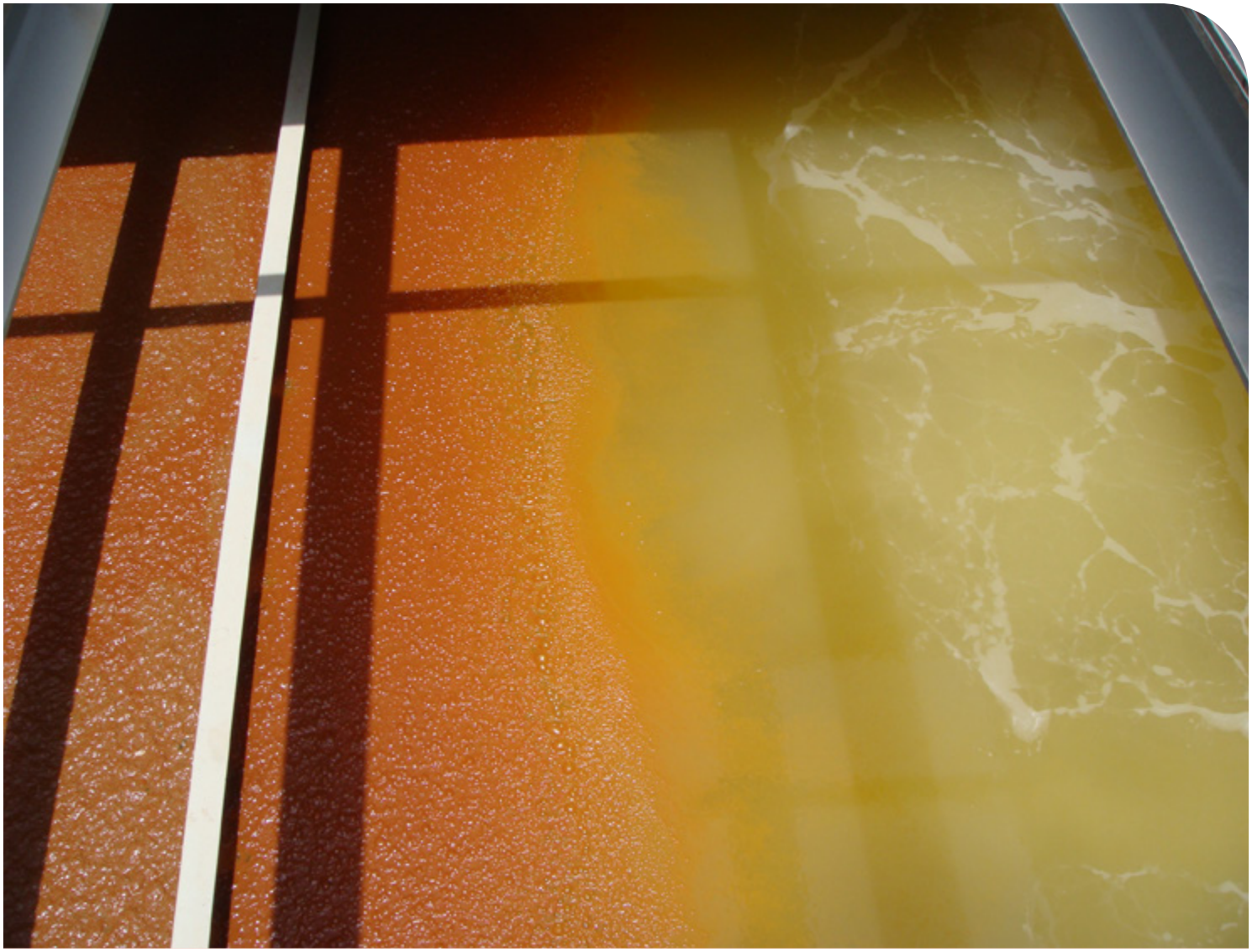


VEOLIA

SPIDFLOW®

Rapid Dissolved Air Flotation Units

WATER TECHNOLOGIES

SPIDFLOW®

The next-generation rapid flotation

Clarification is a key step in any water treatment line whether for the production of drinking water or industrial process water, for the treatment or reuse of wastewater. It is required to remove suspended solids.

It is a particularly critical step when the water to be treated contains low density particles such as algae.

