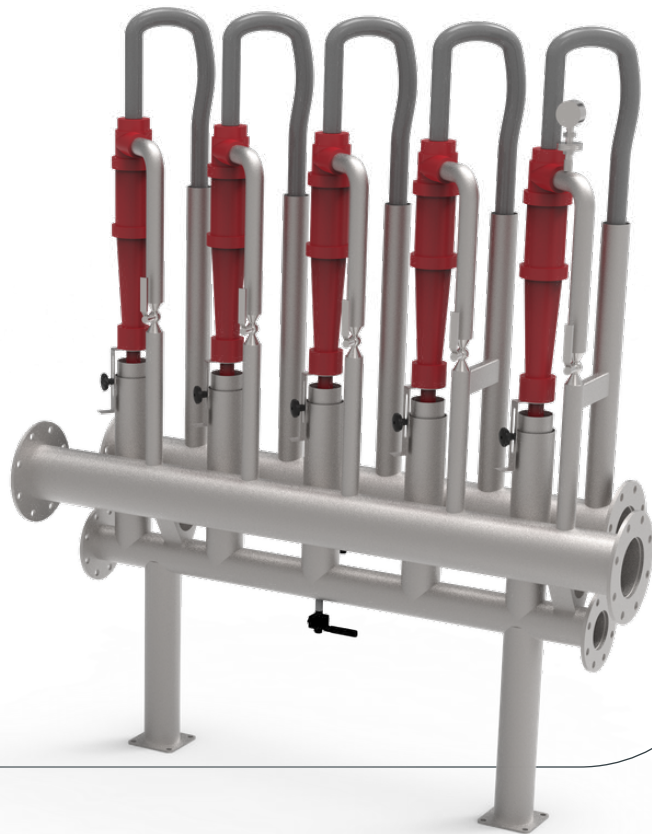


- LESS SPACE NEEDED FOR GREENFIELD INVESTMENTS
- SLUDGE SELECTION
- BOOST CAPACITY – NO NEED FOR NEW STRUCTURES
- LOWER OPERATING COSTS, GREATER SYSTEM RELIABILITY



# INDENSE

## GRAVITY-BASED SLUDGE SELECTION, IN BRIEF

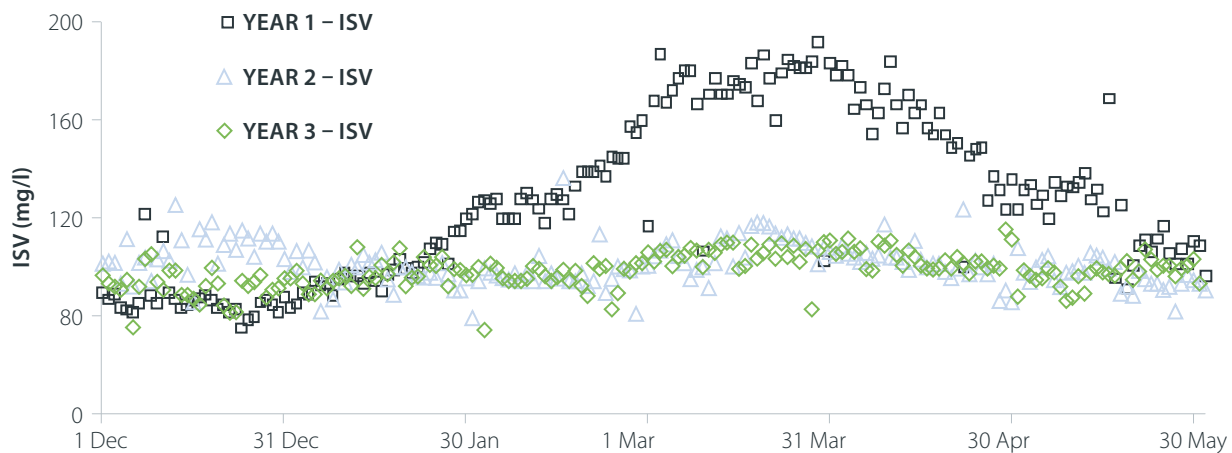
In activated sludge treatment, the bacteria involved have different settling characteristics. The InDense hydrocyclone takes advantage of these traits to achieve selection. Inside the device, centrifugal force separates the sludge mixture into a light, poorly settling fraction (OF) and a dense, well-settling fraction (UF). The dense phase, with a low sludge index and good settling properties, is returned to the biological treatment stage, while the light fraction – mainly filamentous bacteria with weak settling abilities – is removed as excess sludge.

