Multiflo®
Enhanced clarification and lamella settling
Veolia’s MULTIFLO® technology is a universal and multi-purpose clarification process that can be adapted under different forms to meet the various needs of our municipal and industrial clients.

In the municipal market, MULTIFLO® classic is recommended for surface water and seawater treatment, but also for primary, secondary and tertiary wastewater treatments.

The coagulation / flocculation stage
Reagents injected into the coagulation tank come into contact with organic matter and suspended solids and precipitate to form microflocs.

Polymers in the flocculation tank combine with these microflocs to form large, easily settled flocs.

The lamella settling stage
The flocculated water enters the bottom of the lamella settling tank. The water flows upward, in the opposite direction to the settling flocs, which are deposited along the lamella plates and settle downward under the effect of gravity.

The sludge that accumulates in the bottom of the tank is regularly removed utilizing either a suction draw-off or scraper mechanism.

Following the launch of the MULTIFLO® classic, two significant developments in the technology have proven efficient for other applications:

- **MULTIFLO® Softening**: for carbonate removal and softening of drinking water, process water and wastewater before reuse.
- **MULTIFLO® Carb**: drinking water polishing process capable of removing pesticides, organic matters and new emerging pollutants, such as endocrine disruptors.

MULTIFLO® CLASSIC, A PROVEN TECHNOLOGY

MULTIFLO® is suitable for applications such as:
- surface water clarification
- polishing for drinking water
- carbonate removing and water softening
- seawater clarification
- urban wastewater purification
- stormwater treatment
- primary, secondary and tertiary wastewater treatment
- biofilter backwash treatment
- wastewater reuse

AN OPTIMIZED DESIGN

The MULTIFLO® process combines the coagulation, flocculation and counter-current lamella settling stages in a single unit.

Inclined lamella plates located side-by-side create modular sedimentation units. Compared with conventional settlers this configuration provides a larger settling surface area within a similar footprint. Moreover, the lamella plates enhance settling of the less solubles flocs by improving the hydraulic distribution of the water and reducing turbulence.
THE MULTIFLO® RANGE, AN ADAPTED ANSWER FOR EVERY NEED

MULTIFLO® MONO: FOR CONVENTIONAL CLARIFICATION

➤ MULTIFLO® Mono is designed to meet the needs of **clarification combined** with sludge thickening **without** the addition of chemical reagents.

➤ This configuration is recommended for:
  - Partial silt removal of surface water
  - Partial stormwater treatment
  - Partial primary treatment of wastewater

MULTIFLO® MONO PLUS: FOR ACTIVATED SLUDGE CLARIFICATION

➤ MULTIFLO® Mono Plus addresses clarification needs after **biological treatment with activated sludge**.

➤ Based on the same principle as MULTIFLO® Mono, the **MULTIFLO® MONO PLUS** provides a sludge draw-off system based on suction, which controls both extraction and sludge bed level in the settling tank.

➤ Online turbidity measurements are used to control the return sludge concentration.
MULTIFLO® DUO: FOR PHYSICAL-CHEMICAL CLARIFICATION

Based on the same clarification principle as the MULTIFLO® Mono, MULTIFLO® Duo uses upstream chemical reagents in order to enhance the settling performances of the process.

MULTIFLO® Duo is particularly suitable for:
- Surface water turbidity removal for drinking water applications
- Advanced stormwater treatment
- Primary and tertiary wastewater treatment
- Treatment of sludge from biofilter backwashes

MULTIFLO® TRIO: FOR PHYSICAL-CHEMICAL CLARIFICATION WITH INTERNAL SLUDGE RECIRCULATION

The MULTIFLO® Trio range addresses a variety of specific needs:
- Reduction in raw water turbidity for drinking water
- Wastewater purification with primary or tertiary treatment

The MULTIFLO® Softening version allows:
- Carbonate removal from surface or well water

- Heavy metals removal from surface or well water
- Residual carbonate removal from effluent before recycling

The MULTIFLO® Carb version treats:
- Pesticide removal from raw water

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The following management tools are available:
- Re-circulated sludge flow according to the amount of sludge produced
- Excess sludge removal to achieve the desired sludge concentration
- Consistent treated water quality
- Temporary sludge storage without impacting the water and sludge quality
- Optimization of reagents consumption with real-time predictive regulation of chemical products.

The Predifloc™ advanced control system enhances a unique management for our clarification solutions.

It continuously calculates and adjusts the metering pump’s flow and achieves an average savings of 15 to 20% on the injected reagents quantity.

