, pressure, and temperature, industries can achieve superior sealing performance, making gland packings a dependable choice for Progressive Cavity Pumps.

NEW APPLICATION DEVELOPMENTS

Heavy Water Treatment Application in Nuclear Reactor

Roto Pumps India has reinforced its expertise by delivering a custom-designed pumping solution for heavy water treatment in a nuclear reactor. Purity control and contamination prevention were essential to reactor functionality. We addressed these challenges by working closely with top EPC partners, ensuring strict compliance with nuclear safety standards.

Heavy water (D_2O) serves as a neutron moderator, and even the slightest impurity can compromise operations. Our M Series Progressive Cavity Pump was engineered for precision, reliability, and contamination-free handling.

With a strong track record in nuclear applications, Roto Pumps have supplied numerous pumps for heavy water treatment and other critical reactor processes. Our proven expertise and dependable solutions make us the preferred choice for such demanding environments.

Application Details

Flow Rate: 30 LPM (8 GPM) **Media:** Heavy Water **Pressure:** 20 bar (290 PSI)

Chalk Slurry Application

Roto Pumps North America addressed the toughest challenge—delivering a leak-proof pumping solution for a leading industry player struggling with abrasive chalk slurry!

The Challenge: Fine chalk particles were grinding down the seals, damaging internal components, and causing frequent breakdowns. The existing pump's gland packing failed to provide an effective seal, leading to high maintenance costs and downtime.

The Game-Changing Solution: We replaced their failing pump with a custom-engineered D Series Progressive Cavity Pump with Mechanical Seal—offering superior sealing, reduced wear, and long-lasting efficiency.

The result: A delighted customer who now experiences seamless operations, minimal maintenance, and maximized uptime!

Application Details

Flow Rate: 8.5 GPM (2 m^3/hr) **Media:** Chalk Slurry **Pressure:** 100 PSI (7 bar)

First Order – Municipal Solid Waste Based Biogas Project

Roto Pumps India has reached a significant milestone by successfully delivering seven progressive cavity pumps for a leading petroleum company & their first-ever MSW-based Biogas Project.

MSW-based biogas projects are transforming waste into valuable energy. Through anaerobic digestion, organic food waste and sludge are broken down in a controlled environment, generating biogas—a clean, renewable fuel that supports a greener future.

We are proud to contribute to the future of clean energy by providing efficient, reliable pumping solutions for waste-to-energy applications.

Application Details

Flow Rate: 8 m^3/h (53 GPM) **Media:** Digestate & Press Mud Slurry **Pressure:** 4 bar (58 PSI)

Enzyme Dosing for Poultry Feed Mills

Roto Pumps North America has successfully deployed Aggressive Chemical Dosing Pumps to handle highly abrasive enzymes for a leading poultry feed mill.

Our client faced challenges in handling the highly abrasive nature of enzymes, along with the high-pressure requirement of 250 PSI to pump them 80 feet vertically through a ½-inch stainless steel line to the top of the feed mill. Conventional pumps struggled with abrasion, pressure consistency, and reliability under these demanding conditions.

To overcome this challenge, Roto Aggressive Chemical Dosing Pumps with Integrated Drives were supplied for precise, efficient, and reliable dosing. These pumps ensure consistent feed quality, reduced downtime, and optimized processing efficiency, making them a robust solution for enzyme dosing in poultry feed production.

Application Details

Flow Rate: 1/4 GPM **Media:** Enzyme **Pressure:** 250 PSI

Sterilizer Condensate Application – Palm Oil Upstream Industry

Roto Pumps Malaysia has achieved yet another milestone by addressing a key challenge in the fruit sterilization process for a leading palm oil company. During cooking, oil droplets, water, and moisture settle at the bottom of the sterilizer tank, forming a sterilizer condensate slurry. This slurry must be efficiently transferred to the oil-water separator.

However, existing conventional pumps suffer from cavitation due to the high moisture content in the oil-water mixture, resulting in inefficiencies, frequent downtime, and increased maintenance costs.

To overcome this challenge, we provided a custom-engineered L Series Progressive Cavity Pump, specifically designed for the Sterilizer Condensate application. Our pump exceeded the client's expectations, ensuring efficient handling of the condensate and streamlining the fruit sterilization process.