To enable its customers to meet these challenges, Veolia Water Technologies has developed Spidflow, a new generation of Rapid Dissolved Air Flotation (DAF) units.

Spidflow is flexible, efficient, compact and hydraulically optimized, which ensures the production of high quality water.

Regardless of the kind of water to be treated, Spidflow effectively removes colour, suspended matter, grease, organic matter and algae, even when present at very high concentrations.

-75%
smaller footprint

- Hydraulic **OPTIMISATION**
- **COMPACTNESS**: 75% less footprint compared to conventional flotation units, enabling Spidflow to be installed in treatment plants of all sizes, including for retrofitting of facilities
- **MAXIMUM TREATMENT PERFORMANCE**
- **SIGNIFICANT REDUCTION** in the clogging ability of the water
- **HIGH CONCENTRATIONS** of floating sludge, which does not require an additional thickening stage
- **HIGH LEVELS of clarification** rates between 20 and 60 m/h depending on the applications
- **COMPETITIVE OPERATING COSTS** thanks to
  - moderate use of chemicals and for certains applications no use of reagants
  - optimised energy consumption
- **RESPONSIVENESS** of Spidflow to variations in water quality to be treated, through
  - control over white water via exclusive specially designed nozzles
  - complete and advanced automation
- **OPERATIONAL FLEXIBILITY** for shutdowns restarts and maintenance

20-60 m/h
clarification rate

Spidflow Operating principle

Spidflow comprises a coagulation stage, followed by a flocculation step and a clarification phase through fast flotation. The flocculation step may use a Turbomix®.

The fine air bubbles characterising the white water are formed and injected into the Spidflow flotation unit through unit through specially designed diffusers (exclusive nozzles), from recirculated water which has been subjected to air pressurization (from 5 to 6 bars).

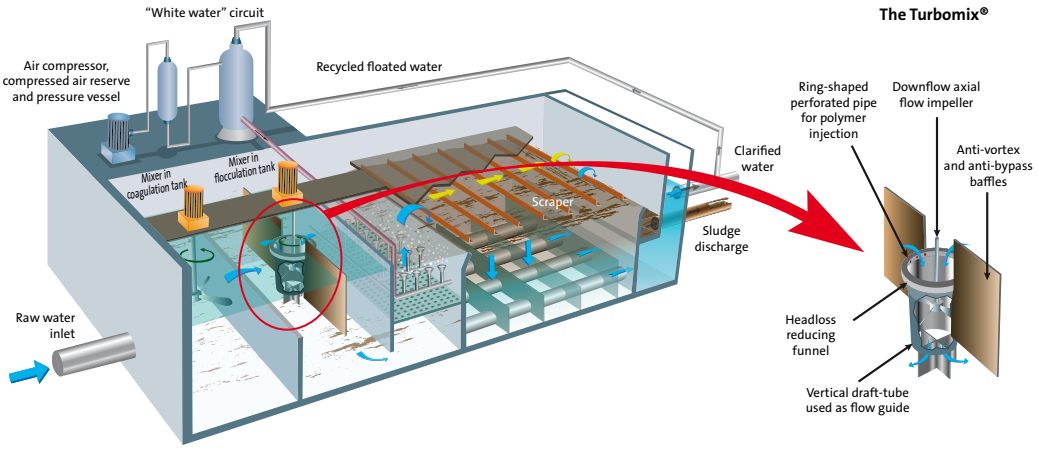
The hydraulic sequencing of the various compartments of the Spidflow™ process has been designed in accordance with specific studies such as Computerized Fluid Dynamics (CFD) and confirmed by a series of pilot tests.

Spidflow has a floor for the distribution of flocculated water, which is located before the mixing step with white water. It also includes anti-spiral flow plates that break down any by-pass and collection lines which uniformly distribute water flow.

This unparalleled optimization of the process ensures that Spidlow achieves very good levels of treatment efficiency which allows it to operate at clarification rates between 20 and 60 m/h.

