

Arkal Filtration Systems

Advanced Industrial Filtration Services

- Cooling towers - sidestream or fullstream
- Seawater, Desalination, Aquaculture
- General water inlet
- Industrial process water
- Pre-membrane treatment
- Ion exchange/boiler feed water
- Water recycling & effluent recovery



Arkal Filtration Systems

Understanding Your Needs

- The ever growing need to improve industrial water quality is the driving force behind Arkal Filtration Systems innovative technology.
- Problems which have previously been hard to address are now better solved.
- Previously unaddressed problems can now be treated by Arkal's advanced systems.

Outstanding Filtration Technology

- The grooved disc, depth filtration technology performs at the level of media filters, without encountering their well known drawbacks.
- The backwash mechanism surpasses that of the best screen filter backwash.

Support

- Understanding customer needs
- Proven experience and success
- Time proven operation record
- Extensive R & D know-how
- Excellent worldwide market reputation
- Comprehensive design and proposal
- Sales and service engineers

Customer Services

- Supply of custom made, fully assembled, factory tested and ready to operate systems
- Water quality monitoring and testing, to provide data concerning particle size distribution
- Design and small footprint sizing for flexible systems
- Presale, installation and after sales support and service
- Integration of filtration systems with other water treatment technologies.

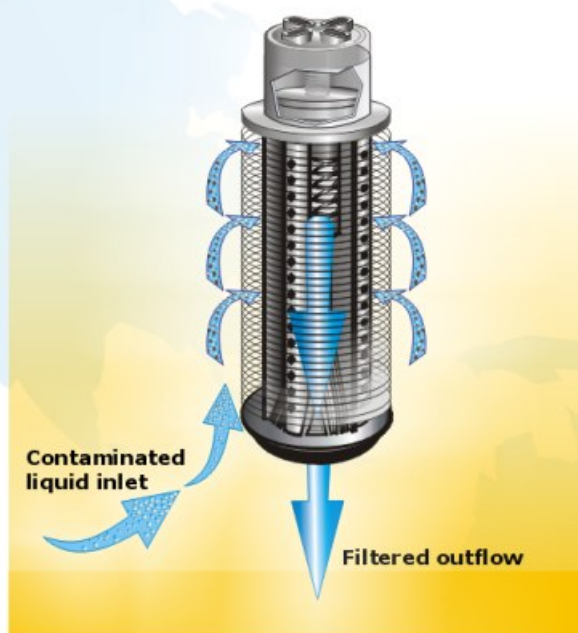


■ **Carefully selected worldwide representatives**

■ **Numerous satisfied customers are the best proof of success!**

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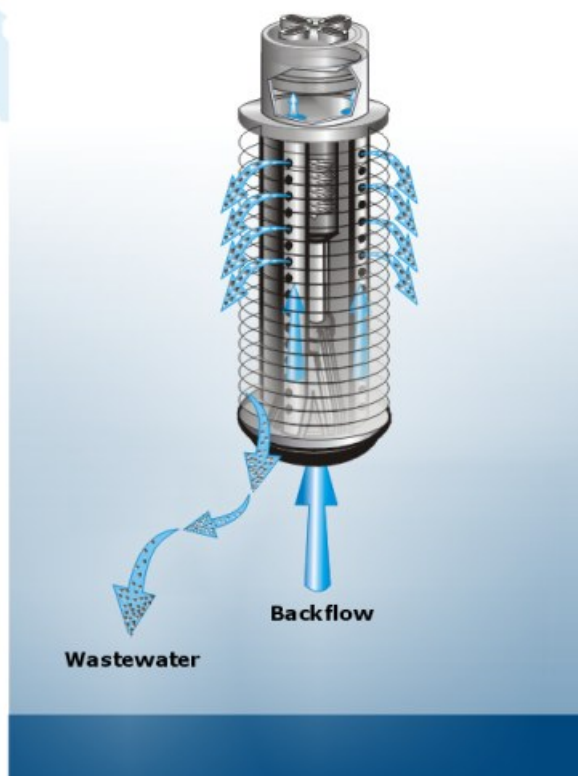
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Filtration Process

The Spin Klin® discs are stacked on the Spin Klin® spine. The discs are color-coded by micron size, and are assembled according to your water filtration requirements. The spine assembly has a spring compression unit and an internal piston which operate during alternate filtering or backwash modes.

