



PRODUCT SHEET

KLEERFLO AUTOMATIC SELF-CLEANING FILTER





Kleeeflo Filters are in-line, pressurised, automatic self-cleaning filters. They are used for the removal of suspended solids from water. They offer continuous flow and a strong, positive backwash action that ensures thorough cleaning of the screens.

Kleeeflo's unique design with no rotating parts or close tolerance elements, very few moving parts and no electric motor ensures robust performance, proven reliability and low maintenance.

Applications

Kleeeflo Filters are installed in process lines to remove suspended solids from water. Kleeeflo applications include the following:

1. Pre-Filtration

- For membrane separation processes
- For treatment processes on potable water- and sewage wastewater plants
- For treatment processes on industrial process water plants

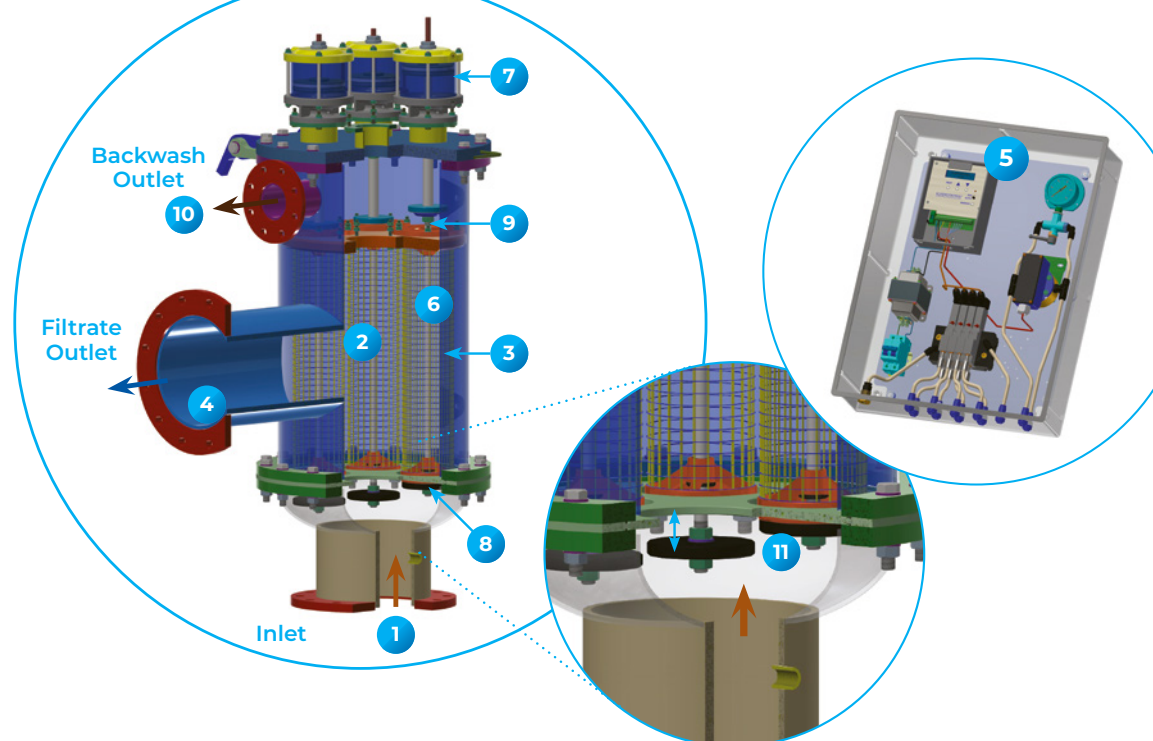
2. Final Filtration

- To protect water spray systems or equipment
- Water Spray Systems
 - Dust suppression
 - Irrigation
 - Filter presses
- Equipment Protection
 - Gland service water
 - Measuring and metering equipment
 - Cooling water heat exchangers
 - Removal of solids from water for general purpose plant re-use.

Industries

Kleeeflo Filters are used extensively in all industries where water forms part of the process and where macro- and micro-particles need to be removed from suspension. These include:

- **Industrial Process Water**
 - Agricultural and Horticultural
 - Automotive
 - Brewing & Distilling
 - Food & Agri Processing
 - Nuclear
 - Pulp & Paper
 - Power Generation
 - Quarrying
 - Rubber Processing
 - Textiles
- **Mining**
- **Mineral Processing**
 - Steel Processing
- **Potable Water and Sewage Wastewater**
- **Petrochemicals**
 - Refining
 - Pharmaceutical
 - Plastics
- **Oil and Gas**



How it Works

The inherent simplicity of the Kleerflo Automatic Self-Cleaning Filter contributes to the low operating and maintenance costs and the ease of operation.

