

**FLOSPERSE™**

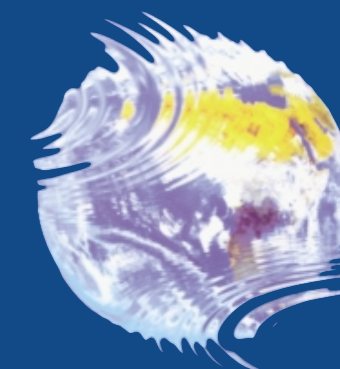
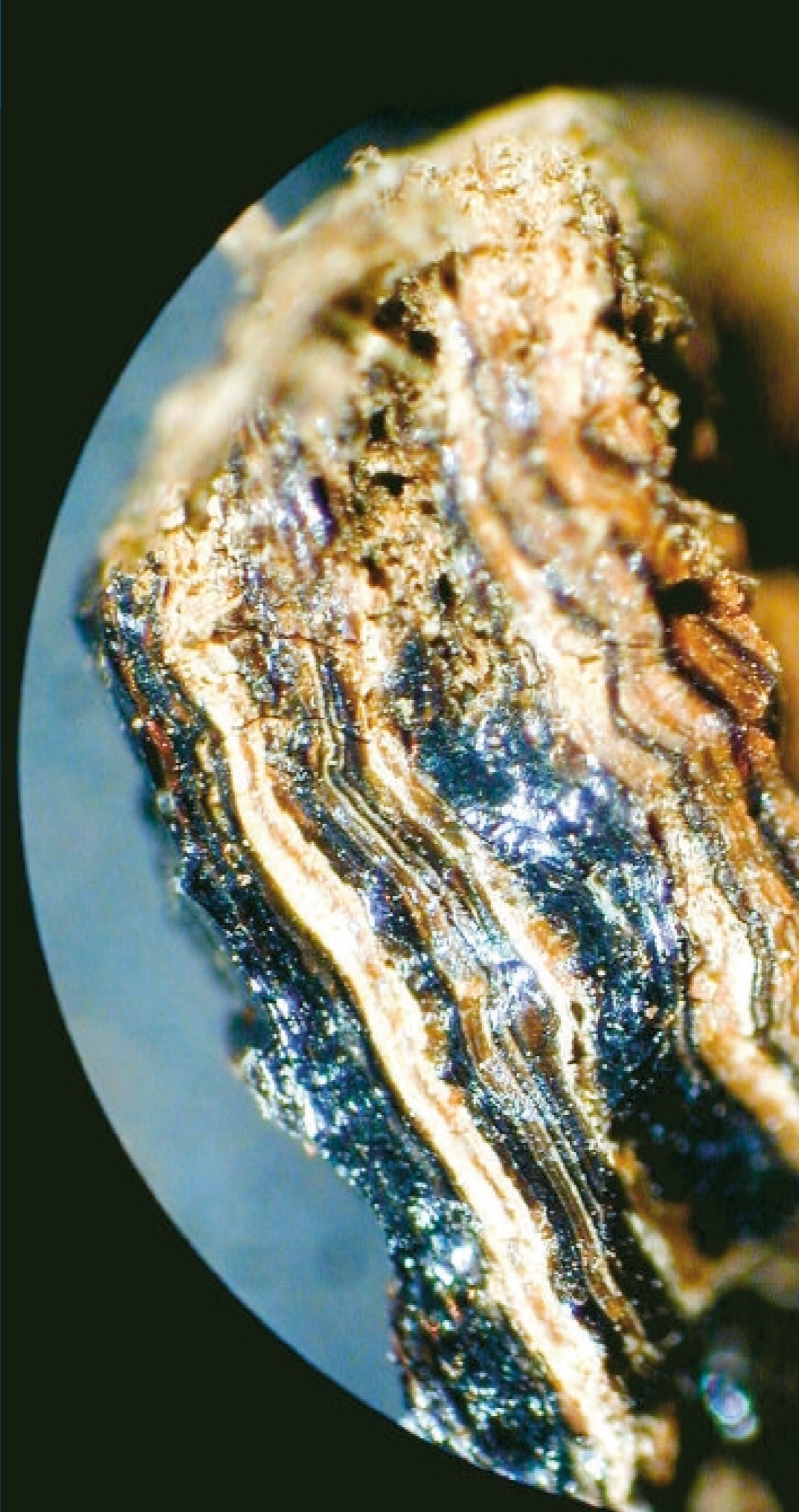
*Anti-scalants and  
Deposit Control*



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The information in this brochure is provided in good faith. To our knowledge it reflects the truth.

# FLOSPERSE™ crystallization

“The problem of crystallization”

- Particular at the dewatering of digested sludge it comes to trouble by crystallization and depositions. Layers consisting from salt crystals in the change with sludge and polymer particles are frequently built up.
- The crystal formation depends on the nature of the contents and on the concentration of the ions as well as on the pH value. Another important point for sludge dewatering with centrifuges is the gas escape of CO<sub>2</sub>. The pH value increases and depending on the solubility of the products, the precipitation starts.



