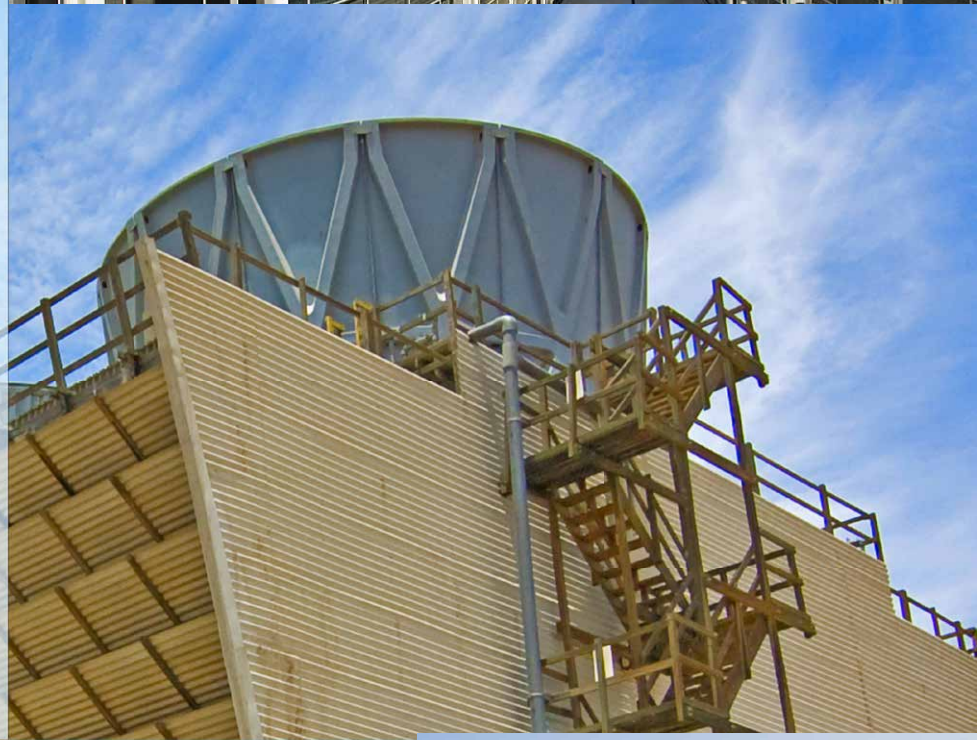
AZUD

Greater productivity and less environmental impact

COOLING SYSTEMS FILTRATION

SELF CLEANING DISCS

TECHNOLOGY



WATER QUALITY, SYNONYM OF **EFFICIENCY**

An accumulation of particles larger than 0.3 mm in the cooling circuit reduces its heat transference capacity by 10%

Cooling systems are present in the municipal, residential, and industrial sectors and in Data Processing Centres (DPC), where they dissipate heat generated during the production activity, ensuring optimal process temperatures.

These systems must handle large volumes of water and/or air exposed to the ingress of particles that settle and accumulate on the different heat transfer surfaces in the cooling circuit, reducing the performance of the installation and increasing process water delivery temperature, leading to loss of productivity and increased operating costs.

HOW DO THESE SOLID PARTICLES ENTER THE SYSTEM?

- **Make-up water:** contains various types and quantities of suspended and dissolved solids, depending on water origin and prior treatment.
- **External environment:** suspended particles in the air, such as dust, pollen, spores and microorganisms, which enter the system via the surroundings where it is located.
- **Process water:** due to the deterioration of system components, addition of inhibitors and biocides, and application characteristics.

WE UNDERSTAND
YOUR CHALLENGES

SCALING

The loss of solubility of certain salts when in contact with high temperatures, principally CaCO3, causes their precipitation on the heat transfer surfaces of the cooling circuit, reducing energy efficiency.

SETTLED SLUDGE

The accumulation of suspended particles in areas with low system water velocity generates obstructions, favours microbial growth, and increases the intensity and duration of maintenance shutdowns.

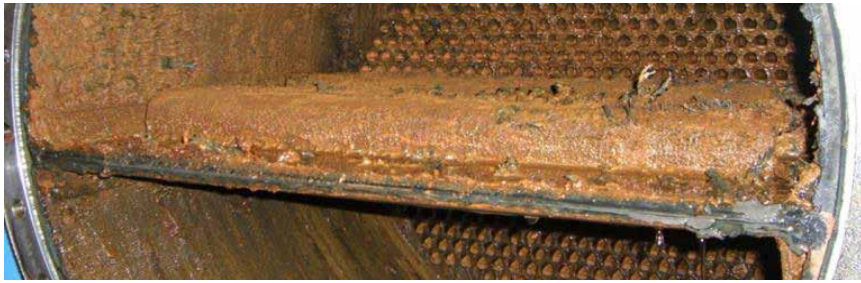
BIOLOGICAL PROLIFERATION

The deposition of algae, protozoans and bacteria generates biofilms (heat transfer 25 - 600 times lower than many metals), corrosion and in the case of Legionela Pneumphila this leads to risks to human health.

