

Recovers dissolved phosphorus as hydroxyapatite (HAP) from drainage and converts HAP into fertilizer.

# Phosphorus (HAP) Recovery System

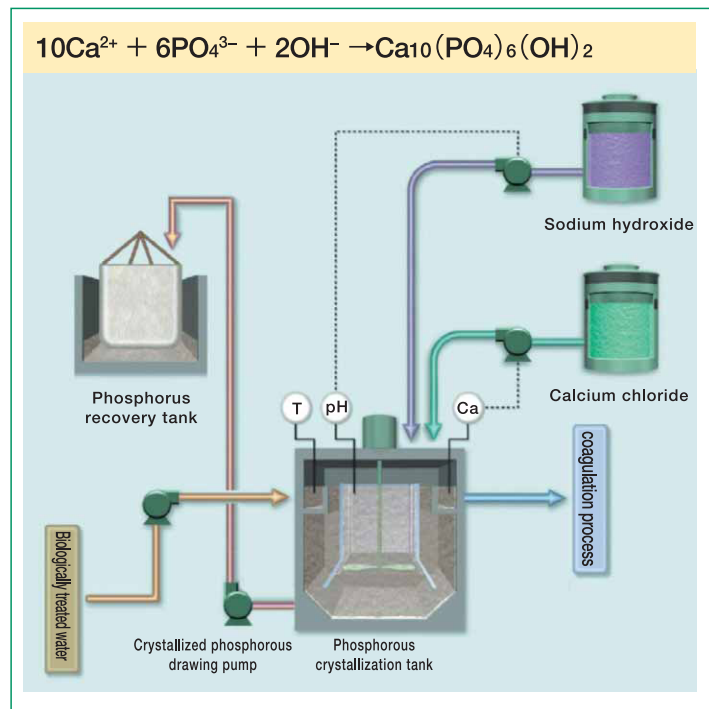
## Features

- Recovers dissolved phosphorus as hydroxyapatite (HAP) from drainage by adding calcium chloride to the dissolved phosphorus.
- Alleviates the density of phosphorus acid in wastewater to 20 mg/L from 100 mg/L (with a recovery rate of approximately 80%), thus making it possible to reduce the quantity of coagulant consumption at the post-processing stage.
- The processing of drain at the rate of 100 m<sup>3</sup> a day will collect approximately 43 kg of HAP.

## Overview

The phosphorus (HAP) recovery system is a technology to recover dissolved phosphorus as HAP from drainage. The main part of the system is a crystallization tank where dissolved phosphorus reacts with calcium chloride. The system incorporates a chemical injection equipment and phosphorus drawing equipment as well. The system does not require concrete water tanks, thus connecting to existing wastewater treatment facilities with ease. The phosphorus in wastewater is a water pollutant, to which a coagulant is added to change the phosphorus into cohesion sludge to be discharged from conventional systems instead of making effective use of it. The phosphorus (HAP) recovery system recovers phosphorus as HAP from wastewater, thus making it possible to return the HAP as phosphate fertilizer to green farmland.

Sandy HAP is crystallized in weak alkali water at a minimum temperature of 25°C according to the above equation, on the condition that a seed crystal exists in the water. The crystallization of HP occurs in the center of the crystallization tank, and there is a sedimentation separation area in the outer peripheral part. The crystallized HAP has very good sedimentation characteristics, and it is separated with ease. There is little leakage of crystallized HAP to the next stage, which allows ease of operation and maintenance.



System configuration

## Introductory Track Record

The system has been delivered in Japan only.

- The Sludge Treatment Reproduction Center of Senboku-shi, Akita
- The Sludge Treatment Reproduction Center of Totsukawa-mura, Nara
- Central Clean Center for Seihoku Gokan Environmental Development Union in Aomori
- Ikenoyama Environmental Health Center for Kushimoto-cho Kozagawa-cho Health Facility Union in Wakayama
- Wakai Green Center for Shimanto -cho in Kochi

## Effects

- Phosphorus is one of the three elements of fertilizer, and it is highly meaningful to recover phosphorus that is depleting globally. Phosphorus is eliminated as a water pollutant in conventional wastewater treatment process. The recovery of phosphorus as HAP will enable the effective use of phosphorus as a precious resource and the reduction of chemicals used for the elimination of the phosphorus in wastewater. This system is not suitable to wastewater with a phosphorus acid density of several milligrams per liter, but can be applied to wastewater with a phosphorus acid density range from 20 mg/L. Therefore, the system is applicable to a comparatively wide variety of wastewater. With a possible price hike of phosphorus ore in the future, there will be an increasing demand for this system.

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