

PCM PUMP FOR BIOGAS PLANT

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PCM

keep it moving



YOUR DAILY PARTNER FOR BIOGAS PRODUCTION OPTIMIZATION

The production of **environmentally friendly** energy is of crucial importance today for the preservation of our planet. **PCM pumps play a vital role in this sector** by optimizing the transfer of waste involved in the biogas manufacturing process, such as plant, animal, or food waste.

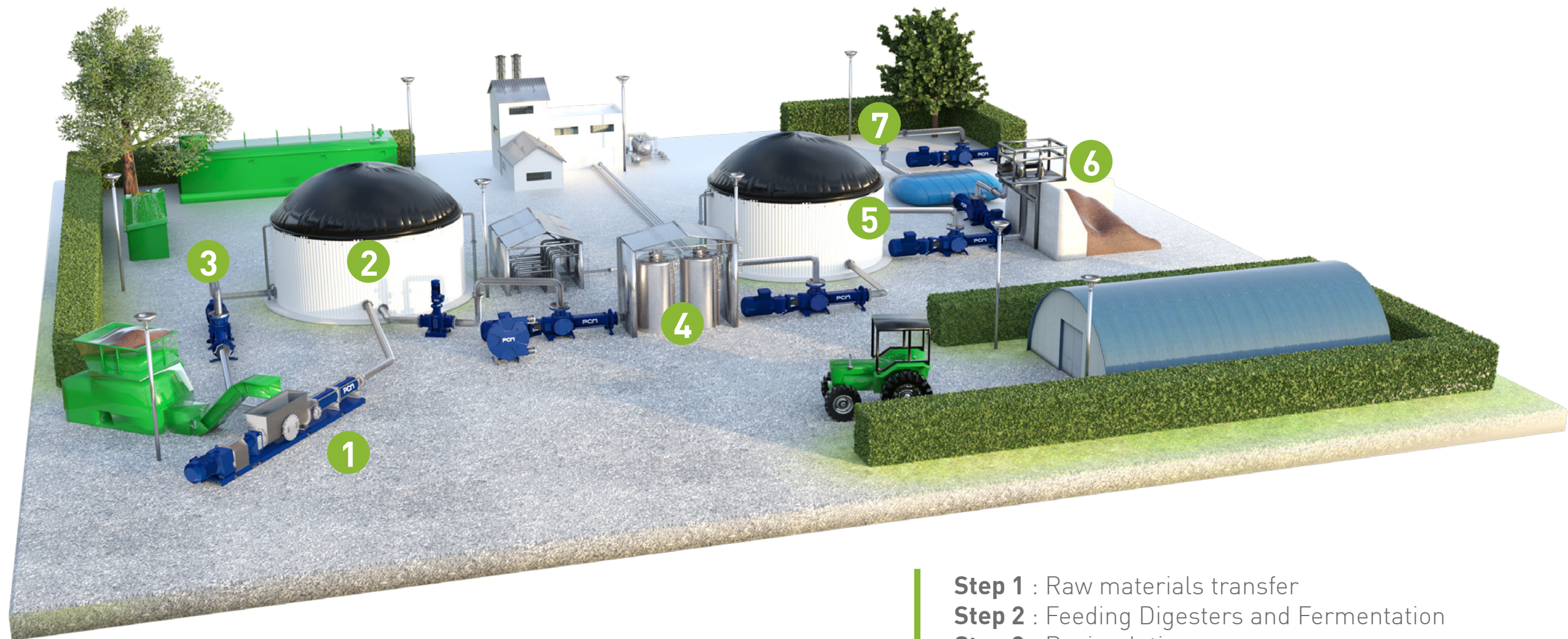
In anaerobic digestion facilities, pumping equipment is essential as it ensures the profitability and safety of the process, whether it's for transferring organic materials, feeding digesters, or other stages of the process.

PCM pumping solutions cover a wide range of applications and are designed to deliver high performance in anaerobic digestion facilities, whether for the transfer of liquid, thick, or dehydrated organic raw materials, or the transfer of digestate.

PCM accompanies you throughout the process, from storage to the spreading of organic materials, including their fermentation and recirculation. **With over 90 years of expertise and know-how**, PCM has mastered the hydraulic design of its pumps to meet the challenges of this sector.