CORROSION

Degradation of metal surfaces in the system increases the cost of premature replacement of equipment, unexpected production shutdowns, and loss of heat transfer efficiency.

Precipitation of calcium carbonate salts and the presence of corrosion on the heat transfer surfaces of a tubular heat exchanger.



The deposit and accumulation of sludge inside a heat exchanger increases its energy consumption and reduces its performance.

Cost increases due to unexpected production shutdowns, greater dosage of biocides and inhibitors, and a reduction in the life span of the installation.

Capital invested in the correct filtration system can be lower than the cost of a single unplanned production shutdowns

TECHNOLOGICAL ALTERNATIVES

AZUD TECHNOLOGIES

Disc filter

- Filtration of organic and inorganic particles in suspension with sizes 5 - 400 µm.
- Provides double filtration: centrifugal separation and depth filtration.
- Technical plastic materials. Resistant to aggressive water and corrosive environments.
- Effective water/air self cleaning with minimum water consumption.
- Minimum footprint, with different configurations adaptable to any location.

Screen filter

- Filtering of inorganic particles with sizes 100 - 3,500 µm.
- Multilayer stainless steel mesh ensures filtration quality.
- Robust steel fabrication, resistant to high pressures and working temperatures.
- Effective self-cleaning, with suction nozzles having low water consumption.
- Elevated filter flows per unit with very low footprint.

Media filter

- Filtration of small inorganic particles with 10 µm.
- In-depth filtration with quality control by adjusting the water flow velocity.
- Fabricated in stainless steel, resistant to to tough working conditions.
- Optimised backwash water consumption thanks to the low density filter bed.

Centrifugal separator

- Filtration inorganic particles with higher density than water.
- Filtration by the combined effect of centrifugal and gravitational forces.
- Plastic and steel materials for operation at high working pressures and temperatures.
- Low flush water consumption due to cyclonic separation of water/particles.
- Minimum footprint.

TECHNOLOGICAL ALTERNATIVES

SELF CLEANING DISCS FILTERING

SUPPORT STRUCTURE
monoblock MBK with columns that incorporate the spray nozzles.

Patented anti-clogging centrifugal deflector **AZUD HELIX**.

HYDRAULIC PISTON WITH A SPRING,
that compresses the disc stack during the filtration phase and releases the disc stack during the backwash phase.

FILTRATION MEDIA
composed of the AZUD DISC stack with a wide range of filtration degrees (5 - 400 micron).

BASE AND LID
house and protect the filtering element. Easy opening system thanks to a tool-less safety clamp,

INLET, OUTLET AND DRAINAGE MANIFLODS,
made of HDPE, with DIN/ANSI flange or grooved connections, provide robustness, durability and maximum resistance to chemical and saline corrosion.

PLASTIC DUAL-PLATE CHECK VALVE
manages the flow of filtered water and flushing water. Reliable deisgn with a minimum pressure drop.

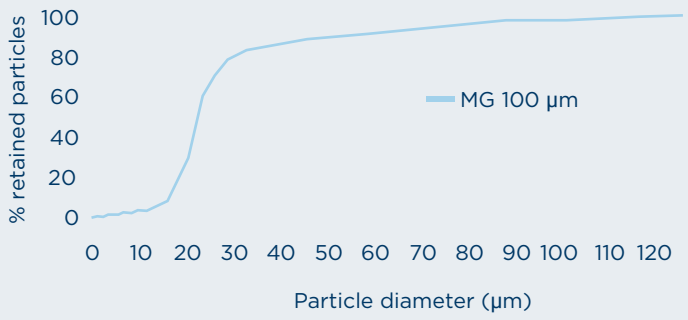
BACKWASH VALVE
enables the autonomous and independent backwash of each filter and guarantees a continuous filtered water supply.

MODULARITY, with a wide range of flow rates and configurations using a minimum number of components.

NON-STOP FILTRATION, thanks to the sequential self-cleaning that garantees a continuous supply of clean water.

SAFETY, due to the rapid recuperation of the filter, even with high loads of organic and filamentous particles, thanks to the high-speed water-air mixture.

