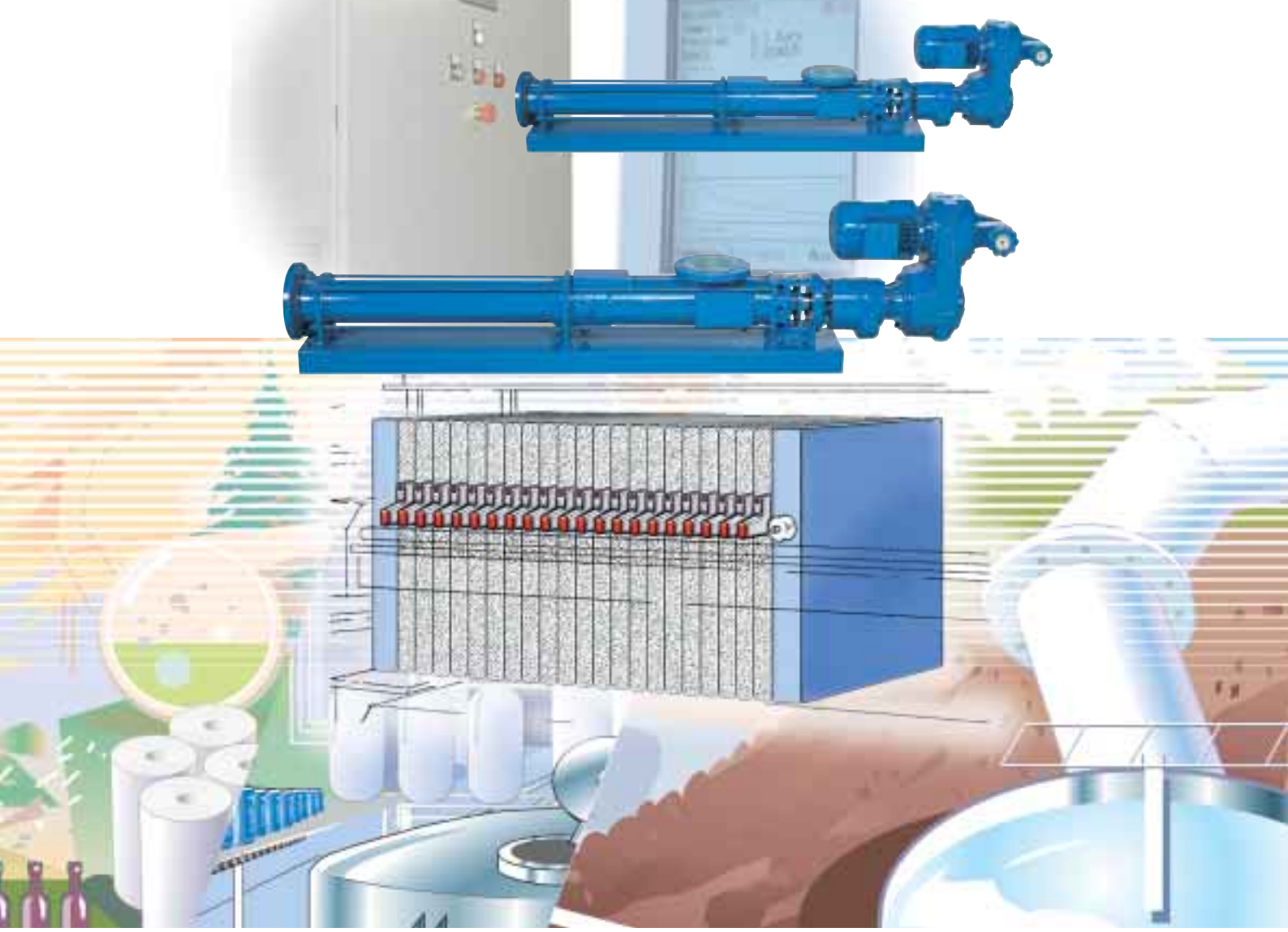
PCM MOINEAU

FPF Filter Press Feeding

The Moineau pump
- economical alternative
- increased output
- cycle optimisation

PCM Automation
- conviviality
- flexibility of use
- evolutionary



PCM

Pumps to process

Use

The filter press is used to separate solids and liquids by filtration under pressure, enabling either the volume of the product to be reduced or the solutions to be filtrated.
This dewatering - concentration - filtration technique is used in a wide range of sectors for a variety of applications.

In all cases, the performance of the appliance depends directly on the performance of the feeding system, i.e. the pumping operation upstream of the filter press.

FPF Filter Press Feeding

The filter press working cycle is made up of two stages that are essential for the feeding unit; **filling** and end of cycle **pressure maintenance**.