The sludge settling ability (ISV ml/g) is one of the most important design and operational parameters. Faster settling allows for smaller clarifiers and biological treatment tanks, or, in existing wastewater plants, can boost treatment capacity.

After a short period of using the cyclone, the dense sludge stabilizes within the system and the sludge index (ISV ml/g) can be consistently maintained at low values (around 80 ml/g). Alongside physical separation, the cyclone also performs biological selection. In the heavy phase, slowly growing

nitrifying and phosphorus-accumulating bacteria (PAO) are retained in higher proportions, leading to a more stable purification process. Its use requires the presence or creation of an anaerobic selector space within the treatment technology.





ISV ml/g sludge index trend without InDense hydrocyclone (1 year) and with hydrocyclone (2–3 years)

## Application possibilities installation options

### Expanding capacity of existing plants

- process intensification can be achieved without building additional infrastructure, provided there is available anaerobic space (within the current biological treatment and phase separation system, a higher sludge concentration can be maintained)
- if stricter discharge limits are imposed or in case of non-compliance, rapid and cost-effective intervention is possible
- the hydrocyclone can be installed without major mechanical modifications, and it offers a viable capacity expansion solution even when there's no extra space available on site

### Reducing operating costs and improving efficiency at existing wastewater treatment plants

- plant stability is enhanced, and sludge washout from secondary clarifiers can be prevented even during heavy rainfall
- fluctuations in the sludge index and resulting operational

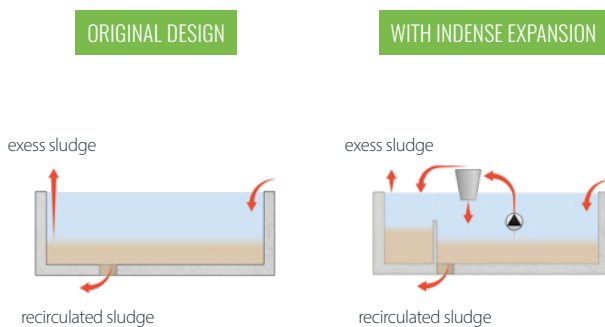
challenges (such as sludge carryover and foaming) and the extra costs of addressing them (like adding chemicals to control filamentous bacteria) can be avoided or reduced.

- biological phosphorus removal becomes more efficient, requiring less chemical precipitation
- delivering consistent effluent quality (N, P), reducing the risk of penalties
- lowering energy usage, and potentially reducing RAS runtime
- all these benefits together lead to decreased operational costs

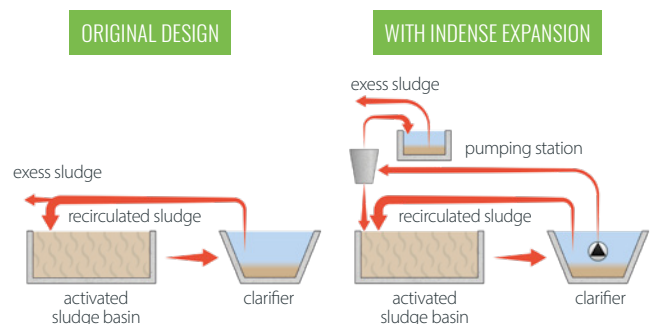
### Greenfield development

- thanks to a lower sludge index (ISV ml/g), smaller biological volumes are required
- which means a reduced footprint
- lower investment costs
- and the operational stability achieved is just as valid for greenfield projects

## Installation options



Partition wall installation in the recirculation sludge pit



Direct hydrocyclone feed from the secondary clarifier structure