PCM IS COMMITTED TO SERVING YOU AND PROTECTING THE ENVIRONMENT. WE SHARE YOUR COMMITMENT !

PCM AT THE HEART OF THE BIOGAS PROCESS



- Step 1** : Raw materials transfer
- Step 2** : Feeding Digesters and Fermentation
- Step 3** : Recirculation
- Step 4** : Pasteurization/Sanitization
- Step 5** : Digestate Transfer
- Step 6** : Phase Separation
- Step 7** : Digestate Disposal

WE KNOW YOUR FLUIDS AND THE BEST TECHNOLOGY TO HANDLE THEM!

STEP 1

Storage of Raw Materials before Feeding the Digester. The raw materials used in the anaerobic digestion processes are diverse :

- **ANIMAL BY-PRODUCTS**
(Pig and cattle slurry, pig, cattle, and poultry manure, fats, blood, bones...)
- **CROP RESIDUES**
(Potato, corn, and cereal pulps, rapeseed meal...)
- **ABATTOIR WASTE**
(Intestinal contents, brewery waste, flotation sludge, abattoir fats, molasses...)
- **MUNICIPAL WASTE**
(Used fats, sewage treatment plant sludge, household organic waste, lawn clippings, sewage treatment plant fats...)
- **FOOD WASTE**
(Expired supermarket products, restaurant and cafeteria waste...)



The pumped products have very high dry matter content (greater than 40%). They can also be highly abrasive depending on the organic materials used. Progressive cavity pumps, therefore, need to be equipped with Archimedean screws to allow effective pumping

STEP 2

Feeding Digesters and Fermentation

Organic material is transported to digesters where it undergoes fermentation, producing gas. To facilitate fermentation, a portion of the fluid can be transferred from one digester to another, initiating the process in a different digester.

At this stage, organic material is not fully digested, making the **transferred fluid particle-laden**, significantly increasing its viscosity. Depending on particle size and the variety of raw materials used, **progressive cavity pumps or peristaltic pumps will perfectly** meet the requirements for pumping these products



STEP 3

Recirculation

The raw materials used contain a high proportion of dry matter. To facilitate filling and transfer to the digesters, a closed recirculation circuit can be implemented. **The digestate is pumped into the digesters and then re-injected into the hopper pump body to be mixed with the raw materials.**

This recirculation helps liquefy the mixture for easier transfer and to prevent pump clogging. Since the digestate is liquid and low-viscosity, progressive cavity **pumps are perfectly suited for this application.**



STEP 4

Pasteurization/Sanitization

Regulations **mandate pasteurization or sanitization during anaerobic digestion** when using animal by-products (grease, blood, old foodstuffs, manure, etc.). Depending on the type of input, regulations vary and define hygienization or non-hygienization obligations according to different criteria. **Incoming materials must meet a specific size requirement (maximum 12 mm) and be heated for a minimum of 60 minutes at 70°C to ensure the health and safety of the anaerobic digestion process.** In health regulations, the general principle is to sanitize before digestion. However, in certain cases, it is possible to request an exemption to sanitize animal matter between two digesters or after digestion.

In the standard sanitization process, **pumps are used to transfer the materials to be sanitized from their storage area to the grinding stage upstream of the sanitization tank or to pump the sanitized material back to the digester.**



STEP 5

Digestate Transfert

The anaerobic digestion process occurs through the fermentation of organic materials. Once this process is completed, the liquid substrate, known as digestate, is transferred for filtration. At this stage, the fluid is highly liquid and therefore low-viscosity.

The organic materials have been fully digested, resulting in the liquid being low in particle content. **Progressive cavity pumps are used to transfer the digestate from the digester to the phase separator.**



STEP 6

Phase Separation

The digestate undergoes filtration through a phase separator to separate solid material residues from liquid material. This makes it easier to store the solid components and also reduces the volume of liquid digestate by approximately 25%.

The solid residues are then stored for use as bedding in animal husbandry or spread in agricultural fields. The liquid digestate is stored in tanks for spreading.



