Densadeg®

lamellar settling sludge thickening

- **drinking water, urban wastewater, industrial water, rainwater**

an efficient separation process with multiple applications and advantages

a proven technology

that meets the environmental standards for all types of effluents

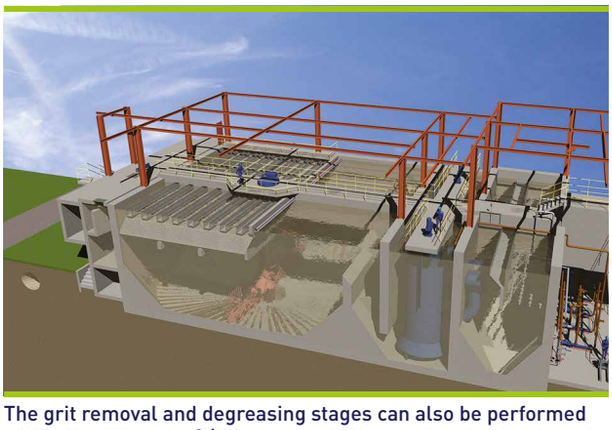
a compact process

that combines rapid commissioning and flexible operation

the Densadeg® is a system that combines rapid physical-chemical settling and sludge pretreatment through thickening

The Densadeg® is a physical-chemical settling tank (optimised flocculation) using external sludge recirculation. It combines the principle of lamellar settling with an integrated thickener.

A recognised expertise in lamellar settling with the Densadeg® installed in over 600 treatment plants.



The grit removal and degreasing stages can also be performed within the Densadeg® (this applies to the wastewater treatment applications).

the Densadeg® is **a compact system** developed in the 1980's which includes stages of coagulation / flocculation, water clarification (lamellar zone) and settling / thickening of sludge.

suez

Densadeg® technology . . .

a process that includes 4 functions

coagulation

The raw water enters a flash mix zone (1) where a coagulant is added, causing agglomeration of the colloidal particles.

flocculation

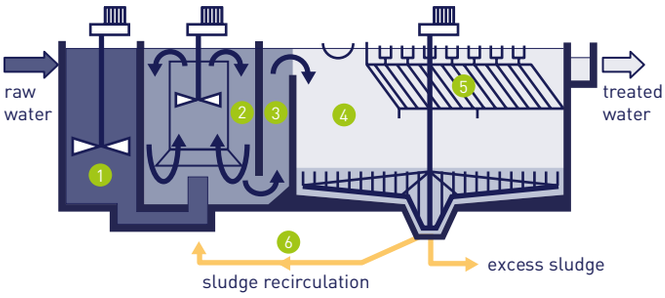
In a second zone (2), the coagulated water is brought into contact with a flocculating agent and the thickened, recirculated sludge coming from the settling / thickening zone. The recirculated sludge accelerates the flocculation process and insures a dense and homogeneous floc.

The transition to the settling stage is done via a piston reactor (3) with an upward current in which the flocculation continues.

clarification / settling

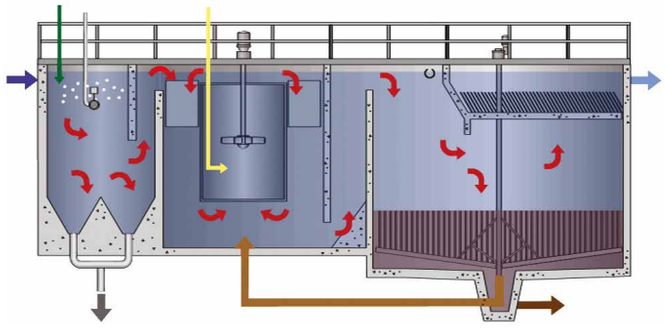
In this zone (4), due to their size and particularly their density, the flocs settle at the bottom of the settling tank. The clarified water is separated from the descending sludge and goes back up through the lamellar modules (5)

The sloping lamellae, which are configured in a honeycomb pattern, act like a refining stage, trapping the lighter less dense solids which have not settled. The uniform speeds at which they go through prevent any sludge going back up: the clarified water has the same quality over the entire recovery area.



thickening and densification of sludge

The settled sludge is progressively thickened at the bottom of the settling tank using a floor scraper and picket fence (6). Thanks to the density of the flocs, the thickening is very rapid and superior to those obtained from other solids contact settlers. A part of the thickened sludge is recycled (7) towards the coagulation zone and the surplus is periodically evacuated (8).