The filter press feeding must:

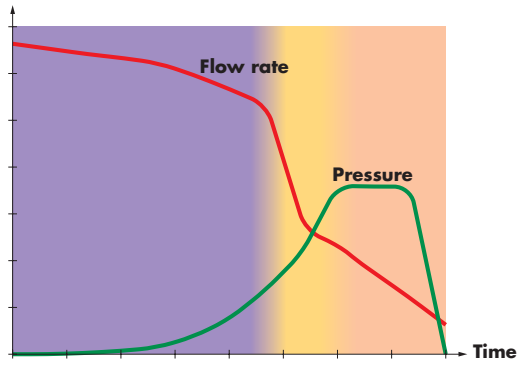
- ensure filling at a high flow rate for better control during the cycle
- control this flow rate in the pressure maintenance stage for filtration quality
- guarantee the desired minimum capacity at the end of the cycle for improved filter cake quality
- guarantee a proportional polymer and sludge flow rate

Appliance optimization must allow maximum operational flexibility:

- allow for operational changes in order to follow process developments
  - user process modification
  - changes in nature of the product to be filtered
  - dirt accumulation in the filter cloths
  - variation of change at inlet
- allow for restarts, with cycle position taken into account
- allow to integrate pump protection with a pipe-liner
- allow to adapt to different modes at the cycle end

Typical operating cycle of filter press

- **High capacity** filling allowing filter cake formation
- **End of filling,** filtration resistance, capacity reduction
- **Pressure maintenance,** filter cake formed, high filtration resistance, reduction of filtrate flow to minimum flow at end of pressing



Operating Principle

During the filling stage, the input of settings of the flow rate in relation to the pressure, allows to define a configurable pressed curve, up to the pressure maintenance threshold. From this threshold, the operation relates to the pressure regulation, the frequency inverter allowing the adjustment of the flow rate in relation to the pressure maintenance, to reach the minimum flow rate corresponding to the end of the pressing cycle.

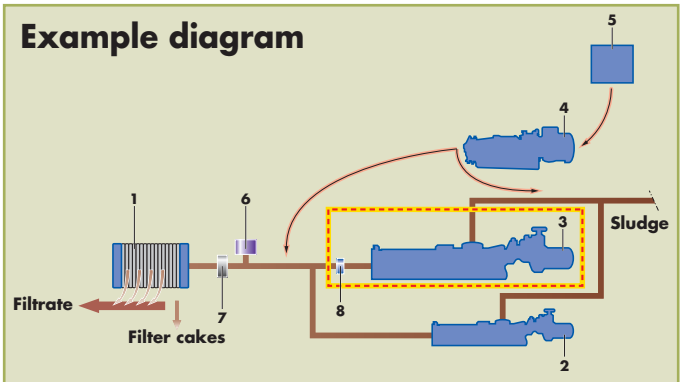
During the cycle, the pressure controls the feeding capacity in order to guarantee optimum filtration performance.

When operating with an additional filling pump (low pressure pump) and a filling and pressure maintenance pump (high pressure pump), the operating principle is identical; the flow rates are combined at the beginning of the cycle during the filling stage. The low-pressure pump is then stopped on its operating threshold, while the high-pressure pump finishes the pressing cycle.

The settings and operating points, which can be configured on site, are accessible in the form of different receipts allowing greater flexibility of use for the unit.

The flow rate of the polymer pump remains proportional to the flow rate of the sludge pump throughout the cycle with one or two Moineau pumps.

Example diagram



1- filter press
2- filling and pressure maintenance pump
3- additional filling pump
4- polymer pump
5- polymer preparation
6- pressure gauge
7- bursting disk
8- non return valve
---- according to configuration

The advantages of the Moineau Pump

The design of filter press feeding system with a Moineau pump has all the **advantages linked to using a positive displacement pump:**

- Solution specially adapted to fragile products
- Respects pumped product
- Non pulsating flow rate
- Constant flow rate with evolution of pressure
- Automatic control of flow rate by frequency variation
- Quieter operation

These advantages affect the operation of the unit as a whole:

- rapid filtration even with a thick filter cake
- shorter pressing cycle
- filling flow rate easily adaptable to process demands
- lower electric power
- long-life of filter press (cloth or diaphragm)
- easier integration of pump into its environment

PCM features also include:

- energy balance optimisation
- operating cycle optimisation
- choices suited to best investment outlay
- lower operating costs

Related features:

- turnkey installations
- equipment start-up
- staff training

Performances

Operational characteristics:

- capacity up to 175 m3/h
- maintenance pressure up to 15 bar
- operational characteristics adjusted to process needs
- energy balance optimisation
- high operational output at all stages of the cycle
- choice of most effective solutions for operating conditions
- memorisation of operating cycles

A maximum filling capacity of up to 90% of maintenance pressure can be guaranteed.