STEP 7

Digestate Disposal

The liquid digestate that has been previously stored is discharged and spread in agricultural fields. It may sometimes be transported over several kilometers. The greater the distance and length of the pipes, the more there are losses in pressure, resulting in an increase in internal pressure. **Progressive cavity pumps are capable of handling high pressures, making them an effective solution to counteract these challenges.**



PCM TECHNOLOGIES FOR YOUR BUSINESS

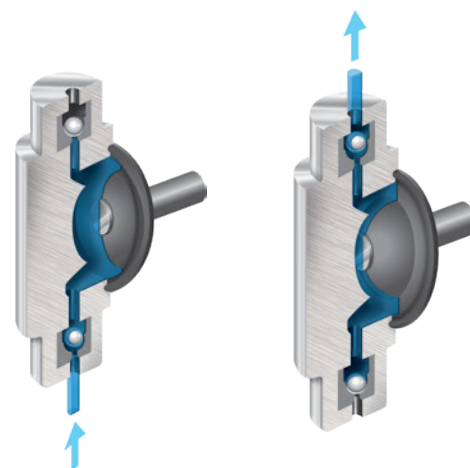
› PRINCIPLE OF MOINEAU™ TECHNOLOGY

A Moineau™ pump consists of a helical rotor turning into a helical stator. When the rotor turns inside the stator, the honeycomb progresses spirally along the axis of the pump without changing either shape or volume. This action transfers the product from the pump suction to the pump discharge without degrading the product. This basic principle of Moineau™ pumps allows a high accuracy of flow and pressure, making these pumps extremely efficient for transferring and dosing the most complex fluids



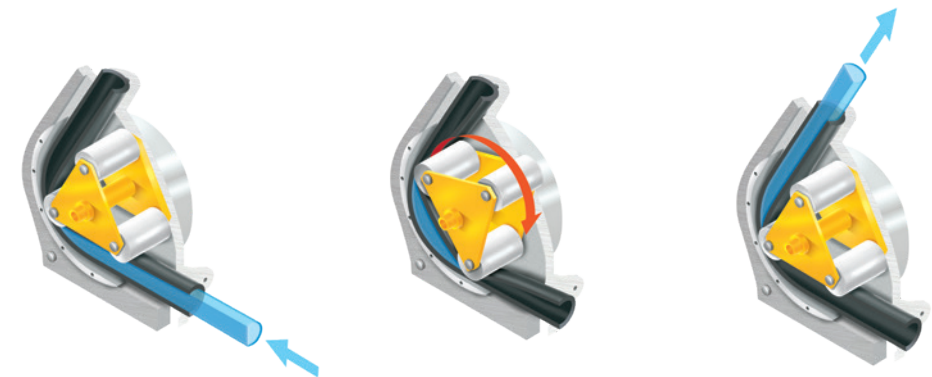
› PRINCIPLE OF THE METERING PUMP LAGOA

The PCM Lagoa pump is composed of a diaphragm connected to a piston of which the alternating movement successively fills and empties the pump head. This pump is most used in the dosing of chemically aggressive reagent, thanks to its stainless steel or plastic mono-material construction, with a PTFE membrane. Dosing accuracy and repeatability are guaranteed.



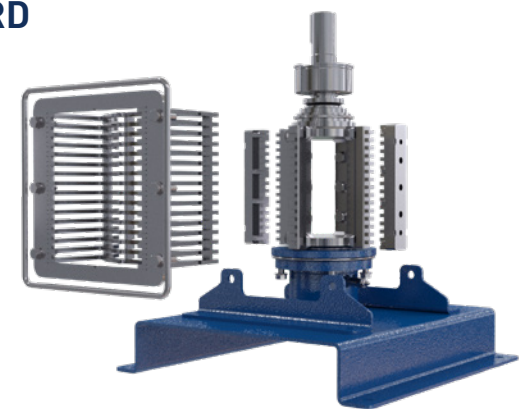
› PRINCIPLE OF THE PERISTALTIC PCM DELASCO™ TECHNOLOGY

The peristaltic pumping principle is based on the capacity of a soft elastomer hose to accept a deformation and subsequently recover its initial shape. Peristaltic pumps are provided with either high- or low-pressure hoses, covering a wide range of applications which need versatility and flexibility. Thanks to its all-elastomers construction, this technology is perfect for the dosing of reagent and chemicals that are not compatible with metallic parts. Moreover, the peristaltic pumps are seal-less constructed, are able to dry run and are quiet (very low shear of the pumping action).