Example of a Densadeg® configuration including the grit removal and degreasing functions.

the Densadeg® treats all types of water

urban wastewater
Primary physical-chemical settling (removal of suspended solids and colloids - reduction of BOD and COD - to some extent), sludge thickening, tertiary treatment (removal of phosphorous and residual suspended solids).

industrial wastewater
Process water, softening, reduction of silica, metals precipitation, washed effluents from thermal power plant smoke (Flue Gas Desulfurization – FGD), sludge thickening, tertiary treatment (phosphorous and residual suspended solids).

rainwater
Primary settling of water from a combined or separate network.

drinking water
Clarification (removal of suspended solids, colloids, colour, micro-algae etc.), carbonate removal (softening), reduction of organic matter, treatment of filter and membrane (microfiltration or ultrafiltration) washwater.

. . . what it can do for you

efficient treatment for multiple applications

- drinking water
- domestic and industrial wastewater

no additional sludge thickening equipment before dehydration

- the sludge from the Densadeg® > 30g.L-1

fast and easy operation even when there is a great variation in flows and / or load

no abrasive ballasting material to be handled, removed or replaced

flexible fitting option: can be tailored to every plant size

compactness of the equipment due to its modular and lamellar design

- which combines together the functions of settling, sludge densification and grit removal / degreasing: 8 to 10 times smaller footprint than a traditional settling unit

easily installed on site

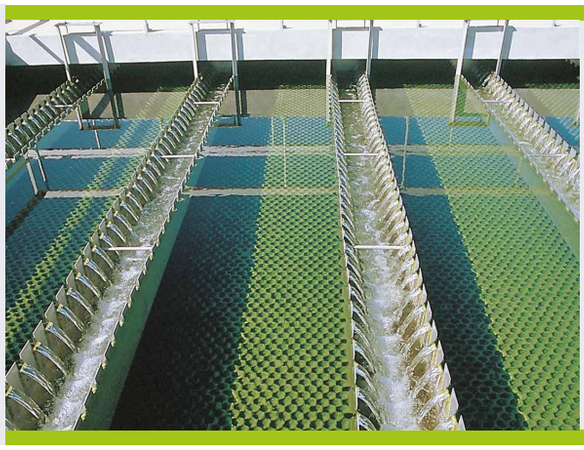
- modular aspect

no environmental constraints

- very little or no odour
- no noise
- small footprint

main features of the Densadeg®

- **Speed of lamellar settling** from 15 to 100 m.h-1 depending on the application;
- **More through treatment of Suspended Solids** (SS), **BOD** and **phosphorous** (< 1 mg.L-1);
- **Withstands significant hydraulic variations**;
- **Volume of sludge** one tenth of what it is for ballasted floc systems;
- **Optimal use of chemical products**;
- **Very rapid** (15 to 30 min) **and automated** commissioning, which means various different applications using the same equipment (primary or tertiary treatment, for example);
- **Flexible in terms of use**, and not very sensitive to changes in the quality and flow of raw water, since the concentration in the flocculation zone depends mainly on the recirculation of thickened sludge and few flocculated suspended solids from the incoming water;
- **Automatic control of the start-up, shut off and sludge management functions;**
- Simplified reduced implementation with pre-sized lines of units;
- Steel tanks or concrete units.



a few references . . .

. . . over **600** references

drinking water production plant
Yangshupu (China) - 16,800 m^3/d

drinking water production plant
Morsang-sur-Seine (France) - 84,960 m^3/d

urban wastewater treatment plant
les Mureaux (France) - 20,000 m^3/d

urban wastewater treatment plant
Mulhouse (France) - 98,000 m^3/d

desalination plant
Wadi Main (Jordan) - 135,000 m^3/d

oil & gas petronas
Kerteh (Malaysia) - 14,400 m^3/d

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