MINING SOLUTIONS FOR SUSTAINABLE DEVELOPMENT

SNF
RESPONSIBLE CHEMISTRY

SNF

RESPONSIBLE CHEMISTRY

REDUCING WATER, ENERGY, AND ENVIRONMENTAL IMPACT

Future development of the mining industry is facing important challenges.

Continuous growth of the global population increases the metal demand worldwide, whereas mining resources are declining with respect to grade processability, and accessibility.

The freshwater availability for mining would decrease following the increasing water scarcity in many areas of the world.

In order to reduce carbon footprint, the industry would have to switch to alternative sources of energy and optimize consumption.

The development of renewable energy resources would increase demand for large batteries to store the energy, leading to an increased demand for more lithium, nickel, and cobalt.

Emission of pollutants into the atmosphere is a fight that the entire mining industry will have to face. At the 40th session of the Human Rights Council, the right to breathe clean air was highlighted in a report by the Special Rapporteur for Human Rights and the Environment.

As the global leader in the manufacture of water-soluble polymers, SNF has developed a range of more than 1,000 products that help preserve natural resources, encourage recycling, improve industrial process efficiencies, and limit emissions into the atmosphere.

SNF has the advantage and privilege of being positioned in markets at the heart of sustainable development issues and the forefront in combatting climate change.

To consolidate its position as a leader, SNF constantly expands its range of products and technologies through continuous investments in R&D. SNF also reinvests significant financial resources into improving and expanding our manufacturing assets to enable us to produce as close as possible to end-use markets.

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UN GLOBAL COMPACT

6 CLEAN WATER AND SANITATION

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

15 LIFE ON LAND

SUSTAINABLE DEVELOPMENT GOALS

AT THE MINE SITE

FLOSET™ RANGE OF PRODUCTS

Water is necessary for dust suppression:

- On haulage roads, and crushing and conveying equipment, large amounts of water are used daily, which contributes to a neat loss as this water evaporates
- Tailings are a significant source of dust emissions that potentially harm nearby communities

SNF provides several specialty, chloride-free products that help save water, contain dust, and save energy.

OUR PRODUCTS

FLOSET DUST™ is comprised of two lines of products: wetting agents and binding additives.

Wetting agents increase wettability of dust particles. On coal fines, the addition of a wetting agent decreases water consumption by at least 20%. Wetting agents are used primarily for conveyors and crushers circuits.

Binding additives are based on polyacrylamide polymers, used for roads, tailings, and stockpiles. The polymers are prepared as a mother stock solution and sprayed at recommended dosages onto the surface. The polymers create a solid crust or elastic film trapping soil particles into a solidified medium. Binding additives form a continuous matrix and film around the aggregates.

Without treatment, the usage of water on a haulage road is around 150 L/m². **Using a binding agent reduces water consumption to 5 L/m².**

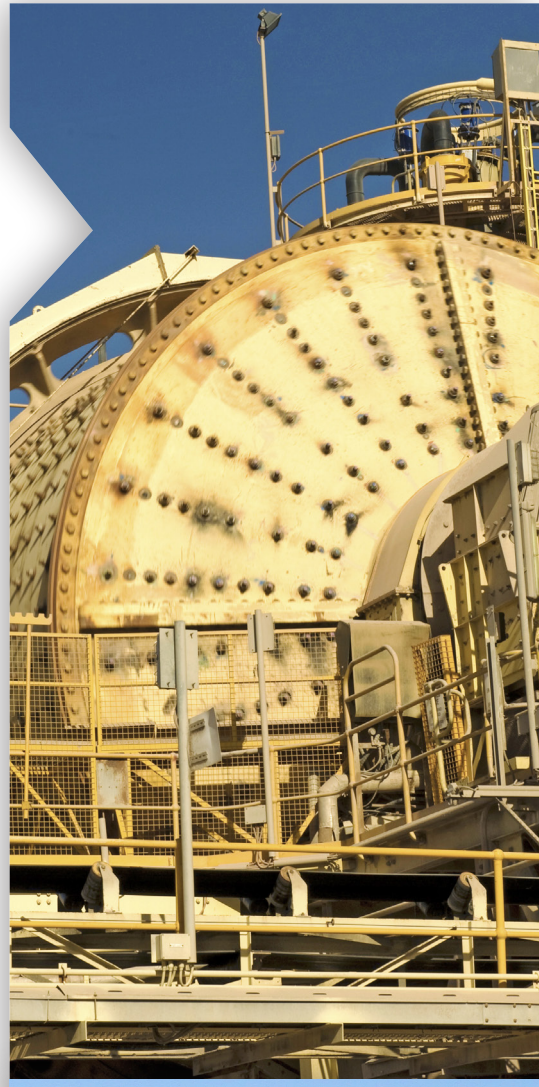
Treatment is carried out monthly, instead of daily, resulting in significant fuel savings from fewer **water truck rotations being required**.