The spine assembly is specially designed to compress the filter element. Inside the spine, a spring and the pressure difference compress the discs tightly during the filtration process, forcing the water to flow between the grooves which trap the solids.



Backwash Process

Activated by a predefined command (differential pressure or time) alternate units of the Spin Klin® system go into backwash operation. The valve changes position, closing the inlet port and opening the drain port.

During the backwash process, the compression spring is released. The spine piston rises up, releasing the pressure on the discs. Tangential jets of clean water are pumped at high pressure in the opposite direction through nozzles at the center of the spine. The discs spin free and clear, loosening the trapped solids. Solids are quickly and efficiently flushed out through the drain.

General Water Inlet

Industries - Food and Beverage, Textile, Chemicals, Mining, Electronics and Plastics

The Need

Deteriorating abstraction water quality, growing consciousness of suspended matter problems. The need to recycle and minimize both abstraction and discharge costs.

The Problem

Suspended solids in inlet water should be trapped to the exact grade specified by the plant engineer.

The Solution

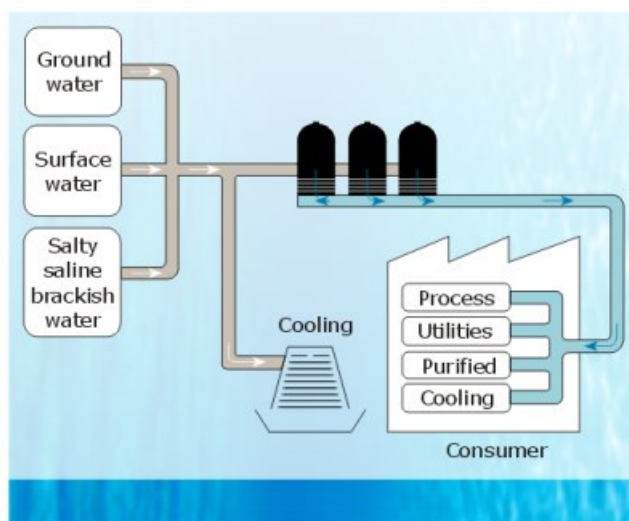
Installation of a modular automatic filtration system that will reject the specific suspended material size with minimum backwash volume, improving cost effectiveness.

Arkal's Performance

Up to 95% retention of specified size particles. Constant water supply. Backwash volume kept in the range of 0.5% -1% of product flow. Fully automatic, low maintenance. Substantial reduction of clogging related problems, recirculation increase and decrease of effluent discharge volume.

Advantages

- **Filtration** - accurate, stable, efficient, with no breakthrough of contaminants
- **Automatic backwash** - extremely efficient
- **Continuous supply** - negligible headloss during backwash
- **Long lasting** - durable, resistant, years of dependable operation
- **Operation and maintenance** - simple and friendly



References

- Australia
- Canada
- Great Britain
- Israel
- France
- New Zealand
- Thailand
- U.S.A.
- Taiwan
- South Korea

Flow Rates

15-5,000 m³/h
70-22,000 G.P.M

Filtration Grades

55-130 microns

Fine Water Ducts and Nozzle Protection

Industries - Food and Beverage, Pulp & Paper, Steel Plastics, Machinerys, Plastics



The Need

All fine ducts and nozzles are susceptible to clogging, reducing water abstraction necessitates more recycling.

The Problem

Suspended solids sediment and clog, acting as a nucleus for dissolved carbonates precipitation, significantly increasing maintenance costs and down time expenses.

The Solution

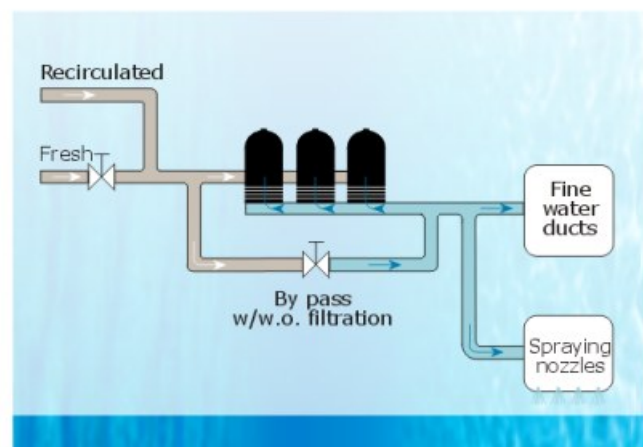
Filtering at a clogging free grade calculated according to nozzle orifice. Compact system design enables placement in optimal location. Safeguarding and protecting is the preferred solution.