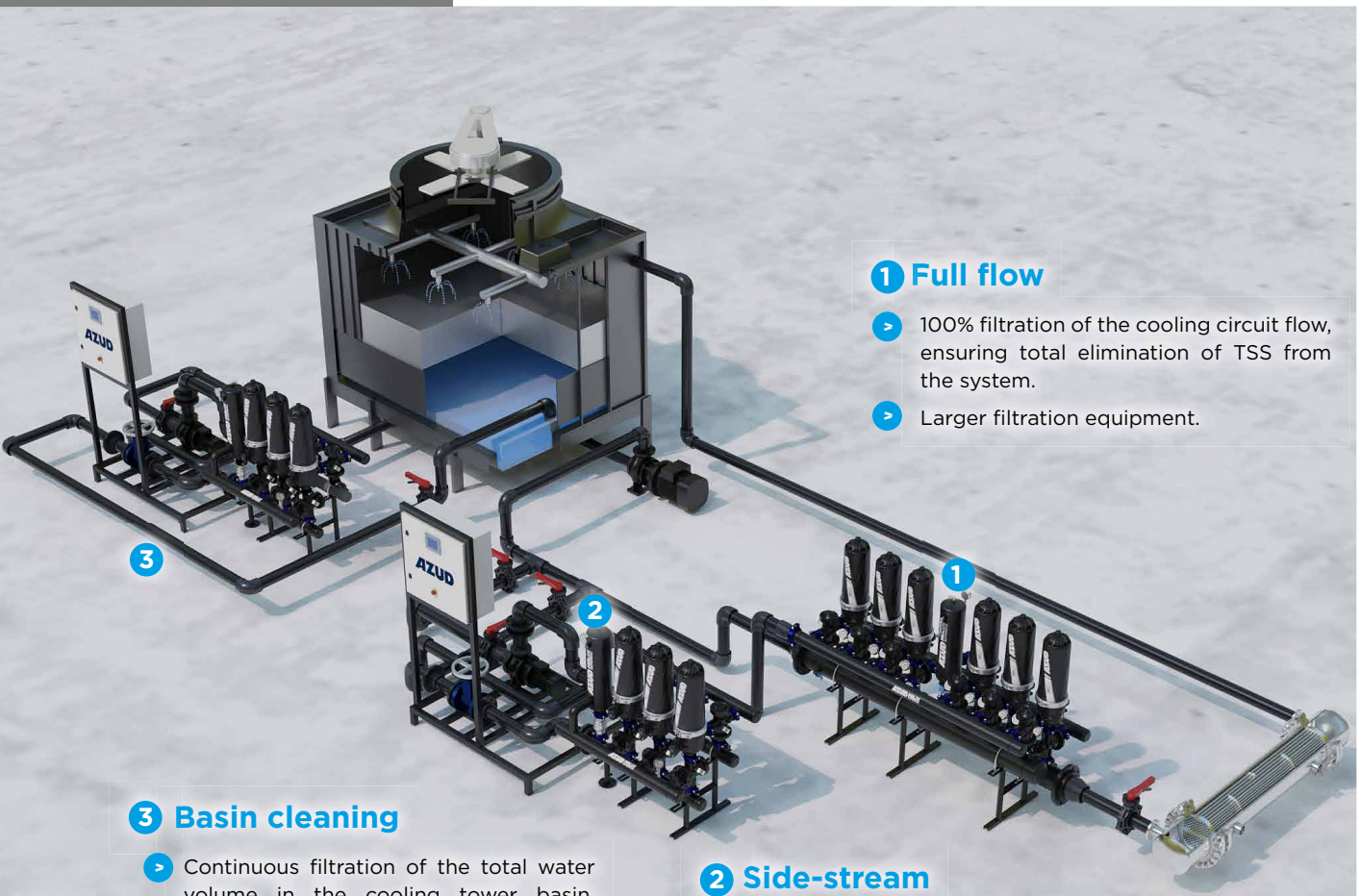
Particle retention efficiency of the AZUD 100 micron disc filter



The optimal degree of filtration is the one that ensures maximum efficiency while eliminating unwanted particles, with minimal cleaning frequency.

02 APPLICATIONS

COOLING TOWERS



1 Full flow

- 100% filtration of the cooling circuit flow, ensuring total elimination of TSS from the system.
- Larger filtration equipment.

2 Side-stream

- Partial filtration of between 5% and 10% of the total circulating flow, ensuring elimination of 92% - 95% of TSS in the system.
- Independent circuit, does not interfere with the production process.