Kleerflo only requires single phase electricity supply (to power the local controller and instrumentation) and a supply of pneumatic or water pressure (to drive the backwash cycle).

Dirty water flows (under pressure) into the Kleerflo Filter **1**. The water is then passed through several cylindrical, stainless steel wedge wire screens **2** that are installed in the main filtration chamber **3**. Flow is from the inside to the outside and clean, filtered water is delivered to service via the filtrate outlet **4**.

The screens are available in a wide range of apertures with the quantity and size of the screens dependent on the selected aperture, the flow rate and the solids load in the water.

Solids accumulate on the inside (dirty side) of the screens **2**. As it blocks the gaps in the screens, a pressure differential gradually builds up between the dirty side and the clean side. This pressure differential is ultimately relieved by initiating the backwash cycle. A signal from the control system **5** initiates the backwash cycle, either on a predetermined time interval, or when the pressure differential reaches a predetermined limit. Backwash consists of a simple back and forth shuttle movement on the one screen that is to be backwashed **6**.

The shuttle action is achieved by selectively applying and releasing pressure on the actuator **7** that controls the screen that is to be cleaned. This seals the water inlet to the filter screen **8** and simultaneously opens the top of the screen **9** to the backwash outlet **10**. The backwash outlet is open to atmosphere.

The difference between the line pressure maintained in the main filtration chamber **3** and the backwash outlet that is open to atmosphere **10** causes a reversal of flow through the screen **6**. The screens that are not in backwash mode continue to produce filtrate. Some of the filtrate in the main filtration chamber **3** flows from the outside to the inside on the screen that is being cleaned **6** creating a strong, positive backwash that carries the dirt out to waste **10**. The remainder of the filtrate continues to flow to service **4**.

Applying pressure to the active actuator **7** opens the water inlet to the filter screen **8** and simultaneously closes the top of the screen **9** – returning the screen to filter mode. Backwash takes place sequentially, one screen at a time. The screens that are in filter mode continuously produce filtrate. Process flow is uninterrupted with minimal losses to backwash. The unique shuttle mechanism allows the processing of oversized particles without the need for a manual pre-screen **11**.

The Kleerflo design is inherently flexible and process parameters such as backwash frequency, the duration of each backwash and the dwell time between the backwash of each screen can be set independently with the local controller **5** – or written into the plant SCADA.

In addition, installation can be horizontal, vertical or at an angle, and the orientation of the inlet, outlet and backwash ports can be set independently.

Maintenance on Kleerflo Filters is easy. The strainer body does not need to be removed from the line for service. Access to the screens is allowed by removing the backwash cover plate. No heavy lifting equipment is required, and maintenance staff can be kept to a minimum.

CASE STUDY

KLEERFLO: AUTOMATIC SELF-CLEANING FILTER

QUELLAVECO COPPER MINE – FLUIDISATION WATER

Client: Anglo-American – Quellaveco Copper Mine
Industry: Mining & Mineral Processing
Region: Moquegua region of Peru
Product: Kleerflo Automatic Self-Cleaning Filter – 6 x CS6E4/2000/40 DA BB
Installation: 2024



Challenge

- Anglo American's Quellaveco Copper Mine is one of the largest and most well-known copper mining projects in the world
- They use Eriez **CrossFlow**® hydraulic classifiers and Eriez **HydroFloat**® coarse particle flotation cells in their recovery processes (efficiently scavenging coarse material from the Quellaveco concentrator rougher tailings)
- CrossFlow**® and **HydroFloat**® Separators require the introduction of teeter water
- Blocked teeter water pipes cause production delays (when the production lines must be shut down to remove and unblock pipes) and significant sub-optimal recovery/efficiency (when the units are operated with some of their outlets blocked)
- In addition, the control- and instrumentation equipment required to operate the separators are also subject to orifice blockages when fed with dirty water. This leads to further inefficiencies and additional downtime
- During the initial operational phase of the CPF project at Quellaveco, blockages in the teeter water pipes and issues with control and instrumentation equipment caused significant problems
- It soon became evident that fluidisation water strainers were required to ensure that oversized particles never block the teeter water pipes.
- Superior Filtration engineers collaborated with the client to specify the correct models and ensure the installation configuration was fit for purpose
- Supply included control and instrumentation housed in a Nema4x enclosure
- Current installed units:
 - Kleerflo Automatic Self-Cleaning Strainers
 - 6 x **CS6E4/2000/40 DA BB**
 - Processing a combined total of **5 600 m³/h** water
 - Key Features that make Kleerflo automatic self-cleaning strainers uniquely suitable for this demanding mining application:
 - no rotating parts
 - very few moving parts
 - no close tolerance elements
 - no electric motor
 - effective removal of oversize solids
 - simple maintenance procedures
 - high-quality, durable, stainless steel wedge wire screens.