Application Details

Flow Rate: 25 m^3/h (110 GPM) **Pressure:** 3 bar (45 PSI)

Media: Sterilizer Condensate

Water Treatment Application for Drilling Process – Oil & Gas Industry

Breaking New Grounds! **Roto Pumps MENA** has successfully delivered four customized Progressive Cavity Pumps with skids to a leading oil & gas giant in the Middle East. These pumps were supplied for a water treatment application in drilling operations.

Water plays a critical role in drilling operations, primarily as a key component of drilling fluids (mud). It helps cool the drill bit, transport cuttings to the surface, and maintain wellbore stability. However, managing and treating this water is essential to ensure efficient operations, reduce environmental impact, and enhance equipment longevity.

Drilling water often contains abrasive particles, high-viscosity fluids, and contaminants, which can lead to clogging, excessive wear, and increased maintenance if not handled properly. Effective water treatment solutions help separate solids, control fluid properties, and ensure the proper disposal or reuse of water, making operations more efficient and sustainable.

Recognizing our customer's needs, we have custom-engineered our M Series Progressive Cavity Pumps with various skid options, ensuring smooth handling of the application and superior performance. With our proven expertise and dedicated post-installation support, we have once again exceeded customer expectations.

Application Details

Flow Rate: 22 m^3/h (96 GPM) **Media:** Water **Pressure:** 10 bar (145 PSI)

MAJOR ORDERS

Prestigious Order: 18th Roto Kwik Pump Ordered by Leading UK Biogas Contractor

Roto Pumps UK is set to deliver its 18th order for the Roto KWIK pump to a leading UK-based biogas contractor, who continues to place trust in our product quality and our prompt service & support. The customer has previously procured over 30 Roto KWIK pumps from us.

Roto KWIK pumps continue to set new benchmarks in the pump industry. Customers appreciate its innovative maintenance-in-place design, and when combined with our advanced wear-compensation stators, it outperforms the competition in quick maintenance and durability by a big margin.

This repeated success reinforces Roto Pumps as the go-to partner for reliable, high-performance pumping solutions, ensuring uninterrupted operations and maximum efficiency in biogas production."

Application Details

Pump Series: Kwik Range

Media: Sludge

Qty.: 18

Flow Rate: 200 m^3/h (880 GPM)

Pressure: 4 bar (58 PSI)

Landmark Order for Roto Mining Stations

Roto Pumps Australia has bagged its biggest mining station order to date, supplying a Dual Mine Dewatering Unit featuring two Roto Flex (Flexible Shaft) Series Progressive Cavity Pumps with a specialized dual-hopper arrangement. These pumps are engineered to handle mine dewatering at 36 m^3/hr with an 18-bar discharge pressure, ensuring efficient water removal from deep mining operations.

This order marks a major breakthrough in Roto Pumps' mining sector presence, as it could lead to the supply of up to 15 such units over the next 12 months. The mining industry demands reliable, high-performance dewatering solutions, and Roto Pumps' proven expertise in handling challenging applications has once again earned the trust of a leading mining operator.

Application Details

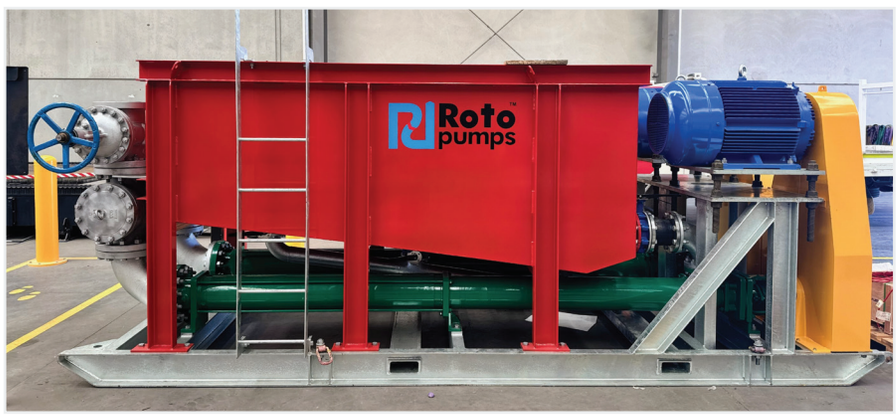
Pump Series: Roto Flex

Flow Rate: 36 m^3/h (160 GPM)

Media: Muddy Water

Pressure: 18 bar (260 PSI)

Qty.: 02



Prestigious Order Received for a Palm Fruit Processing Project in India

Roto Pumps India has secured a prestigious order for eight progressive cavity pumps to handle palm crude effluent. This project is unique, as most Indian companies typically import palm oil for refining. However, in this case, the end user is importing palm fruit and processing it to extract palm oil.