› PRINCIPLE OF THE MACERATOR PCM X-GUARD

The mechanical action of the rotating knife throwing the static knife, makes the PCM Xguard the best solution to protect your equipment's. Installed before the pumps and the dewatering machines, it avoids failures by grinding all the big pieces you can find in the liquid. Its heavy duty design makes the PCM X-Guard machine a real asset in the minimization of downtime and maintenance operations.



PCM SOLUTIONS FOR BIOGAS INSTALLATIONS



PCM ECOMOINEAU™ MX : HIGH-PRESSURE DIGESTATE TRANSFER

The easy-to-use pump specially designed to adapt to your anaerobic digestion processes:

- Withstands pressures of up to **48 bar**.
- **High-performance**, with flow rates of up to **240 m³/h**.
- Transfers products with **low viscosity** and **low dry matter content**.
- **Robust**, highly resistant to abrasion.
- **Easy transfer** of particle-laden fluids.
- **Maintenance-in-place** system enables stator and rotor to be replaced without **moving the pump** from its installation.
- Patented **3-screw** connection system facilitates rapid seal replacement.

Compared to other technologies such as the lobe pump, the **PCM EcoMoineau™ MX is better suited to transferring abrasive or particle-laden products. They therefore require very little maintenance on anaerobic digestion applications**, which greatly reduces their cost of ownership.

PERFORMANCE	CONSTRUCTION
<ul style="list-style-type: none"> • Flowrate : 240 m³/h / 1056 US GPM • Pressure : 48 bars / 696 PSI • Viscosity : 20 000 cPo • Size of admissible particles : 40mm / 1.57 inch 	<ul style="list-style-type: none"> • Monobloc mounting • PCM CR elastomer stator • AISI 420 chromium-plated stainless-steel rotor 100μ or 400μ • Lubricated gland or lubricated mechanical seal (depending on concentration ratio) • Cast iron body

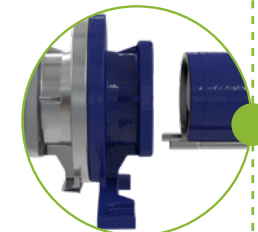
MAINTENANCE IN PLACE SYSTEM

The new maintenance system in place as standard on the entire **PCM EcoMoineau™ MX** range allows the stator and/or rotor to be replaced in just 5 steps and without having to remove the pump from its installation. Maintenance time is considerably reduced, which in turn reduces downtime and life-cycle costs.



STEP 1 :

Unscrew the two screws on the MIP ring to remove it. Then unscrew the tie rods on the suction pipe and remove the top two.



STEP 2 :

Unscrew the suction flange. Shift it towards the pipe to hold and support it.



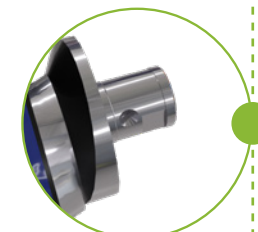
STEP 3 :

Remove the inspection hatches from the body. Then unscrew the 3 screws on the shaft line to release the rotor head.



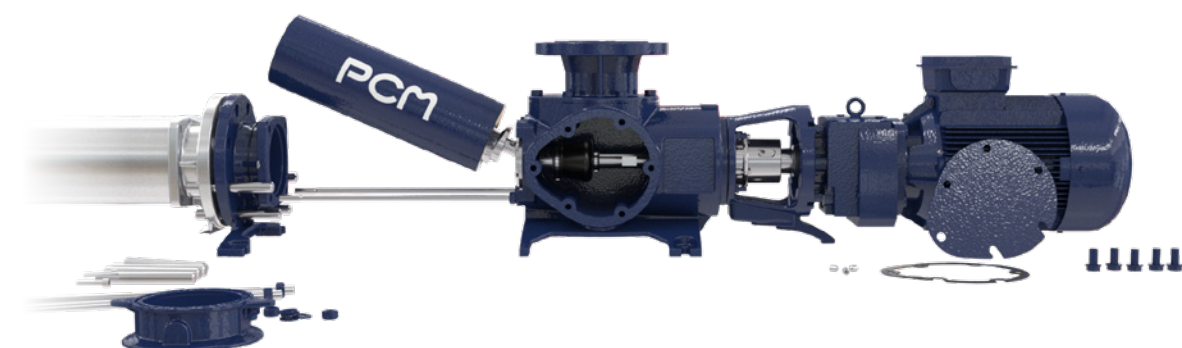
STEP 4 :