Application

- Primary Filtration – Filtration of Fluidisation Water for Coarse Particle Flotation process
- Filtration of raw feedwater to remove oversize particles, preventing blockages in the teeter water pipes.

Solution

- The inherent simplicity of the **Kleerflo** strainer design combined with the peace of mind of a 40+ year track record in similarly demanding mining environments appealed to DRA (the project engineers) and Anglo American

Results

- The client subjected the strainers to a 50-day performance review
- The outcome was that Kleerflo strainers effectively removed oversized solids to prevent blockages in the teeter water pipes
- The result is increased uptime and improved recovery efficiency
- Inherent simplicity and rugged design ensure low maintenance costs and high in-service time.

Client experience

"The filter installation is performing according to our expectations for what was designed. Thanks for all your support."

Luis Roman: Director & Senior Manager – Operations & Processing

CASE STUDY

KLEERFLO: AUTOMATIC SELF-CLEANING FILTER EXXONMOBIL – SEAWATER FOR COOLING

Client: ExxonMobil / Exxon Chemical Limited,
Fawley Refinery
Industry: Chemicals and Energy
Region: Fawley Chemical Plant, Southampton, United Kingdom
Products: Kleerflo Automatic Self-Cleaning Filter - 2 x DD6E4/500/40
+ 2 x DD4E4/500/30 + 2 x DD4E4/500/35
Installation: 1988



Challenge

- Exxon Chemical's Fawley facility requires considerable quantities of process cooling water
- They extract raw seawater for this purpose – piping it about two miles from the Solent to small filtration stations on the site's blocks
- Filtration is required to remove any material which could foul up the condensers and heat exchangers in the plant
- The filters must be highly reliable, effective and efficient automatic self-cleaning filters that ensure continuous flow and that can operate in Zone II Hazardous Areas
- In 1987, Exxon had motorised, rotating filters in place that did not live up to expectations – *“not providing the required filtration and unavailability of spare parts.”*

- With this began an ongoing, near 40-year relationship during which time Kleerflo has remained the filter of choice
- Current installed units (all Duplex Stainless Steel):
 - Kleerflo Automatic Self-Cleaning Filters, 2 x **DD6E4/500/40** + 2 x **DD4E4/500/35** (MEK/Basic Chemicals) and 2 x **DD4E4/500/30** (Butyl Polymers)
- Key Features that make Kleerflo automatic self-cleaning filters uniquely suitable for this tough, industrial application:
 - no rotating parts
 - very few moving parts
 - no close tolerance elements
 - no electric motor
 - high-quality, durable, stainless steel wedgewire screens.

Application

- Primary Filtration – Seawater Cooling Systems
- Filtration of seawater to protect heat exchangers and condensers from damage caused by shells, pebbles, seaweed and stones in raw water.

Results

- Kleerflo filters deliver filtrate in compliance with client acceptance standards – now for almost 40 years
- Inherent simplicity and rugged design ensure low maintenance costs and high in-service time.

Solution

- The inherent simplicity of the **Kleerflo** filter design appealed to ExxonMobil
- This, combined with the offer of an innovative, all-pneumatic control system for safe operation in Zone II Hazardous Areas was enough to convince ExxonMobil to commission a trial
- At the conclusion of the 3-month trial in 1987, ExxonMobil *“recommended to install the **Kleerflo** filter: combined with the mark two pneumatic controller: to replace the existing saltwater strainers.”*

Client experience

“The Kleerflo Automatic Self Cleaning Filter for industrial water, combined with the MKII pneumatic controller, can be seen as a reliable, maintenance-free, heavy chemical filter usable in hazard areas.”

PL van Roon – Exxon Chemical Ltd.