Applied on stockpiles, open trucks, or rail wagons, **dust emissions would be almost eliminated.**

IN BENEFICIATION AND PROCESS PLANTS

FLOSPERSE™ & FLOGRADE™ RANGE OF PRODUCTS

Water savings are obtained by increasing the solids concentration in the slurry to be treated.



OUR PRODUCTS

FLOGRADE™ FOR GRINDING

In presence of clay particles, the slurry at low solid concentration appears “thick” and “sticky” and is impossible to work at the desired solid concentration. The use of dispersants leads to the deagglomeration of the ore and a reduction in viscosity, i.e. the yield stress. Care must be taken not to upset the dewatering circuit in the down-stream process.

FLOSPERSE™ FOR HYDRAULIC TRANSPORT

In the transport of hydraulic slurries, solids concentration could be limited due to the high viscosity of the slurry. Addition of a dispersant decreases the yield stress and thus allow the slurry to be transported at a higher solid concentration.

For both applications, the water savings are commensurate with power savings. On the grinding circuit, as more feed is pushed, the energy consumed by tons of ore is reduced. For hydraulic circuits, the cost savings are linked to the reduction of friction losses within the pipes.

FLOSPERSE™ FOR FLOTATION

In flotation, dispersants are used to free the mineral surfaces. This allows better adsorption of the reagent onto the free mineral surfaces, thereby increasing metal recovery.

FLOSPERSE™ FOR LEACHING OF GOLD ORE

The solids concentration process within the cyanidation process is typically in the range of 50%. In presence of clays, the slurry is too viscous to lead to efficient leaching. Mixing in tanks is not easy, and Air dispersion in the tank is not optimum, and the cyanide cannot properly reach the ore surface, which is coated by the fines.

Introducing a dispersant lead to fines deagglomeration and reduction of slurry viscosity. This allows the process to work at normal solids concentrations. If these reagents are participating to the water savings, they are indeed used for energy savings.

DEWATERING REAGENTS

FLOQUAT™, FLOPAM™ AND FLODRI DA™ RANGE OF PRODUCTS

SNF Coagulants (FLOQUAT™) and Flocculants (FLOPAM™) are widely used in dewatering applications, contributing to the water recycling in mining processes.

Coagulants have always been used in association with flocculants, whereas the flocculant could be used alone. The coagulant will destabilize the colloidal suspension and force the colloids to aggregate forming microflocs. The addition of the flocculant would then lead to the formation of larger aggregates called flocs that settled.

The use of coagulants is recommended when fine particles or clays are present in the slurry to be dewatered.

Coagulants help obtain better clarity of the effluent.

For beneficiation processes, water losses occur with the concentrate and the tailings.

FLODRI™ FOR FILTRATION

Range of products is mainly used on filtration unit for finished or semi-finished products. These products are called dewatering aids.
They are helpful to further decrease the moisture of filter cakes. As a matter of fact, the dryness of the cake is only improved by 1 to 5%.

For the concentrate, the residual moisture is linked to the performance of concentrate filters. For tailings the optimization of water recovery is made by optimizing the operation of tailings filters (dry stack). FLODRI addition help to reduce the moisture.

DEWATERING REAGENTS

SNF adapts the charge, molecular weight, and “shape” of the polymer to the dewatering processes, ensuring that optimum solids concentrations are reached in all thickener underflows or in the filtered cakes.

The technical services offered by SNF are focused not only on selecting polymers, but also contributing to process optimization and training of operators and engineers.