Microscope view of crystals layers (Struvite)  $[Mg(NH_4)(PO_4) \cdot 6H_2O]$



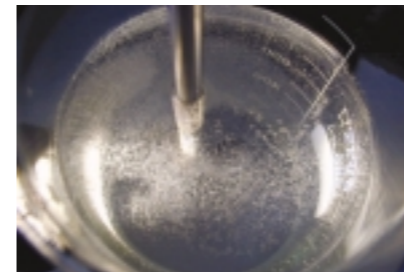
Deposition on the end wall of a centrifuge



Deposits of CaSO<sub>4</sub> in a sludge pipe

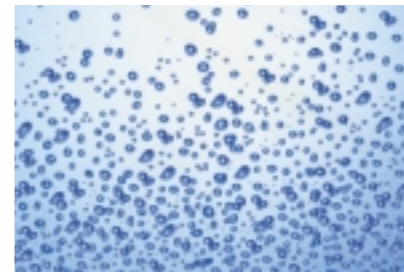
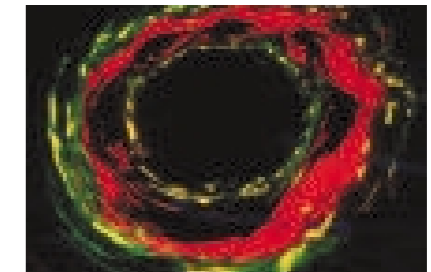
crystallization

# FLOSPERSE™ mechanism of crystallization



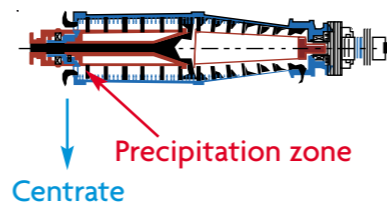
Super saturation of Mg, Ca - salts

High pressure in centrifuge +/- 2000 bar



Sudden violent release of CO<sub>2</sub>

PH increase

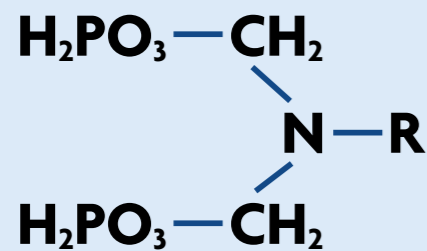


Precipitation of dissolved salts, ie. Struvite, CaCO<sub>3</sub>, CaSO<sub>4</sub>, Apatite

mechanism of crystallization

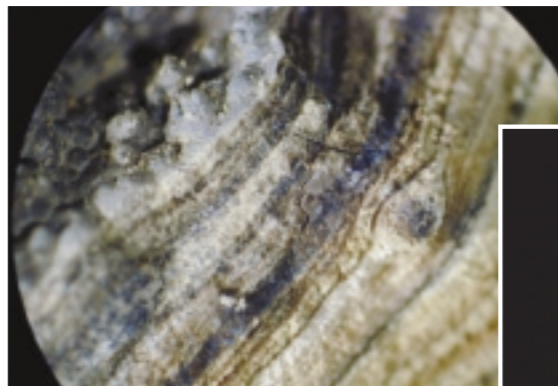
# FLOSPERSE™

## amino-phosphonic acid complex



### Double action

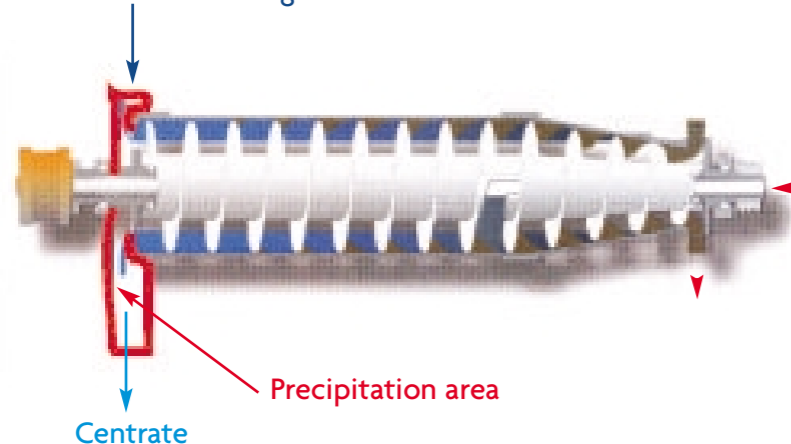
- Complexes Mg and Ca ions
- Interferes with crystal formation



Struvite (Magnesium-Ammonium-Phosphate) in combination with sludge/polymer deposits.



FLOSPERSE™ dosing



- The best dosing point is direct in the water area.
- Depending on the concentration in salts, a dose of 10 to 30 ppm of FLOSPERSE™ is required.