The rotor/stator assembly is now free. The space left by the MIP ring makes it easy to remove them.

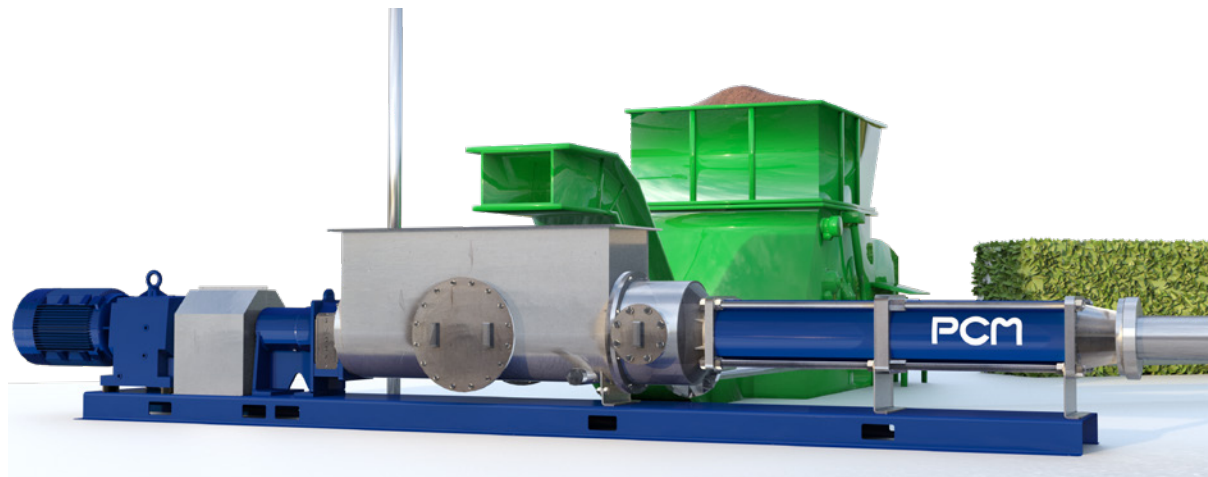


STEP 5 :

The rotor head has two flats. These allow the rotor to be removed from the stator using a simple spanner.



Then simply repeat these steps in reverse to reassemble the pump.
Maintenance is now completed!!!



PCM X-BIO : TRANSFER OF RAW MATERIALS WITH HIGH DRY MATTER CONTENT

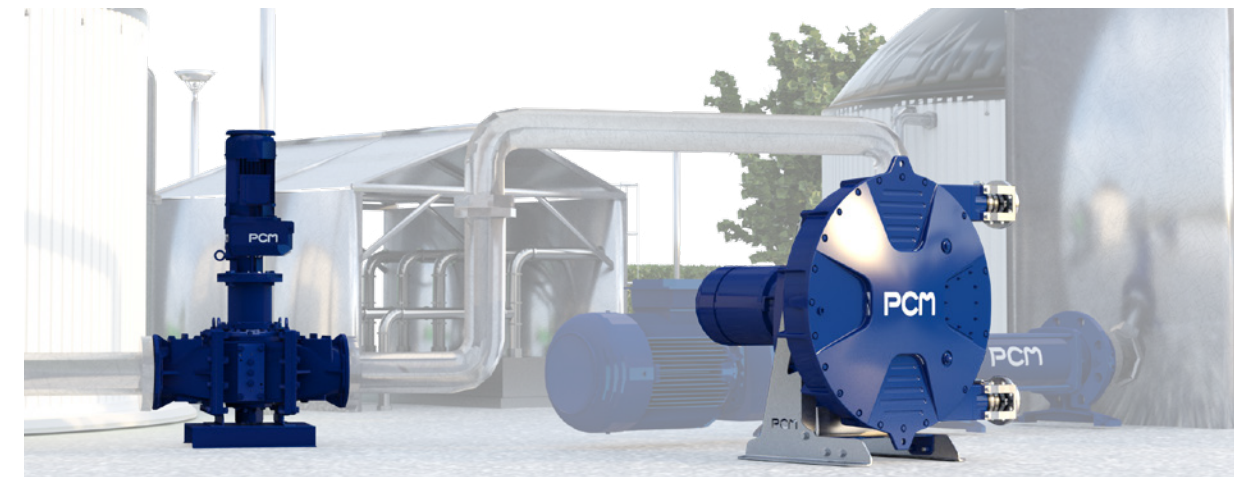
PCM X-BIO hopper pumps facilitate the transfer of **thick, viscous, pasty, sticky, high-drying**, solids-containing fluids encountered in many industrial applications.