Using our PSU, (Polymer Slicing Unit) preparation make-up units for dry flocculants are another benefit to the mining industry.

Standard preparation units prepare stock solutions at 3 to 5 g/L, whereas with the PSU, the concentration can reach 10 g/L; nearly half of the fresh-water consumption is spared and the size of storage tanks can be reduced. Secondary dilution can be completed in-line with the aid of static or dynamic mixers.

OUR PRODUCTS

FLOPAM™ Blocks

Flocculant blocks have been specially developed and slowly dissolve directly into an effluent flow to flocculate suspended solids.

Applications for flocculants blocks are typically at remote sites without any water services available to install normal flocculant dosing systems. The blocks are used in the mine for treating run-off water or in truck cleaning stations.

REDUCING FRICTION LOSSES

DRAG REDUCTION products are used for hydraulic fracturing of rocks, water-jet cutting (marble), and water pumping.

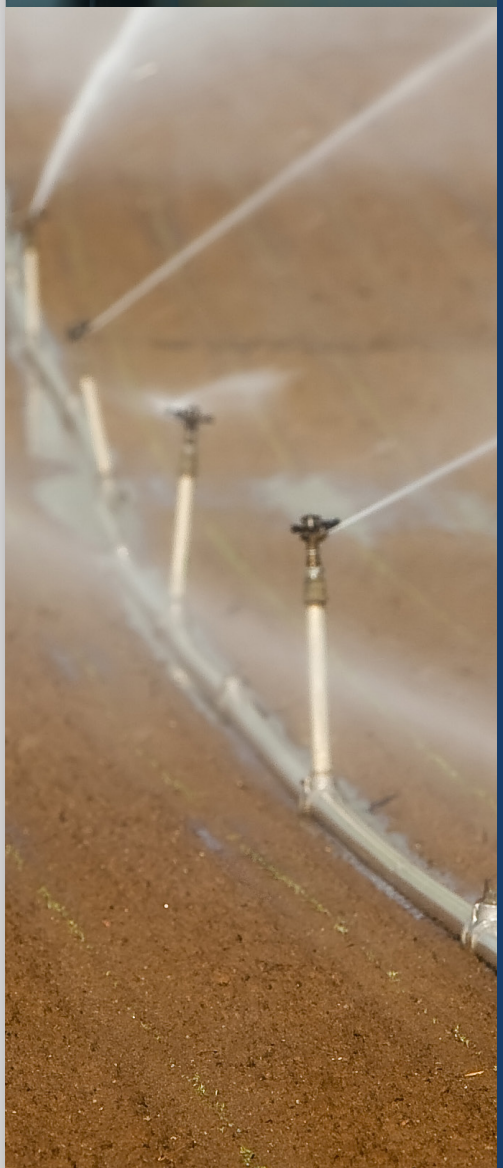
Large volumes of water are often pumped through pipelines over long distances. Operating costs can be high, and in many fields, the flowrate of water is limited by facilities.

Polyacrylamide DRA is supplied to the field in emulsion form and injected directly into the pipeline: to decrease the output pressure and the energy consumption of the water pump for the same flowrate, or to increase the flowrate through the existing pipeline for the same pump pressure.

ANTISCALANTS for the control of calcium carbonate deposition in gold processing is vital in heap leach operations.

Annual accumulation of scale can be as much as 3 cm in piping, valves, and drip emitters in the absence of scale inhibitor addition.

Low dose injection of an antiscalant reduces scale to undetectable levels. Eliminating scale decreases friction losses and prevents reduction of the inner pipe diameter.



SNF (CHINA) FLOCCULANT Co. Ltd.
Taixing economic development zone
West of Tongjiang road
Taixing, Jiangsu 225442
CHINA

+86 523 767 6300
commercial@snfchina.com
www.snfchina.com

SNF Holding Company
1 Chemical Plant road
Riceboro, Georgia 31323
U.S.A

+1 (912) 884 3366
info@snfhc.com
www.us.snf.com

SNF sa
ZAC de Milieux
rue Adrienne Bolland
42163 Andrézieux Cedex
FRANCE

+ 33 (0)4 77 36 86 00
info@snf.com
www.snf.com

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