



SIDEM  VEOLIA

DAF Filter

**Combined High Rate Flotation and
Media Filtration for SWRO**

Spidflow® Filter

WATER TECHNOLOGIES



Improved SWRO membrane protection

Sea Water Reverse Osmosis (SWRO) membranes are **highly sensitive** and **can become fouled** if **algae, suspended solids, soluble organic molecules and hydrocarbons** in feed water are not removed adequately. An **effective raw water pre-treatment** system upstream of an SWRO system is therefore **essential to prevent the risk of membrane clogging and to ensure durability of the plant**.

In order to deal with the most challenging seawater quality (red tide, high levels of nutrients, suspended solids peaks...) and feed SWRO membranes with consistently good quality of seawater, Veolia Water Technologies has developed and patented a DAF Filter, named Spidflow® Filter.

This unique and compact solution combines into one structure the advantages of two proven pre-treatment processes:

- **high rate Dissolved Air Flotation**
- **high rate Multimedia Granular Filtration**

The DAF Filter, combining the advantages of flotation & filtration

Veolia's DAF Filter, patented as Spidflow Filter, benefits from all of the best features of two technologies and has a lot of advantages compared to other pre-treatment solutions (i.e DAF+DMF or DAF+UF) such as:

— Lower Footprint

- **Compact design** with a very limited footprint (at least **25% gain** compared to conventional design).
- **Modularity:** can be installed in plants of all sizes, it is the obvious choice for extending existing capacity.
- **No thickening required:** high concentration floated sludge avoiding an additional thickening stage in sludge treatment.

— Improvement of SWRO membranes performances

- **Eliminates fouling and biofouling agents:** Spidflow Filter is the ideal pretreatment solution to remove low density suspended solids, algae, oils and hydrocarbons as well as soluble organic compounds which are detrimental to SWRO membranes.

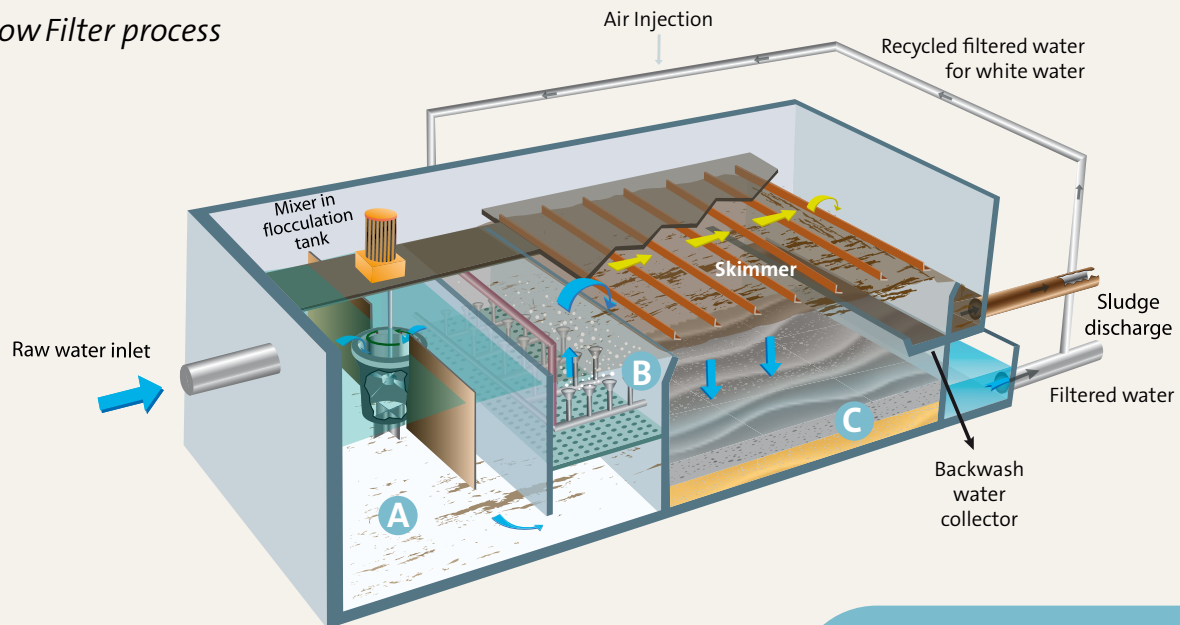
— Lower Capital & Operational Costs

- **Compact design** leading to **lower equipment and construction cost**.
- **Energy-efficient design.**
- **Optimisation of chemicals consumption.**
- **Increases membrane life duration** compared to UF pre-treatment.
- **A fast reacting solution** to variations in raw water quality, enhanced by optimized hydraulics and Veolia's exclusive white water injection nozzles.
- **Reduced frequency of backwashes** thanks to an optimized filtration operation management.
- **Ensures plant's full production capacity** at all times.

Operating principle

DAF Filter: the best choice for SWRO desalination pretreatment

Spidflow Filter process



A Flocculation phase: Increases collision probability between particles to increase floc size

- *Turbomix technology to reduce the footprint of the flocculation tank if required*

B Dissolved Air Flotation: Flocs are carried to the surface by very fine and calibrated air bubbles, resulting from extensive R&D work. Flocs are then removed by skimming:

- *Deals successfully with raw seawater quality upsets (turbidity peaks, algal blooms or hydrocarbon contamination)*
- *Guarantees consistent seawater quality to feed the subsequent filtration step*
- *Very efficient Veolia Water Technologies' skimming process: minimizes pre-treatment water losses & lowers disposal volume with highly concentrated sludge production*

C High rate Multimedia Gravity Filtration:

- *Removes smallest particles*
- *Allows biomass development in the media depth which degrades biofouling molecules – **Significant advantage compared to MF/UF process** (only mechanical filtration barrier) **which does not remove dissolved nutrients***
- *Provides long filtration cycles through constant feed water quality, even in the most challenging conditions*
- *Fast maturation enabling to feed quickly & safely SWRO units*

References

Veolia Water Technologies' expertise on Flotation and Media Filtration has been proven over many years, Veolia's DAF & DMGF technologies are installed and operating successfully worldwide.

The DAF Filter is the unique re-engineered combination of these two best-seller processes. Long term performance has been assessed during extensive operation in challenging raw water conditions in different locations of the Gulf region. As a technology partner for Masdar (Abu Dhabi Future Energy Company), Veolia developed an innovative, low energy desalination plant in the UAE, incorporating the DAF Filter, with a performance consistently beyond expectations.