Simple in design, this range combines several advantages:

- Robust bearing / integral bearing construction to guarantee reliability and extend service life
- **Equipped with a large 1500mm** hopper and an Archimedean screw, it is ideally suited to the transfer of fibrous, high-dry-matter products.
- Two inspection/maintenance hatches on either side of the hopper and feed barrel allow **connection of a recirculation circuit.**

The modular design of the **PCM X-BIO** series means it can be perfectly adapted to any anaerobic digestion plant. The different PCM stator materials available in this series meet different process requirements for transferring fluids up to 12 bar.

PERFORMANCE	CONSTRUCTION
<ul style="list-style-type: none"> • Flowrate : 240 m³/h / 1056 US GPM • Pressure : 12 bars / 174 PSI • Viscosity : 500 000 cPo • Size of admissible particles : 30 – 120 mm / 1.18 – 4.72 inch • Percentage of dry matter : 50 % 	<ul style="list-style-type: none"> • Bearing mounting • PCM CR elastomer stator • Chrome-plated stainless-steel rotor 250μ • Lubricated gland or lubricated mechanical seal (depending on concentration level) • 2 inspection doors on each side of hopper • 304L stainless steel body



PCM X-GUARD : PROTECT YOUR PUMPS

The **PCM X-Guard** in-line grinder reduces the size of solids contained in wastewater or other fluids to fine particles. **It crushes and shreds rags, pieces of wood, plastics or other solid or semi-solid parts to a size of 5-6mm** so as not to damage pumps or other downstream treatment equipment.

Its extremely robust cartridge cutting system, offering high torque at low rotational speeds, is ideal for improving the performance of equipment used to treat and dewater sludge or highly charged fluids. **PCM X-Guard therefore prevents costly damage, time-consuming repairs and unscheduled maintenance.**

PERFORMANCE
<ul style="list-style-type: none"> • Flowrate : 234 m³/h / 1049 PSI • Pressure : 4 bars / 58 PSI • Particles : reduction to 5-6 mm / 0,19 – 0,23 inch
CONSTRUCTION
<ul style="list-style-type: none"> • 4 interchangeable and reversible knives • 4 gearmotor powers available

PCM DELASCO™ DX : DIGESTATE TRANSFER

Thanks to their different constructions and the **variety of their elastomer tubes**, **Delasco™ PCM** peristaltic pumps can cover multiple applications requiring versatility and flexibility.

Simple to use and maintain, they offer an efficient solution for transferring **fragile, abrasive and corrosive products.**

Thanks to their construction, **Delasco™ DX pumps have a low life-cycle cost:**

- Only the tube is in contact with the product
- Low operating speed reduces tube wear- Low power requirements, reducing energy costs

PERFORMANCE
<ul style="list-style-type: none"> • Flowrate: 98 m³/h / 431 US GPM • Pressure : 15 bars / 217 PSI • Viscosity : 40 000 cPo • Size of admissible particles : 35 mm / 1.33 inch
CONSTRUCTION
<ul style="list-style-type: none"> • EPDM or NR tube • No dynamic sealing • Cast iron body

