

U-PHOS®

Cost effective
recovery of
phosphate



U-PHOS®

Application

The U-PHOS® technology extracts phosphate from wastewater, focusing on sustainable and efficient phosphorus recovery rather than removal. In the U-PHOS® process, phosphate and ammonium are precipitated as struvite by adding magnesium to the wastewater. The primary goal of a U-PHOS® installation is to robustly and reliably extract phosphorus from wastewater to protect downstream systems from unwanted struvite formation or high consumption of chemicals in biological systems, which also result in high sludge disposal costs. On the other hand, a U-PHOS® installation distinguishes itself in terms of ease of operation and struvite quality. U-PHOS® struvite pellets can be applied as fertilizer or as substitute for the depleted phosphate ore. U-PHOS® is mainly applied on wastewater streams with 50-100 mg P/L or higher from for example:

- Potato processing plants;
- Distilleries;
- (sludge) digestion plants;

References

U-PHOS® is the result of over 20 years of full-scale experience in phosphate removal and struvite production. It's a further development from Colsen's renown ANPHOS® process which has been a BAT for phosphate removal for many years.

The first full-scale U-PHOS® application treats 400 kg P/d!

Process

The U-PHOS® process consists of:

- CO₂ stripper (optional);
- An upflow U-PHOS® reactor
- A struvite dewatering screw, including struvite storage;
- A magnesium dosing tank;
- A caustic soda dosing tank (optional);
- An equipment skid including control system.

First, a positive pH shift is induced by a CO₂ stripping. From this first process step, the U-PHOS® reactor is fed together with re-circulated effluent, and magnesium. By means of an optimal up-flow velocity, the struvite pellets are fluidized and phosphate precipitation takes place.

The top of the reactor expands to a larger diameter where the upflow velocity is reduced and the struvite pellets settle. The effluent is discharged via an overflow channel.

At the bottom of the reactor, struvite pellets are periodically harvested and transported by a dewatering screw to big bags (or a container) for storage and transport.

Result

- U-PHOS® reduces phosphate concentration down to 10mg/L P.
- Harvested U-PHOS® pellets can be certified for fertilizer applications;
- U-PHOS® reduces operational costs for phosphate removal up to 60-80% compared to conventional dephosphatation.

