Fertilizer Production Expertise
HPD® Evaporation and Crystallization
Fertilizer Expertise

HPD® Evaporation and Crystallization systems from Veolia Water Technologies provide innovative process solutions for large-scale fertilizer production facilities worldwide. These systems allow production of a wide range of high-quality fertilizer products from natural sources (mined or solution mined deposits) or by-product streams from other processes that include:

- Ammonium sulfate
- Ammonium nitrate
- Potassium chloride (MOP)
- Potassium sulfate (SOP)
- Monoammonium phosphate (MAP)
- Diammonium phosphate (DAP)
- Epsom salt: Magnesium sulfate heptahydrate
- Magnesium sulfate monohydrate
- Mono potassium phosphate (MKP)
- Sodium nitrate
- Phosphoric acid merchant/technical/food/electrical grade
- Potassium carbonate
- Potassium nitrate
- Calcium phosphate
- Calcium sulfate
- Calcium chloride

ICP’s Ochoa Mine project (New Mexico, USA) is projected to produce approximately 714,000 TPY of Sulfate of Potash (SOP-K2SO4) from Polyhalite ore (K2SO4·MgSO4·2CaSO4·2H2O) for more than 50 years.

Veolia was selected to refine, confirm, and validate the overall ICP process utilizing HPD® Evaporation and Crystallization technologies through a series of bench and pilot-scale testing programs performed in Veolia’s in-house testing facility.

The scope of the testing extended from the ore leaching to the SOP crystallization process including crystallization/redissolution of leonite (K2SO4·MgSO4·4H2O), and calcium sulfate removal.

As a “first-of-kind” process, the challenge was to develop a cost-effective process to produce a premium potassium sulfate fertilizer. The series of tests proved to be a success as the produced SOP achieved the purity, crystal size, and habit requirements for a fertilizer application.

Based on the results, the testing provided the confidence that a commercial system would perform as designed and met the product quality requirements.

Fertilizer Project Capabilities

- More than 50 references in fertilizer production and more than 85 years of industrial crystallization experience
- Process Development of customized solutions with extensive laboratory and pilot testing facilities including in-house analytical capabilities
- Materials of construction for corrosive operating environments
- Global turnkey project execution, modularized supply, and process guarantees
HPD® Evaporation and Crystallization Case Studies
- Fertilizer Industry

**N**
- **Product:** Ammonium sulfate crystals
- **Project:** Petrobras FAFEN, Brazil
- **Start-up:** 2013
- **Production Capacity:** 875 T/day
- **Feed:** Surplus ammonia (NH₃) from an on-site production facility and sulfuric acid (H₂SO₄) produced as a by-product from a nearby refinery.
- **Scope:** Design and supply of the fully integrated system with process equipment including an HPD® PIC™ (draft tube baffle) crystallizer, solid-liquid separation, drying, screening, packaging, and storage.

**P**
- **Product:** Monoammonium phosphate crystals (MAP)
- **Location:** Middle East
- **Start-up:** 2004
- **Production Capacity:** 96 T/day
- **Feed:** Ammonia (NH₃) and low-grade phosphoric acid (P₂O₅)
- **Scope:** Turnkey project including feed pretreatment, triple-effect evaporation, vacuum crystallization (HPD® PIC™ draft tube baffle technology), drying, and packaging.

**K**
- **Product:** Potassium chloride crystals
- **Project:** K+S Potash Canada, Canada
- **Start-up:** 2016
- **Production Capacity:** 2 Million T/year
- **Feed:** Solution mining of sylvinite (KCl / NaCl ore)
- **Scope:** Detailed engineering and supply of major process equipment that included three trains of multiple-effect NaCl evaporators in series and a five-stage train of adiabatic flash, draft tube crystallizers. The vessels that make up the crystallization system range in size up to 30 meters in length, a diameter of nearly 10 meters, and weigh up to 180 tons.
Resourcing the world

Veolia Water Technologies
HPD® Evaporation and Crystallization

Plainfield, IL, USA
tel +1 (815) 609-2000

Pyrmont, New South Wales, Australia
tel +61 (0) 407 520 605

Shanghai, P.R. China
tel +86 21 6391 3288

Antony Cedex, France
tel +33 6 09 67 08 35
+33 6 09 57 28 21

Getxo, Vizcaya, Spain
tel +34 94 491 40 92

Calgary, AB Canada
tel +1 403 261-0873

Singapore
tel +65 (6546) 1110

São Paulo, Brazil
tel +55 11 3888 9165

hpd.info@veolia.com

technomaps.veoliawatertech.com/hpdevaporation