3 Basin cleaning

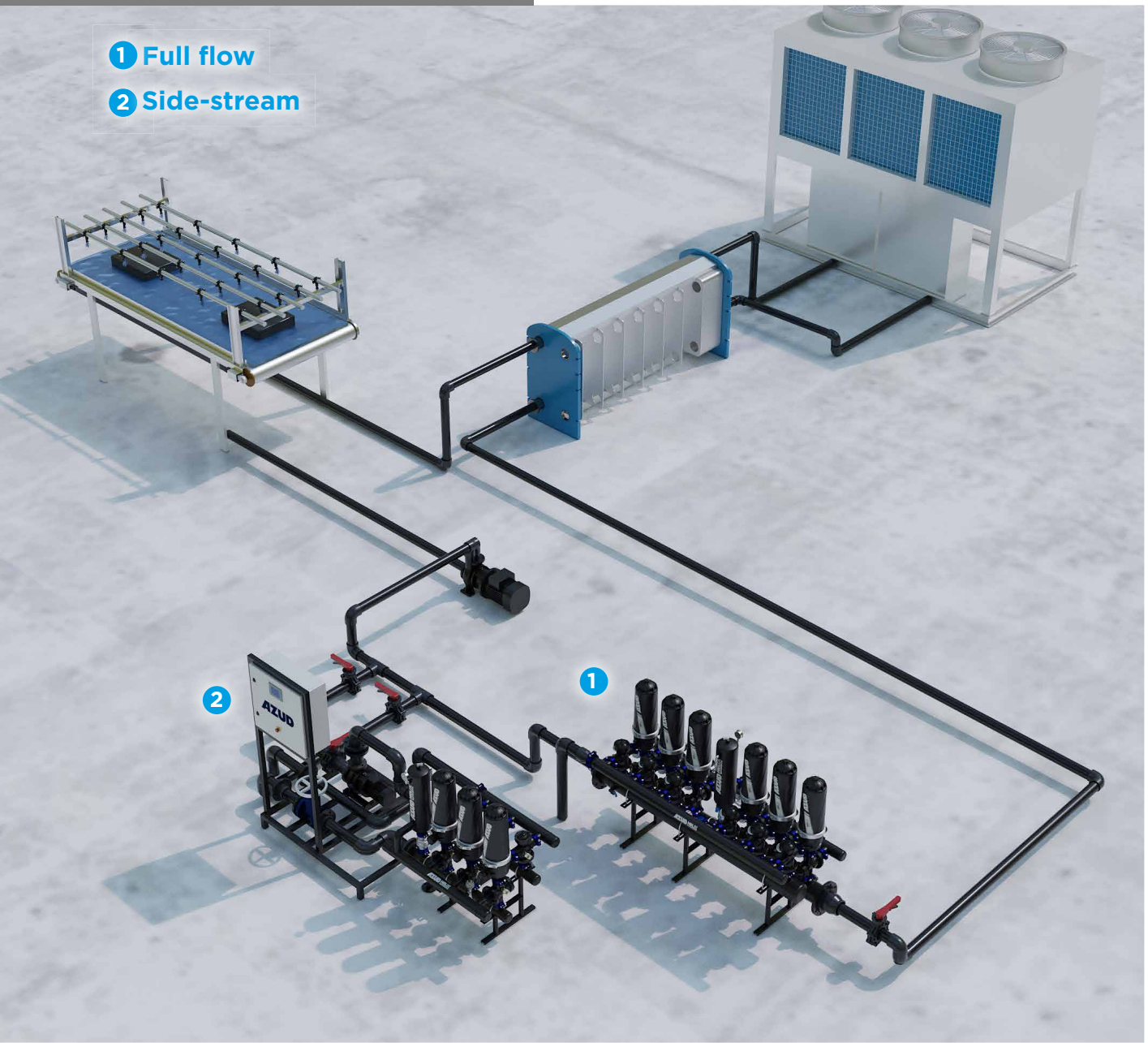
- Continuous filtration of the total water volume in the cooling tower basin, reducing sludge sedimentation rate.
- Independent circuit, does not interfere with the production process.

Why filter?

- Guaranteed water quality for maximum heat dissipation efficiency of the system equipment.
- Optimized working condition of the cooling equipment, ensuring minimum energy consumption.
- Control and reduction of inspection and maintenance shutdowns on cooling equipment.
- Less chemical consumption necessary for microbial and corrosion control in the system.
- More security against high particle entry episodes, such as sand storms, in open circuits.