Application Details

Pump Series: RL Series / WM Series

Media: Palm Crude Effluent

Flow Rate: 4 m^3/h (17 GPM)

Pressure: 2 bar (29 PSI)

Prestigious Order for Carrot Mesh Handling Application

Roto Pumps North America successfully delivered a customized pump for handling carrot mesh to one of the oldest farms in Michigan, replacing their existing pump, which faced operational limitations and could not efficiently transfer carrot mesh.

The farm is a well-known name in the agriculture, food, and beverage industry, specializing in premium-quality beverages, fresh carrot juices, and plant-based products. Given their large-scale carrot processing, they required a highly efficient and reliable pump to handle carrot mesh—a fibrous, pulpy byproduct generated during juice extraction.

Understanding their challenges, Roto Pumps provided a wide throat pump, designed for smooth and uninterrupted transfer, ensuring enhanced efficiency and seamless operations.

Application Details

Pump Series: WM Series

Media: Carrot Mesh

Flow Rate: 22 m^3/h (100 GPM)

Pressure: 13 bar (190 PSI)

Major Order for Crude Oil Handling Application

Roto Pumps North America has secured a major order for four Progressive Cavity Pumps to ensure efficient crude oil handling in the oil & gas industry. Given crude oil's varying viscosity, complex chemical composition, and the presence of impurities like water, sand, and sulfur, effective handling requires a specialized pumping solution.

This order came from a leading EPC company in Mexico, known for its cutting-edge technologies, industry expertise, and commitment to creating sustainable solutions for the oil & gas sector.

Application Details

Pump Series: M Series

Media: Crude Oil

Qty.: 04

Flow Rate: 6 m^3/h (25 GPM)

Pressure: 12 bar (175 PSI)

Large Order Received from Leading Centrifuge System Integrator in Europe

Roto Pumps Germany has received a significant order for 60 progressive cavity pumps from a leading system integrator for centrifuge applications in Europe. These pumps will be used in wastewater treatment processes, where centrifuges play a crucial role in sludge dewatering by separating solids from liquids. The client has been

associated with us for over 15 years and continues to trust us for delivering high-quality pumps and spares. This milestone reflects their ongoing confidence in our reliable and efficient solutions, further strengthening our position as a preferred partner for critical applications.

Secured Two Key Orders in Wastewater & Mining Sectors

Roto Pumps South Africa has further solidified its position as a trusted partner in the wastewater and mining industries by successfully delivering two specialized Progressive Cavity Pumps for critical fluid handling applications. We have supplied the RL Series Pump to a renowned EPC in the wastewater industry for their client's flocculant dosing application. Whereas the other RL Series Pump was supplied to a mining end user for handling mining sludge application.

Application Details

Pump Series: RL Series **Media:** Flocculant & Mining Sludge **Qty.:** 02

Bagged Order for handling Lime Slurry Application

Roto Pumps North America has secured an order for a customized Roto KWIK pump to handle lime slurry in the food industry in Kansas, USA. Lime slurry, a suspension of calcium hydroxide in water, is widely used in food processing for pH regulation, purification, and wastewater treatment. However, its abrasive and sedimentary nature often leads to excessive wear, clogging, and high maintenance costs in conventional pumps. To overcome these challenges, we have recommended our Roto Kwik Pump with Wear Compensation Stator. This pump will help in reduc maintenance costs and increase life cycle.

Application Details

Pump Series: RL Series **Media:** Flocculant & Mining Sludge **Qty.:** 02

EXHIBITIONS

Glimpses of Roto Pumps Germany at Bio Energy Exhibitions

We had a great time connecting with industry experts, innovators, and professionals at the Bio360 Expo (France) and Biogas Infotage (Germany)! These events were the perfect platform to showcase our cutting-edge pump technology and its impact on biogas, biofuel, and sustainable energy solutions. Exciting conversations, insightful exchanges, and a shared vision for a greener future together.