- Development and use of a complete range of Hydrex™ additives have been adapted to MULTIFLO®.
- The Hydrex™ range of polymers that Veolia has developed enriches itself with biosourced products: organic, natural and biodegradable flocculants and coagulants, composed of starch (flocculants) and tannin (coagulants).

Veolia also offers MULTIFLO® solutions in a prefabricated compact modular version.
Crivina, Romania
River water clarification for drinking water production
4 MULTIFLO® Trio units
Average flow: 285,120 m³/day
Commissioned: 2006

Herford, Germany
Primary treatment of municipal wastewater
2 MULTIFLO® Classic units
Average flow: 105,600 m³/day
Commissioned: 1998

L’Hay-les-Roses, France
Underground water treatment and drinking water production for the city of Paris
2 MULTIFLO® Carb units
Average flow: 160,000 m³/day
Commissioned: 2008

Marseille, France (underground WWTP)
Primary treatment of municipal wastewater
18 MULTIFLO® Classic units
Average flow: 324,000 m³/day
Commissioned: 1986

Marseille, France
Tertiary treatment for municipal wastewater recycling intended for industrial use
2 MULTIFLO® Softening units
Average flow: 47,500 m³/day
Commissioned: 2001

Nagpur, India
Clarification treatment for drinking water production
6 MULTIFLO® Classic units
Average flow: 240,000 m³/day
Commissioned: 2010

Naghu, China
Pretreatment for thermal seawater desalination (MED) process
2 MULTIFLO® Trio units
Average flow: 108,000 m³/day
Commissioned: 2006

Saragosse, Spain
Primary treatment of municipal wastewater
42 MULTIFLO® Classic units
Average flow: 518,400 m³/day
Commissioned: 1993

Shanghai, China
Primary treatment of municipal wastewater
12 MULTIFLO® Duo units
Average flow: 1,890,000 m³/day
Commissioned: 2004

Durban, South Africa
Tertiary treatment for municipal wastewater recycling intended for industrial use
6 MULTIFLO® Classic units
Average flow: 240,000 m³/day
Commissioned: 2010

Durban, South Africa
Clarification treatment for drinking water production
6 MULTIFLO® Classic units
Average flow: 240,000 m³/day
Commissioned: 2010

The MULTIFLO® units are designed for a variety of water treatment applications, such as river water clarification, primary treatment of municipal wastewater, underground water treatment, and clarification treatment for drinking water production. The average flows vary from 105,600 m³/day to 1,890,000 m³/day, showcasing the versatility and scalability of the MULTIFLO® technology across the globe. The commissioning dates range from 1986 to 2010, indicating a long-standing and ongoing commitment to water treatment technology.
EXTENSIVE EXPERIENCE IN CLARIFICATION/SETTLING

For over four decades, the MULTIFLO® process and its applications have been continuously improved. With more than 500 references worldwide providing first-hand operational feedback, Veolia offers efficient, broad applications knowledge to improve and optimize the process in order to meet customers’ needs.

Through its various options, MULTIFLO® (Mono, Mono Plus, Duo, Trio, Softening, Carb and Packaged Solutions) covers a full range of applications, thus allowing integration into many treatment lines.

MULTIFLO® is ideal for small to large-sized plants. It can treat any kind of water characteristics and pollutant loads.

MULTIFLO® is an efficient process for removing total suspended solids (TSS), color, algae and heavy metal co-precipitates for drinking water production and softening.

MULTIFLO® is suitable for treating water with an average to high turbidity level (10-4,000 mg/l TSS) and produces water with a turbidity of less than 3 NTU, depending on the raw water characteristics.

MULTIFLO® can also be installed as primary, secondary, or tertiary treatment of wastewater and stormwater for partial to nearly complete removal of suspended solids, as well as carbonaceous pollutants and phosphorus.

MAJOR BENEFITS

- **Efficient treatment adapted to meet your needs**: The MULTIFLO® range offers several treatment solutions depending on the required objectives (drinking water, water reuse, and discharge into the environment) and the inlet water quality (surface or underground water, stormwater, municipal wastewater, biofilter backwash, and mixed liquor).

- **Compact**: The lamella plates provide a very large projected settling area in a limited space. The footprint is **10 to 20 times less** than that of a conventional settler system.

- **Flexibility and reliability**: MULTIFLO® takes changing raw water characteristics and consistently achieves high settled water quality.

- **Optimized control system**: The MULTIFLO® process can be managed with the Predifloc™ advanced control system, which allows optimization of physical-chemical treatments and minimization of reagents consumption thus decreasing operating costs.

- **Simple installation and operation**: All units in the MULTIFLO® range incorporate a lamella plate system which is both easy to install and maintain.