02 APPLICATIONS

INDUSTRIAL COOLING CIRCUIT

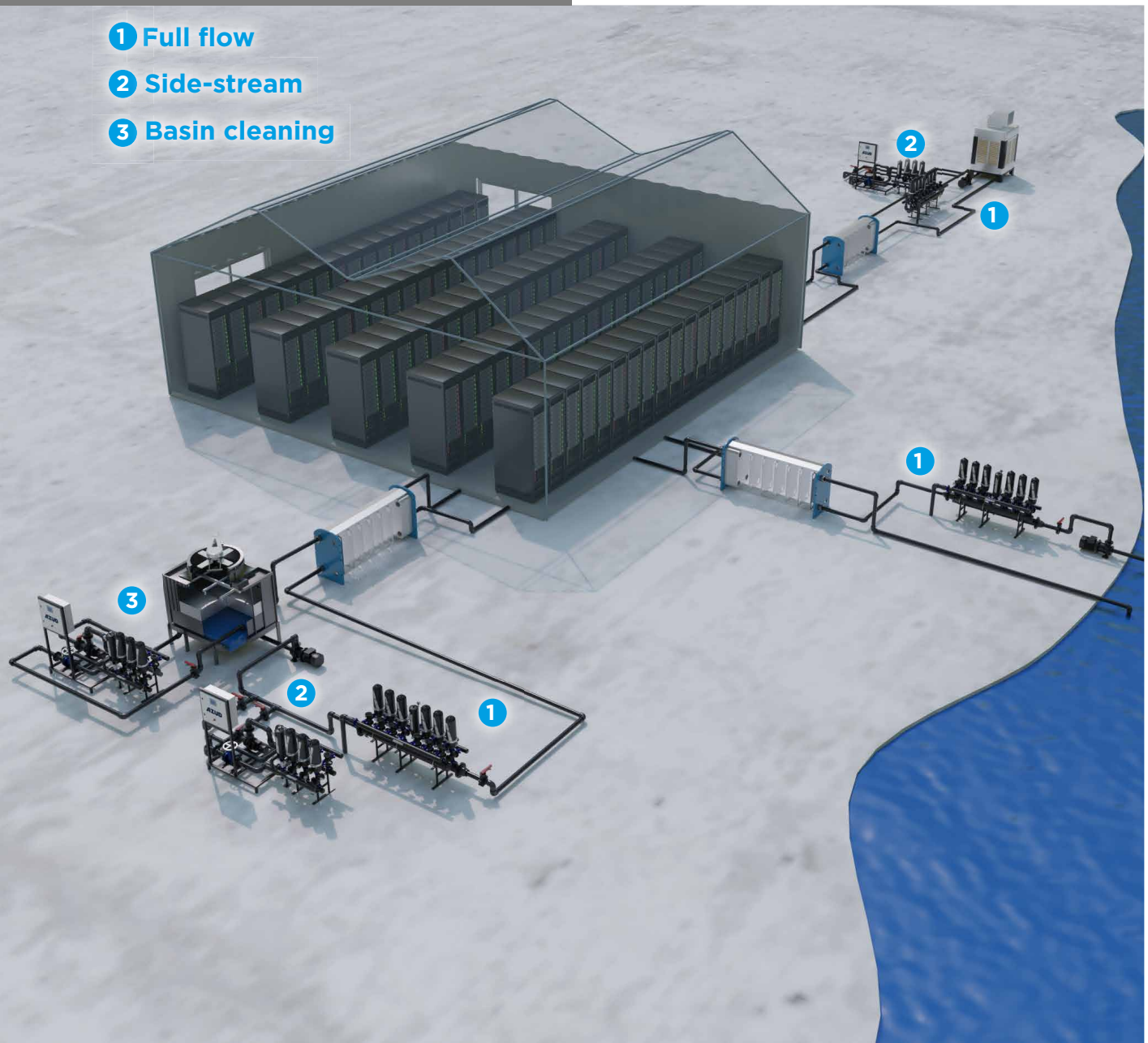


Why filter?

- Retention of particles 5 to 10 times smaller than the diameter of the nozzles, eliminating obstruction risks.
- Uniform water distribution pattern over the components to be cooled.
- Elimination of production losses due to non-conformity with final product quality.
- Reduction in consumption of chemicals required to ensure water quality in the cooling circuit.
- Full flow or side stream filtering option to ensure the quality of water present in the cooling circuit.

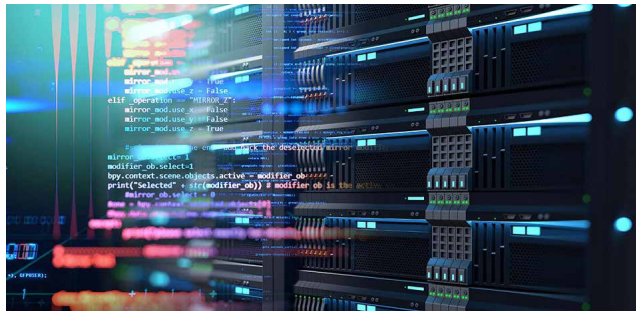
02 APPLICATIONS

DATA PROCESSING CENTRE (DPC)



Why filter?

- Increase in overall system security and guarantee of 24/7 continuity for the installation.
- Environmentally sustainable solution, reduction in the water footprint and savings in energy consumption.
- Different filtering configurations are easily adaptable to the cooling circuit.
- Performance Indicator (PI) improvement through the increase in the adaptability of the system for flow and pressure changes and installed thermal capacity.



03 AZUD SOLUTIONS

3. VALVES:
Control valves for the complete isolation of the unit during maintenance and inspection tasks, and regulating valves in order to maintain operating conditions.

1. MODULAR FILTRATION SYSTEM:
Consisting of one or several filtering elements with a wide range of filtration degrees (5, 10, 20, 50, 100, 130, 200 and 400 micron).