Performance

Nozzle clogging is reduced by up to 98%. Even in the case of unexpected high solids load, the filtration system reacts by backwashing more frequently, but no breakthrough is encountered. The laborious task of cleaning the nozzles has been minimized or is made unnecessary. Downtime is effectively avoided.

Advantages

- **High filtration efficiency**
- **Automatic backwash**, extremely efficient, usually <1% of flow
- **No side effect** of backwash on filtration, no channeling, no breakthrough
- **Continuous supply**



- **No time effects**
- **Design configuration and installation**, completely modular systems, flexible, adjustable, compact space saver
- **Operation & maintenance**
- **Reliable**

References

- Australia
- Canada
- Great Britain
- Israel
- South Korea
- U.S.A.
- Germany
- Finland

Flow Rates

7-500 m³/h
30-1,000 G.P.M.

Filtration Grades

50-200 microns

Cooling Towers - Sidestream Filtration/Treatment

Industries - Food and Beverage, Power Generation, Mining, Machinery, Steel, Plastics, Petrochemicals & Refineries, Commercial Cooling and H.V.A.C.

The Need

Cooling tower's fillpack and nozzles, as well as heat transfer surfaces are seriously impaired by suspended material. This may reduce performance by 40% and increase energy consumption by 70%.

The Problem

Suspended particles originate from the following sources: airborne, biological growth, corrosion, carbonate precipitation. These form an insulating layer which reduce heat transfer. Removal of suspended matter will not only ensure less clogging, it will prevent nucleation which is a floc formation trigger.

The Solution

In large systems (usually above 420 T.R.) a side stream filtration unit will significantly reduce the problem. Side stream design is between 5-15% of the full flow and provided the correct grade is applied, reduces fouling problems, which save up to 40% excess energy consumption, reduce chemical dosing and downtime, as well as maintenance costs.

Performance

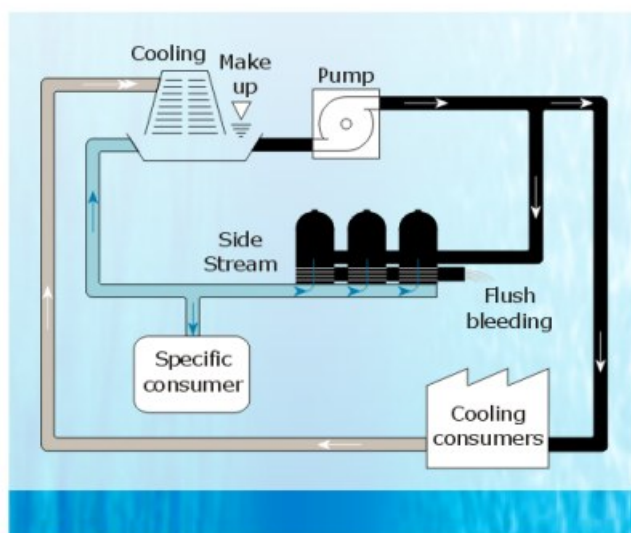
Hundreds of side stream systems have been operating for more than 15 years. The exact filtration grade ensures that only particles smaller than a defined size will be recycled in the cooling loop. Adjustment to the required flow, as well as flexibility of filtration grade are seen by customers as an outstanding advantage.

Advantages

All of the advantages of the "grooved disc Spin Klin® system" are fully expressed in cooling tower applications.

In Addition More Advantages are Highlighted

- **Bleeding** - Usually backwash is adjusted to serve as an automatic bleeding outlet.
- **Rooftops** - A high percentage of cooling facilities are rooftop mounted. In this case, the lightweight, compact, modular design is extremely effective.
- **Corrosion resistant** - Cooling tower water is saline, the advanced polymers used by Arkal are immune to corrosion.