Bio360 Expo

Biogas Infotage

Roto Pumps Germany Marks 5 Years of Operational Excellence!

To mark this milestone, we've painted the Roto KWIK Pump in 5 unique colors, highlighting our journey of innovation and reliability!

NEW JOINING

I am excited to join Roto Pump Ltd and use this opportunity to contribute my skills & expertise to build sustainable profitable growth for the organization.

Mr. Vinod Kumar
Vice President
Roto Pumps, India

Happy and it's my privilege to be a part of this Roto Family, my first interaction with the team it's clear that this is a place where collaboration, Innovation and professional growth are valued. I'm excited to contribute best of my effort to bring remarkable results and Hopefully can develop and succeeded together."

Mr. Gosu Yakob
Territory Sales Manager
Roto Pumps, India (South Team)

Roto pumps is a well-established company in fluid handling equipment and I knew this would be a great opportunity, to associate with this organization. Look forward to contribute to company's growth and success.

Mr. Vijayachandra Hallikerimath
Territory Sales Manager
Roto Pumps, India (South Team)

It's a great pleasure to join in Roto pumps. As a marketing leading Indian company Roto pumps Ltd. done excellent job.

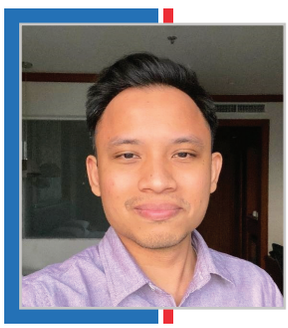
Mr. Dipti Ranjan Mallick
Asst. Territory Manager
Roto Pumps, India - (East Team)

RPMY offers integrated fluid handling solutions, and I am excited to be a part of its next phase of growth. My main responsibility is to utilize the extensive product offerings, such as Progressive Cavity Pumps and Twin Screw Pumps, available under RPMY's management to provide advanced and robust pumping solutions to businesses in the Sumatra region.

Mr. Sumardin Baeha
Sales Manager
Roto Pumps, Indonesia

Previously, I worked as a Sales Engineer experience with wastewater and sewage management plant. Excited on the new journey and eager to contribute my skills with RPMY.

Mr. Mohd Iqmal Bin Muhammed
Sales Engineer
Roto Pumps, Malaysia



The onboarding process at Roto Pumps was a breeze, with colleagues being very helpful and friendly in bringing me up to speed. It's been a great start for a successful future with the team.

Mr. Muhammad Khaliff Bin Mohamed Jefri
Senior Project & Application Engineer
Roto Pumps, Malaysia

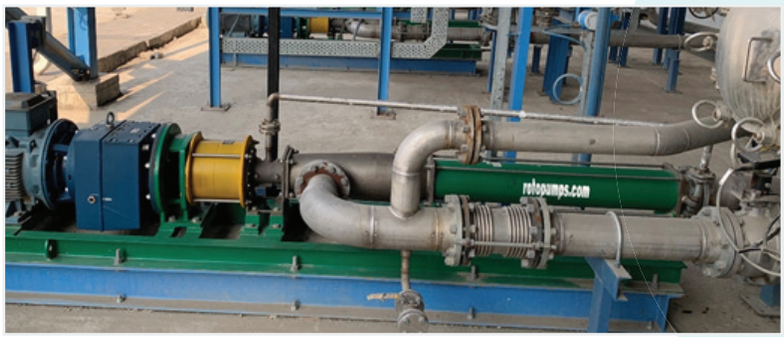
BEST INSTALLATION IMAGES

At Roto Pumps, Every month we host the Best Pump Installation Image Competition and award first prizes to domestic and international winners for their outstanding participation!

DOMESTIC

JANUARY

1st Prize winner - Mr. Himanshu Jalwal
Application: **Emulsion Transfer Application**



FEBRUARY

1st Prize winner - Mr. Himanshu Jalwal
Application: **Biological Sludge Transfer**

INTERNATIONAL

JANUARY

1st Prize winner - Mr. Chris Davis
Application: **Leachate transfer**

FEBRUARY

1st Prize winner - Mr. Arun Kumar
Application: **Drain Pump for Flare KOD**

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