5. AUTOMATION:
Instrumentation, continuous control and monitoring of water quality required for optimal process performance. Includes PLC & HMI with a single interface which permits remote control and autonomous operation of the filtering unit.

2. HORIZONTAL CENTRIFUGAL PUMP:
To ensure the supply of water with the required flow and pressure while assuring filter operating conditions.

4. SUPPORT STRUCTURE:
Constructed from coated carbon steel to provide robustness to the installation and to facilitate its integration.

Integrated skid

Filtration equipment

COMPACT SOLUTION ensures a minimal footprint

ADAPTABILITY to variations in water quality and pressure at the inlet

PLUG&PLAY CONNECTION for rapid installation and start-up

04 AZUD VALUE

EXPERTS IN COOLING

LIFE SPAN
High chemical and mechanical resistance construction materials to extend the life span of the units guaranteeing its optimal performance.

DIGITALISATION
Management, monitoring and remote control of the water quality circulating in the cooling system.

SERVICE
Local assistance for maintenance and training in our solutions is provided through several well-known companies around the globe.

EXPERIENCE
Knowledge and experience to ensure cooling circuit water quality, maintaining optimal working conditions in the system.

SUSTAINABILITY
Environmentally sustainable solution, minimising process water and carbon footprints.

MODULARITY
Wide range of flow rates, configurations and filtration degrees allow us to adapt our solutions to the needs of each user.

LOCAL ASSISTANCE, GLOBAL CONTROL

05 STUDY CASES

District cooling

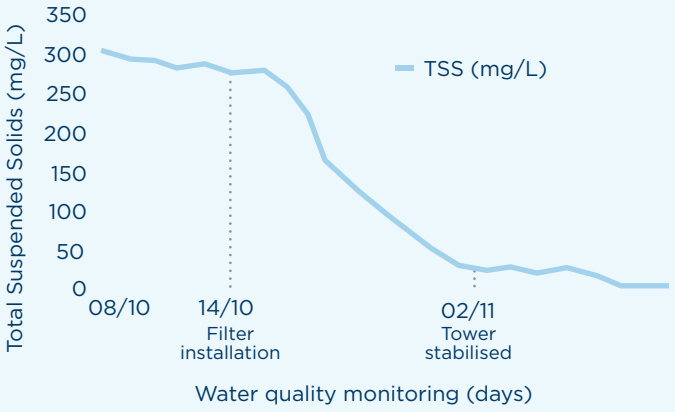
A large commercial centre located in Dubai wanted to improve the performance of its cooling system (DCP) and to protect it against dust and sand particles which entered the open circuit from the surrounding environment.

The solution offered by AZUD was a side stream filtration system ensuring the complete removal of 98% of particles suspended in the water, generating a reduction in energy consumption and ensuring stability in the target temperature within the design envelope.

PROJECT TECHNICAL INFORMATION

YEAR: 2016
PRODUCTION: 2,600 m3/h (11,479.5 gpm)
MAKE-UP WATER: Condensed water
FILTERING LEVEL: 20 micron
SOLUTION: 12 x AZUD HELIX AUTOMATIC 4DC7

EVOLUTION OF TOTAL SOLIDS IN SUSPENSION IN THE SYSTEM OVER TIME



- Payback in less than 3 years
- Maximum flow stability and water quality during the first 15 days
- Guaranteed protection of the tower against sandstorm episodes
- Total Solids in Suspension <5 ppm in cooling and process water volumes

05 STUDY CASES

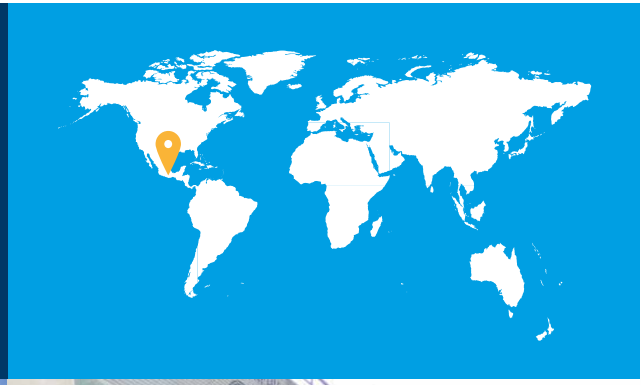
Electrical Sector

One of the largest electricity companies in Latin America had 5 water cooling units which were incurring heat transfer losses of up to 30% due to an accumulation of small particles for which the client needed to apply a large quantity of biocide.