References

- USA
- France
- Great Britain
- Israel
- Thailand
- Germany
- China

Flow Rates

50-500m³/h
200-2,500 G.P.M

Filtration Grades

50-100 microns

Cooling Towers / Cooling Water Full Stream Filtration

Industries - Pharmaceuticals, Machines, Steel Plastics, Food & Beverage, Commercial Cooling & H.V.A.C.

The Need

The same as in large cooling towers. In addition some of the systems may be of the open cooling water loop nature; i.e., more dirt evolving from product direct cooling. Nozzle protection is usually involved as well.

The Problem

Suspended contaminants reduce the efficiency of fillpack and cooling spray nozzles. The nozzles are frequently blocked and the heat exchange rate is reduced.

The Solution

Full stream filtration, predominantly at cooling capacities up to 420 T.R. A carefully selected and accurately designed filtration system that is able to solve nozzle clogging as well as reduce chemical dosing expenses by up to 40%.

Performance

Hundreds of systems have been serving the above mentioned industrial sectors for over 15 years. Systems are always designed with a bypass and indicator. The backwash volume serves as bleeding and can also be recirculated. Air aided backwash is applied when pressure is low and when fine filtration is needed.

Advantages

Same as with sidestream systems, plus:

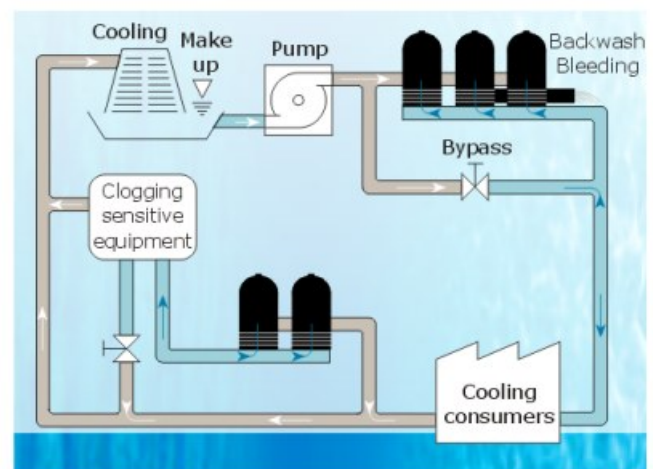
- **Compact** modular systems for limited spaces.
- **Air aided** flushing to further reduce backwash volume <0.2% of flow.
- **Fine accurate filtration grade.**
- **Proven experience in treating customer's needs.**

Additional Capabilities

- **Sidestream design** recommendation - sidestream volume, positioning, filtration grade, intake and return locations.
- **Energy monitoring** - by simple temperature parameters the end user can receive the: "Actual V.S. optimal designed energy consumption" to monitor both cooling system operation and filtration system performance.
- **Integration** with biological growth retardants, scale and corrosion prevention.



Chryptosporidium - there is no media which is regarded as a breeding ground for this pathogenic oocyte.



References

- Canada
- France
- Great Britain
- Israel
- Thailand
- South Korea
- New Zealand
- U.S.A.
- China
- Germany

Flow Rates

5-250m³/h
20-1,000 G.P.M.

Filtration Grades

50-100 microns

Ion Exchange - Boiler Feed Water

Upstream Filtration / Post Protection Resin Traps

Industries - Textile, Power Generation, Chemical, Petrochemical & Refineries, Pulp & Paper, Steel, Machinery, Mining, Food & Beverage



The Need

Depending on the water source, resin beds may perform as filters. They are not intended for this purpose and may clog or increase regeneration frequency and brine discharge as well as salt consumption. Resin escape during regeneration is expensive and should be prevented by all means.

The Problem

Suspended material accumulates on the exchange resin which decreases its capacity and exchange rate. Some of the suspended material will be exchanged, which is a wasteful procedure. If regeneration is not performed according to preselected operation conditions, a certain volume of resin may escape during or immediately after regeneration.

