



Sustainable Nitrogen Recycling

EkoBalans' process and our technology eco:N can be used to remove and recover up to 95% of the nitrogen in liquids such as sludge return liquor without including heavy metals or other undesirable substances.



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High levels of nitrogen in sludge dewatering liquids create unnecessary internal loading on WWTPs. By using EkoBalans' technology eco: N to extract nitrogen as ammonium sulfate, $(\text{NH}_4)_2\text{SO}_4$, the load of nitrogen can be reduced by up to 95%.

eco:N is a combination of ammonium stripping and crystallization of ammonium sulfate, both of which are proven technologies in current use, and EkoBalans' crystal harvesting technology.

BENEFITS OF eco:N

There are several benefits compared to state-of-the-art biological processes for nitrogen removal in dewatering liquids:

- The removed nitrogen is recovered into a marketable fertilizer product/raw material
- The eco:N process is not sensitive to changing conditions or toxic pollutants, which may knock out a biological process
- Net savings in the double-digit percentage range
- No risk for climate-negative N_2O production in the process



EkoBalans refines recovered nitrogen into fertilizers for local use.

THE eco:N PROCESS

The ammonium-rich liquid is heated and the pH is increased by adding NaOH, converting the bulk of the ammonium into dissolved ammonia. The liquid is fed to the top of the stripper column and distributed over the internal packing media. Air enters the bottom of the stripper column through a fan and travels upwards through the packing. The dissolved ammonia is transferred from the liquid to the air and leaves the stripper column at the top. The gaseous ammonia is led to the crystallizer, where it is combined with sulfuric acid to produce ammonium sulfate crystals. The air, now free from ammonia, is led back to the stripper. The liquid exits the stripper at the bottom and is returned to the WWTP. The ammonium sulfate crystals are continuously harvested from the liquid in the crystallizer.



eco:N PLANTS

EkoBalans' eco:N plants are built with standard components and will be available in three sizes:

eco:N 20 5 m³/h (20-foot container)

eco:N 40 10 m³/h (40-foot container)

eco:N 100 > 10 m³/h (fixed installation)

The process will be fully automated. The time required for control, chemical replenishment, cleaning, and ammonium sulfate handling will be less than three hours per week for one container plant. Service will normally be carried out twice a year.