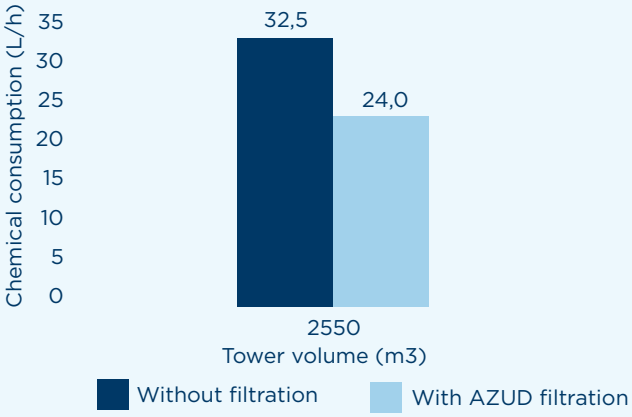
Their strong environmental conscience and the accumulated costs made them look for a solution. They trusted in AZUD to solve the situation by installing 5 side-stream disc filtration units capable of handling a maximum flow of 800 m^3/h to the various cooling units.

PROJECT TECHNICAL INFORMATION

YEAR: 2016
PRODUCTION: 800 m3/h (3,522.3 gpm)
MAKE-UP WATER: Condensed water
FILTERING LEVEL: 130 micron
SOLUTION: 5 x AZUD HELIX AUTOMATIC 210/6FX AA



SAVINGS IN CHEMICALS IN ONE COOLING TOWER



Payback in less than 3 years

Reduced risk of corrosion and biofouling due to the increase in efficiency of the chemicals and biocides

26% reduction in consumption of biocides in the tower

75% reduction in maintenance tasks

05 STUDY CASES

Petrochemicals Sector

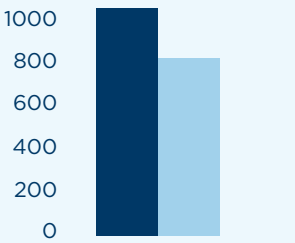
A petrochemicals plant located in Belarus had a 500 ton capacity cooling tower operating with 4 concentration cycles. The most significant conditions in the region were large climatic fluctuations (from -35 ºC to +37 ºC), with an elevated presence of organic particles originating from the Pripiat river, the only available source of makeup water.

AZUD proposed a containerised solution consisting of air assisted disc filtering in order to ensure operating efficiency for the installation and to ensure the reliability of the filtering system in the presence of complex particles.

PROJECT TECHNICAL INFORMATION

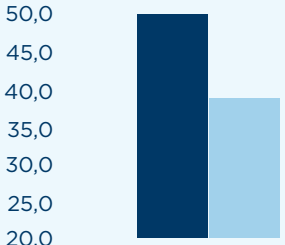
YEAR: 2014
PRODUCTION: 160 m3/h (704.5 gpm)
MAKE-UP WATER: River
FILTERING LEVEL: 50 micron
SOLUTION: 1 x AZUD HELIX AUTOMATIC 204/4FX AA + 1 x AZUD HELIX AUTOMATIC 208/6FX AA

SAVINGS IN ENERGY AND CHEMICALS FOR THE COOLING TOWER



Annual energy consumption (MWh/year)

Without filtration
With AZUD filtration



Daily chemical consumption (L/h)

Without filtration (+biological growth)
With AZUD filtration

25% saving in chemical consumption of the installation

Robust construction in order to withstand the adverse climatic conditions in the region

50% increase of the life span of sensitive components in the tower

22% savings in energy consumption compared to the initial consumption

05 STUDY CASES

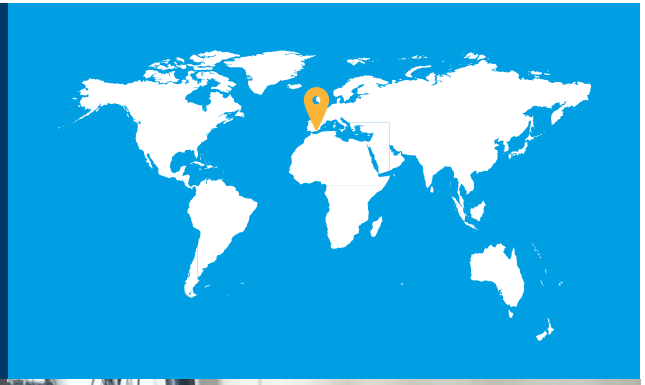
Thermoplastics industry

The cooling water circuit of an industrial plant engaged in the manufacture and development of technical plastic products, showed a buildup of a large quantity of solids in suspension (plastic shavings, pellets, environment, makeup water, etc.), increasing production shutdowns for inspection and maintenance tasks, due to the level of precision required in the process water temperature.