The Solution

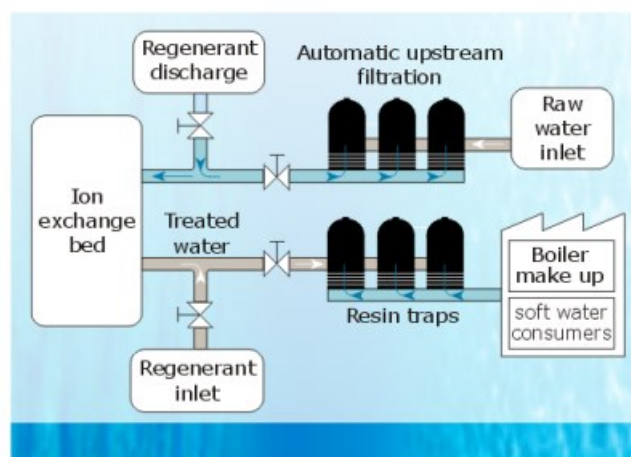
Upstream filtration - an automatic filtration system will reduce the incoming suspended matter, letting the ion exchange bed perform its intended task. Post protection - manual transparent resin traps do not filter but prevent resin leakage and provide easy inspection.

Performance

Unparalleled protection in plants where all incoming water is ionized, as well as in boiler feed preparation stream. Good experience in textile plants, food & beverage and power generation. Resin traps: 1,440 m³/h (over 9mgd) sized unit, special acid resistant filter operating at 200 microns for many years.

References

Mexico, Great Britain, Israel, U.S.A.



Advantages

Upstream Filtration

- **Filtration**
- **Backwash**
- **Continuous supply**
- **No breakthrough** - no time effects
- **Negligible carbonate sedimentation**
- **Reduces regeneration volume**, a major environmental issue and allowing for standard discharge compliance

Resin traps

- **Chemical resistance**
- **Close, simple monitoring**
- **Modular and adjustable**, no maintenance or service

	Flow Rates	Filtration Grades
Upstream Filtration	250 m ³ /h/1,000 G.P.M.	55-100 microns
Traps	1,500 m ³ /h/6,600 G.P.M.	130 microns

Water Recycling, Effluent Recovery and Discharge Reduction

Industries - Pulp & Paper, Food & Beverage, Mining, Steel, Machinery, Municipal W.W. polishing

The Need

Both "end of the pipe" and "in process" treatments can benefit from well designed filtration utilizing directly recycled water for additional consumers and applications.

The Problem

To reduce suspended solids in all three applications: "end of the pipe treatment", ahead of, or post treatment, or "in-process recirculation".

The Solution

To reduce T.S.S. to the required need or regulations. "End of the pipe" - when burden is too high or effluent is unsatisfactory. "In process" - usually post treatment. "Direct recycling" - often filtration may be the primary treatment element.

Performance

In most cases, filtration will be the sole treatment, or the primary stage. Flush volume will be high - 5% of flow or more and will be diverted to the previous storage stage. When carefully selected, filtration offers a unique contribution to the treatment and is of great benefit.

Advantages

- **Filtration** - accurate, stable
- **No side effects** of backwash, no breakthrough, or media migration
- **No organic growth** on media
- **Operation and maintenance** - simple, user friendly
- **Two stage filtration** is often used
- **Economical footprint**

References

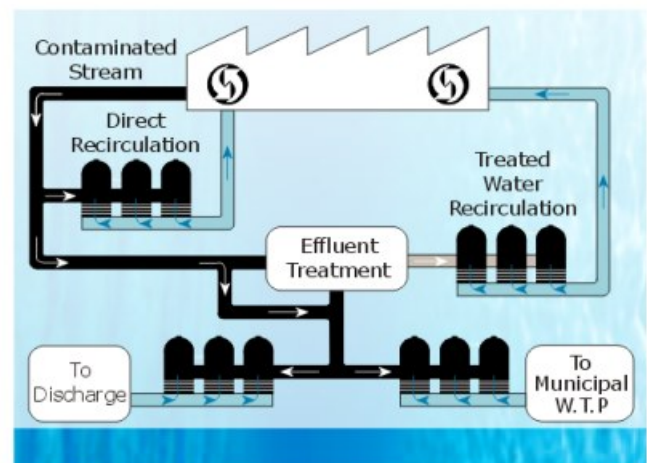
- Israel
- South Korea
- U.S.A.
- Thailand
- China
- Germany

Flow Rates

5-300 m³/h/20-1,320 G.P.M.

Filtration Grades

20-55 microns



Prefiltration Ahead of Fine Disposables / Membranes

Industries - Food & Beverage, Textile, Electronics Chemicals, Pharmaceutical, Municipalities



The Need

Direct filtration at a grade of 10 microns or less, without prefiltration, is very effective. Applying the raw water directly almost always causes high replacement and downtime costs as well as damage to the cartridge and membrane systems.