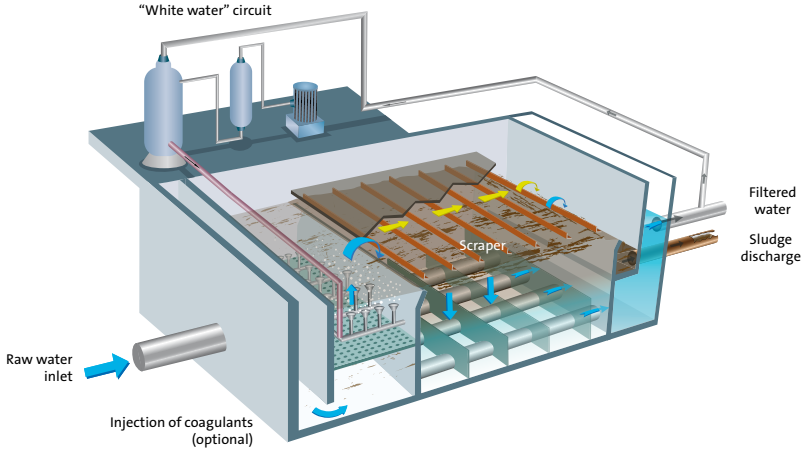
Spidflow Potable water / Process water / Desalination

In desalination, the coagulation step can be carried out online (static mixer)



Spidflow Wastewater / Biofilter Wash Waters / Municipal & Industrial

In wastewater treatment, the coagulation and flocculation steps can be carried out in line without the presence of specific tanks



One solution for all applic

Surface water for the production of drinking water or process water

Features

Spidflow is an excellent process for:

- The clarification of surface water (from lakes, reservoirs, dams and rivers containing up to 100mg/l of Suspended Solids in occasional peak times) into drinking water.
- Elimination of algae and hydrocarbons.
- Treatment of possible cyanotoxins generated by algal decomposition through the addition of PAC in the Spidflow.
- The removal by adsorption of various undesirable organic micropollutants such as pesticides (also thanks to the use of the PAC).
- Underground water treatment (turbidity, Fe, Mn, H2S), and re-oxygenation of the water.

Performance objectives

Even without the additional use of polymers, treatment efficiency is very high, with the elimination of:

- Over **99 %** of algae.
- Over **50%** of organic matter.
- Over **90%** of colour.
- Over **90%** of oils and hydrocarbons, making Spidflow an excellent protection system for installations in locations that are likely to experience unwanted petrochemical discharges (leaks or illegal dumping).

Kermorvan, France

REFERENCES

- **Annet sur Marne, France (2009)**
  2,400 m³/d
- **Toulon La Valette, France (2010)**
  UPEP La Valette, PACA, France, dam water, 67,760 m³/d
- **Kermorvan, France (2013)**
  UPEP Kermorvan, Bretagne, France, dam water, 6,000 m³/d
- **Narva, Estonia (2015)**
  surface water, 19,992 m³/d
- **Trégat, Bretagne, France (2016)**
  dam water, 10,080 m³/d

Toulon La Valette, France

Narva, Estonia

ations

Sea water / Brackish delta water for the production of drinking water or industrial process water

Features

Spidflow is particularly well suited for **pretreatment of seawater desalination** by reverse osmosis, upstream from a **gravity filter** (granular filter) or a **membrane filtration** (ultrafiltration). Its use is essential during algal bloom episodes. It maximises the operation duration of the downstream processes and protects reverse osmosis membranes. Thus, Spidflow provides very low SDI (Silt Density Indices) levels that remain stable over time.

Performance objectives

Spidflow offers unparalleled treatment levels.

- On algae by eliminating more than 99%.
- On oils dans hydrocarbons by eliminating more than 90%.

Al Zawrah, United Arab Emirates

REFERENCES

- **Al Zawrah 1, Ajman site, UAE (2008)** *sea water, 2,984 m³/h*
- **Oman Sur phase 1, Sultanate of Oman (2009)** *sea water, 2,224 m³/h*
- **Fujairah 2, United Arab Emirates (2010)** *sea water, 15,375 m³/h*
- **RWE energy production plant, Eemshaven, The Netherlands (2011)** *brackish delta water, 1,800 m³/h*
- **Al Zawrah 2, Ajman site, UAE (2013)** *sea water, 4,974 m³/h*
- **Oman Sur extension (phase 2), Sultanate of Oman (2016)** *sea water, 5,417 m³/h*
- **Port Alfred BWRO plant, Eastern Cape, Republic of South Africa (2016)** *brackish delta water, 475 m³/h*
- **Sadara Chemical Complex, Kingdom of Saudi Arabia (2016)** *sea water, 20,304 m³/h*
- **CENAL Coal fire Power plant, Turkey (2016)** *sea water, 380 m³/h*