Services

The development of a product is based upon the research of technical performances taking into consideration the highest degrees of exigencies of the user process.

Apart form the technological advances brought by this tool in relation to operation, the global performances have been improved by bringing a better quality product by reducing the operation cycle lengths.

When technological innovation joins with the process service, performance is ensured, guaranteeing service and conviviality for better operating exploitation as well as better results at a reduced cost.

Also, all of the components of the **« Life Cycle Costs »** are taken into account:

Investment optimisation due to an **advanced needs audit** both on new installations and renewed equipment.

Optimisation of energy costs due to an optimal use of installation.

Maintenance reduction due to the flexibility and easiness of adaptation of the automation.

Optimisation of proposed solutions in relation to needs.

Training and maintenance reinforced by the PCM Hotline service completes an offer which goes beyond the realisation of turn-key installations.

FPF Filter Press Feeding

Filter Press Feeding

By means of the configuration of the filling curve and pressure regulation, the Moineau pump technology ensures economical use of the filter press feeding system, by guaranteeing optimum operation throughout the different phases of the cycle.

Two complementary operational methods may be used to carry out the feeding function of the filter press:

- Using only one Moineau Pump

Specially adapted for small filter presses (i.e. when feeding capacity is small) this technical solution is more economical, both in terms of equipment and installation outlay and operating costs.

In this case, the high-pressure pump works throughout the whole cycle, from filling at high capacity until the end of the pressure maintenance stage, at minimum capacity.

Advantages:

- only one pump,
- one conditioning point,
- lower investment cost,
- lower operating cost,
- simplified operation.
- only one discharge pipe,
- one unit to supply and regulate,
- less space occupied,
- reduced maintenance,

- Using two Moineau Pumps

Using two pumps can guarantee the operation of large filter presses, where the filling capacity must be higher in order to ensure a reduced cycle length.

The combination of two pumps enables a greater range of capacity variations to be obtained so as to meet the demands at the beginning of the pressing (very large capacity) and at the end of the cycle (very low capacity).

In this case, supplementary safety devices commensurate with there being two parallel pumps must be installed.

Advantages:

- reduced cycle length
- reduced size of electrical equipment
- better electrical output
- more economical with large power supplies
- reduced maintenance costs
- lower capacity at the end of the pressing (important for large filters)
- equipment cost much lower than with other pump technologies

- Polymer Pumping

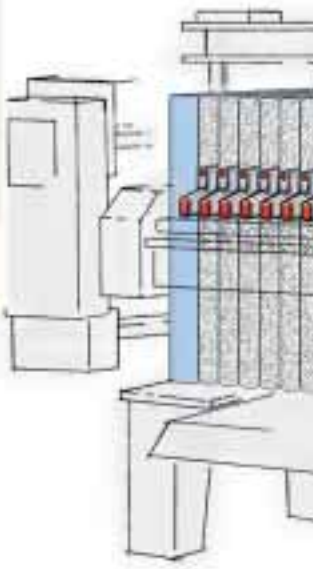
The injection of polymer at the discharge of feeding pumps is entirely controlled by automation enabling delivery of a proportional flow rate of the injected sludge in the filter press throughout the cycle.

This integration in the process permits an optimised control of polymer consumption without adding other materials

- Pump Protection: Pipe-liner*

The command system allows the control of the pipe-liner to protect the pump from fibrous particles.

* See Pipe-liner Brochure



Control Box

Pressure Maintenance System composition:

- simple and easy operation due to the human/machine interface with a monochrome or colour tactile screen
- automatic control of pressure pump flow rates and default control by a programmable automation

A simple and convivial interface useable in 4 languages:

- press configuration in expert mode and operation regulation in user mode
- memorisation of 5 operation modes pour a better adaptation to service conditions
- selection of end of cycle mode
- visualisation of flow rate/ pressure curves
- daily report of events and defaults
- visualisation of maintenance information
- on-line help accessible throughout the cycle

Automatic control at the core of the unit:

- Automatic control adapted to solutions with 1 or 2 Moineau pumps
- Automatic control of injection of the polymer injection pump
- Integration of pump protection with the pipe-liner

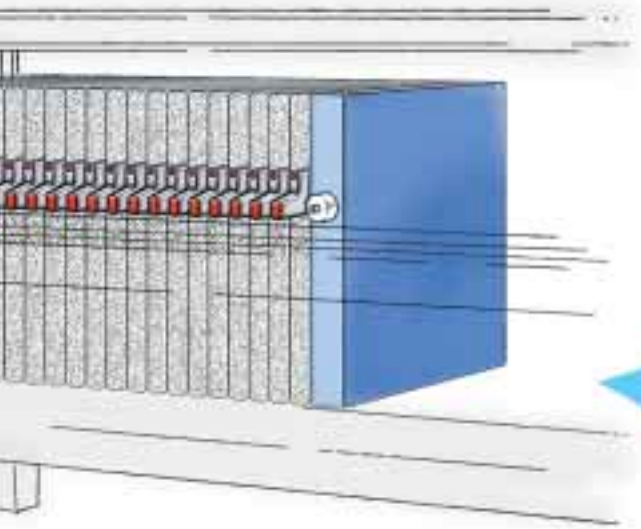
Filter Press

PCM's filter press feeding system suits all types of filter presses and all operating methods:

- plate filter press
- diaphragm plate filter press
- double inlet filter press

Installation safety measures to be fitted on initial operation:

- filter safety pressostat
- bursting disk
- reverse lock valve
- non-return valve
- valve opening controls (switches at the end of the stroke)
- dry running protection device



Conviviality, Flexibility of use, Reliability, Evolutionary

- Easy on site installation configuration
- Choice of operating thresholds depending on filtration output

Control Box Manufacture:

- compliance with standards and technical specifications
- quality assurance processes
- systematic process controls at production plant
- simpler and safer implementation
- simplified maintenance

Related Control Mechanisms:

- Multifunction captors
- Safety pressure switch
- Dry Running protection device

Chemical conditioning

The use of a reagent enables the filtration output to be improved, by making use of sludge coagulation or flocculation. These reactions facilitate particle agglomeration, which improves the filter performance. In this way, the length of the cycle is reduced and the quality of the filter cake improved.
Reagents are injected upstream or downstream of the feeding pumps, depending on the products being used, how they affect the valves, the configuration of the equipment and the process.

There are two types of conditioning:

- Use of inorganic reagents

These reagents are injected upstream of the supply unit, most often in an independent reactor or in a mixer so that the reactions can develop properly.
The substances used are metallic salts, such as iron chloride and other lime washes.
Different PCM products (Préci-Pompe dosing pumps, Delasco peristaltic pumps or Moineau pumps)* provide pumping solutions for each of these substances.
** See respective brochures*

- Use of organic reagents

The reagents used are organic polymers chosen for their good flocculation performance.
These are injected upstream or downstream of the pumping unit, according to the characteristics of the product to be filtered and the expected performances.
Depending on the position of the injection point an F*series Moineau pump or an I series high-pressure Moineau pump should be used.
** See respective brochures*

Sludge recovery with GBB* cake pump

Sludge recovery in the removal stage can be carried out economically with a cake pump, adapted to the installation configuration:

- a GBB equipped with a 2000, 2500 or 3000 mm hopper used to collect directly under low volume press filter
- a GBB equipped with a 500 or 1000 mm hopper fed by a collecting conveyor belt under the filter press

The linking cone with a filter cake stop device allows for direct supply from the GBB or the transporter belt.

** See GBB brochure*

Pump with control box

Filter Press Feeding with 2 Moineau Pumps

Injection of Polymer (15 bar) proportional to sludge flow

Gavopump (GBB) under filter press

Filter Press Feeding in a surface treatment workshop

Applications

1 - Environmental industries

The filter press, widely used in environmental services, concentrates sludge and slurry from:

- municipal and industrial waste water plants
- drinking water production plants
- treatment of fumes by humid process
- removal of ground pollution
- waste recycling and elimination

Sludge types:

- primary sludge
- biological sludge
- digested sludge
- flotation sludge
- physical-chemical sludge

Examples of industries involved:

- tanning, textile, paper
- galvanoplastics (scouring, phosphatization, painting, etc.)
- automobile industry

2 - Food processing and paramedical industries

The use of the filter press is largely developed in the food processing industry, both to concentrate products and to filter liquids on production lines.
The pressure at the end of pressing depends on the nature of the product being filtered and the purpose of filtration.

In all cases, PCM's filter press feeding unit can be adapted to meet the particular needs of the user process.

Applications:

Agro-food processing industries

- beet and cane sugar
- starch flour and flours
- oils and fats

Drinks industry

- yeast

e.g.:

Yeast filtration in beer manufacturing.

3 - Materials and manufactured products industries

Filtration is widely used in materials industries for product concentration (e.g. the ceramics industry) and for fluid recycling on production lines (e.g. surface treatment phosphatization lines).
For all these applications, PCM equipment is the most adaptable to the user process, while the choice of construction materials depends on the fluids to be conveyed and the operating conditions.

Applications:

Material concentration

- clay and earth
- kaolin
- ceramics and porcelain

Recycling baths or substances used in manufacturing

- galvanoplastics (phosphatization bath, etc.)
- paint shops

e.g.:

Kaolin concentration for the ceramics industry.

Paint residue concentration in an automobile production unit.

Calcium nitrate filtration in a fertilizer production unit

Pumps to process

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