The Problem

Fine cartridges are seldom backwashed. Membranes are highly susceptible to fouling. Both the end user and the fine filtration vendor may benefit from prefiltration of the particles ahead of the delicate units.

The Solution

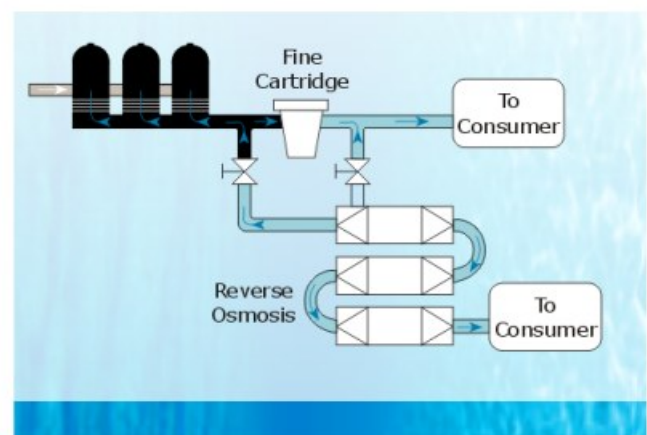
Filtering ahead of both types of systems according to their specifications and water quality reduces energy costs, membrane backwash and replacement.

Performance

Once specifications are set, the prefiltration systems are easily tested for performance and application. Usually a two stage system will be designed, starting from 100 or 55 microns and going down to a 20 micron grade. This combination is in accordance with the innovative concept of letting each unit do the job to which it is best suited.

Advantages

- Continuous supply
- Long lasting
- Design & installation
- Modular, compact, flexible system
- Adjustable, easy to test
- Extremely efficient
- Polymeric materials



References

- Australia
- Canada
- Israel
- New Zealand
- The Netherlands
- U.S.A
- China
- Germany

Flow Rates

Up to 5,000 m³/h/20,000 G.P.M.

Filtration Grades

20-100 microns

Seawater, Desalination, Aquaculture

Industries - Power Generation, Mining, Commercial, Petrochemical

Sand Separation

Industries - Food & Beverage, Municipal, Paper Recycling, Aquaculture, all others



Why

Saline, sea and brackish water are the major unexploited water sources today. Though widespread intake of sea water is rapidly growing, most filtration equipment is inadequate for the task. As a result, metal alloys are used to cope with salt water aggressiveness. These alloys are more expensive and provide inadequate filtration.

How

Arkal Filtration Systems polymeric systems are completely salt and corrosion resistant. Plastic valves and manifolds enable a unique solution for this demanding niche. Same filtration grade going down to a 20 micron rating can be achieved with fully automatic performance in the most cost effective way.

Advantages

- The same as with standard units
- No need for special materials for salt resistance
- Control is usually by air
- **Very long** life span
- **In depth** filtration performance

Installations

- U.S.A.
- Australia

Where

In cases where specific particle gravity is above 1.4 g/cm^3 , sand separation by cyclones is one of the most commonly used techniques. This can serve as prefiltration to a final stage or as a separation unit by itself. The advantage is that there is no blockage of the water passage and high burdens can be treated. The mechanism is energy consuming, evident in the high headloss.

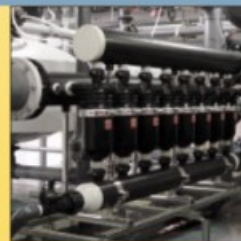
Unique

Arkal applies 2" units in multi-cyclone batteries. Taking advantage of a relatively small unit with high velocity, high efficiency is achieved, combined with the ability to cater to any flow rate. The range of headloss varies between 0.05-1.3 atm / 0.7-19 psi. The separation percentage is 94-96% down to approximately 50 micron particles. These fully plastic sand separators are an excellent combination with the Spin Klin® systems or as separate units as well.

Advantages

- **Fully plastic** - no corrosion, reduced maintenance
- **High separation rate**, based on small unit performance the "multi-cyclone" principle
- **Separation rate** is steady over a wide discharge fluctuation range
- **Compact, modular, adjustable**

Automatic Spin-Klin Industrial Filtration Systems



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