Precipitation area in a centrifuge

# FLOSPERSE™

## anti-scalants

### Buffer, pH and why it works

- During the digestion process large amounts of  $\text{NH}_3$  and  $\text{CO}_2$  are produced by the degradation of organic material.
- Both,  $\text{NH}_3$  and  $\text{CO}_2$  gases are highly soluble in water. These gases combine to form Ammonium-hydrogen-carbonate ( $\text{NH}_4\text{HCO}_3$ ).  $\text{NH}_4\text{HCO}_3$  is a strong buffer with a pH below 7. At this pH most Mg and Ca ions are in solution. If there is sufficient phosphorus in solution (as  $\text{HPO}_4$  and  $\text{PO}_4$ ), we have a system with all the necessary components to potentially form Struvite ( $\text{MgNH}_4\text{PO}_4 \cdot 6\text{H}_2\text{O}$ ).

- A necessary condition for Struvite to remain in solution is a low pH value (the lower the pH, the more soluble the ions). Precipitation of Struvite depends on pH and concentration.

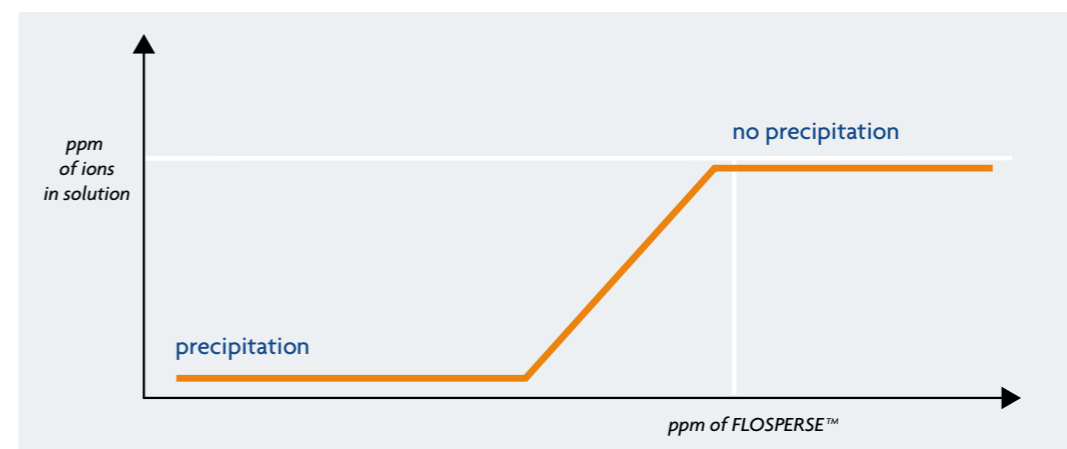
- A sudden change in pressure or temperature will allow the dissolved  $\text{CO}_2$  gas to escape. This causes the pH to increase, thus causing the precipitation of salts such as Struvite,  $\text{CaCO}_3$  or  $\text{CaSO}_4$ .

- In order to prevent the precipitation of salts, the addition of FLOSPERSE™ is required. FLOSPERSE™ complexes the metal ions. Then these ions are not available to precipitate out of a solution.

- An additional advantage of FLOSPERSE™ is that it will dissolve any salts already precipitated over a period of time.

### Optimum dose determination

- One of the many advantages of FLOSPERSE™ over Polyacrylate is that there is a reliable method to determine the optimum dose.
- The optimum dose of FLOSPERSE™ is determined when 100% of the relevant ions are still in solution after we have reached the critical pH value.



# FLOSPERSE™

## products for inhibition of crystallization

PRODUCT	CHEMISTRY	APPLICATION	PACKAGING	TECHNICAL DATA
<b>FLOSPERSE™ PX 60 N</b>	Modified amino-Phosphonic acids and Phosphonates.	<b>Inhibition of Mg precipitation (Struvite), Ca and Fe precipitation (Carbonate, Sulphate, Phosphate).</b>  The product avoids precipitation and re-dissolves existing deposits from pipes and machines over a period of time. Recommended dose 20 – 60 ppm.	Container 1.000 kg net  Drums 200 kg net	pH approx. 5.5 Density (20°C): 1.13 kg/l
<b>FLOSPERSE™ HT</b>	Modified Phosphonic acids and Phosphonates.	<b>Product composition with a special effect against calcium precipitation.</b> High complexing ability with Ca ions beside of a effective Threshold potential. Required dose between 10 – 40 ppm.	Container 1.000 kg net  Drums 200 kg net	pH 5.5 - 5.7 Density (20°C): 1.13 kg/l P content 2.9%
<b>FLOSPERSE™ DISSOLVER</b>	Modified Phosphonic acids, Phosphonates and surfactants.	Special designed for crystal, sludge polymer removal for pipes, dewatering machines and heat exchangers.	Container 1.000 kg net  Drums 200 kg net	pH (1%): approx. 2.1 Density (20°C): 1.21 kg/l



# FLOSPERSE™