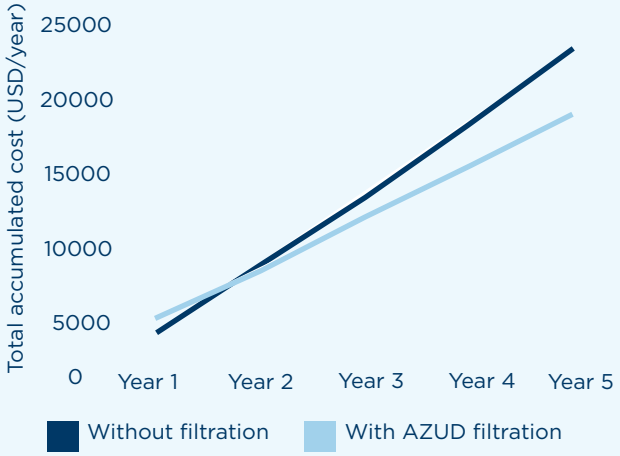
AZUD proposed side stream filtration of the tower, with air assisted disc filtration, ensuring minimum water and energy consumption and filtration of complex particles from the process.

PROJECT TECHNICAL INFORMATION

YEAR: 2019
PRODUCTION: 138 m3/h (607.6 gpm)
MAKE-UP WATER: Mains water
FILTERING LEVEL: 130 micron
SOLUTION: 1 x AZUD HELIX AUTOMATIC FT206 AA



PRODUCTIVITY INCREASE IN PLASTIC EXTRUSION PROCESS



- Payback in less than 2 years
- 70% reduction of maintenance and inspection shutdowns
- 50% increase in the life span of sensitive components in the cooling tower
- Savings in cooling tower make-up water and the consumption of chemicals

05 STUDY CASES

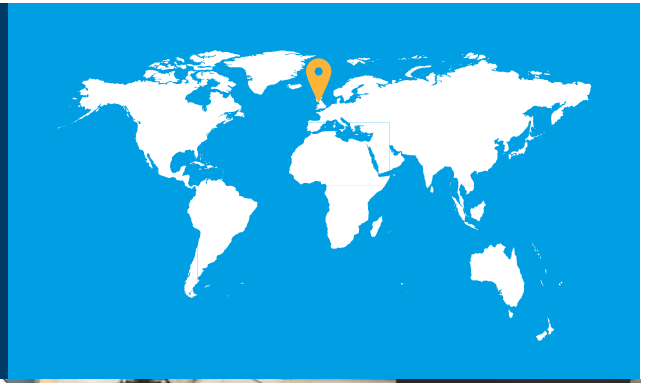
Data Centers

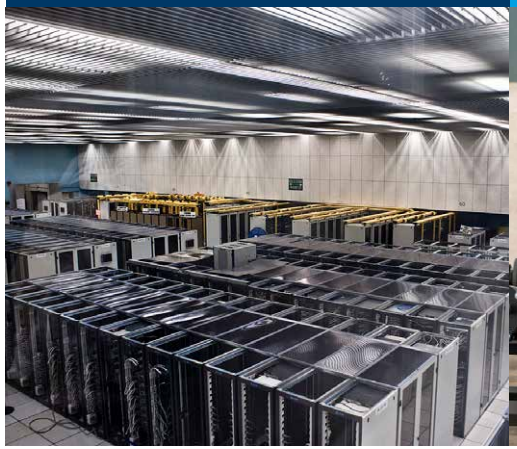
A data processing centre (DPC) was experiencing fouling problems in its cooling system serpentines, leading to large energy losses. In addition, the company wanted to obtain a PUE (Power Usage Effectiveness) as close as possible to 1.0.

AZUD proposed a secure basin cleaning system in order to prevent formation of sedimentary sludge, assuring optimal uninterrupted operating conditions for the cooling system.

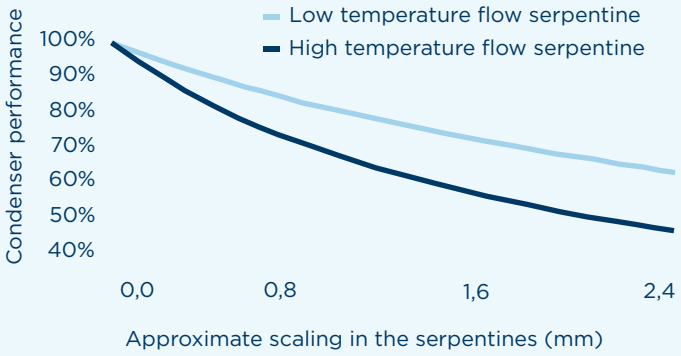
PROJECT TECHNICAL INFORMATION

YEAR: 2020
PRODUCTION: 40 m3/h (176.1 gpm)
ADDED WATER: Basin water
FILTERING LEVEL: 100 micron
SOLUTION: 2 x AZUD HELIX AUTOMATIC FES FT203





PERFORMANCE OF AN EVAPORATIVE CONDENSER WITH FOULING IN THE SERPENTINES



- Homogenisation of the return water to the process
- Uninterrupted production during equipment cleaning
- 20% increase in evaporative condenser performance
- Increase of the life span of the CRAC cooling units

AZUD

The Culture of Water