Fujairah 2, United Arab Emirates

Fujairah 2, United Arab Emirates

One solution for all applic

Wastewater: Primary treatment / Post-MBBR / Tertiary Refining / Biofilter Washing Waters

Features

Spidflow is also positioned on wastewater treatment for several applications:

- In **primary treatment**, it not only removes the Suspended Solids from the effluents but also thickens these Suspended Solids in one single step.
- In **clarification**, for example, downstream from a MBBR technology facility where its compactness and performance make it a preferred choice.
- In **tertiary polishing**, in order to maximize treatment efficiency by removing suspended solids and phosphorous.
- In the treatment of **biofilter wash water**, where the treatment performance and the compactness of the process make it the preferred solution.

Performance objectives

Thanks to Spidflow's high treatment performance levels, it is possible, depending on the raw water to be treated, to avoid the use of coagulation/flocculation tanks, reaching unmatched compactness for speeds above 25m/h:

- In **primary treatment**: SS output <100 mg/l, sludge concentration >50 g/l
- In **post MBBR clarification**:
  SS output <30 mg/l (<20 with coag + floc), sludge concentration >25 g/l
- In **tertiary polishing**: phosphorus removal
- In **biofilter wash water**: <200 mg/l (<70 with floc), sludge concentration >50 g/l

REFERENCE

- **Cagnes sur mer, France (2016)**
  primary treatment, 160,000 EH

ations

Industrial wastewater

Features

The advantages of Spidflow make it particularly suitable for industrial water treatment. It can treat process water or wastewater from industrial installations in most sectors of activity, in particular the Food& Beverage sector.

Performance objectives

Although performances depend on the type of water to be treated, Spidflow always provides compactness, short delivery times and ease of installation, particularly with package plants and containerized units.

SPIDFLOW PACK, FLEXIBLE STANDARDISED SOLUTION

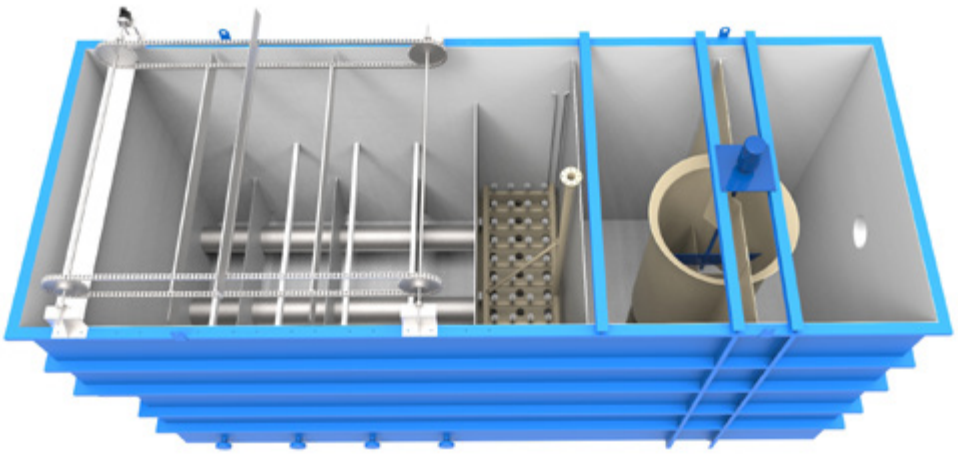
Spidflow is also available in a standardised, metallic and compact version. This complete range can be used for industrial or municipal applications and can achieve flowrates of up to 650 m³/h per unit.

Standardised design

- Skid-mounted - Pre-tests
- Fast delivery and installation
- Limited civil engineering requirements and low engineering costs
- Small footprint

Flexible Solution

- Flocculation: with or without (depending on the applications)
- Two possible designs for the white water skid
- Different coatings depending on the application (seawater version with reinforced resistance to corrosion)



Resourcing the world

Veolia Water Technologies
L'Aquarène • 1 place Montgolfier • 94417 Saint-Maurice Cedex • France
tel. +33 (0)1 45 11 55 55 - fax +33 (0)1 45 11 55 50
www.veoliawatertechnologies.com