

Explanatory Leaflet for SUMI-NAX

1. Aim of Development

SUMI-NAX has been developed for the purpose of making polluted water clean below the environmental standard value in Japan and reuse it, as an agent to flocculate, sediment and separate solid substances from liquid in water^{*1}:

- *1 Extraction of organic substances (Protein, Lipid, Carbohydrates, etc.) from polluted water
- Extraction of inorganic substances (Heavy metals, etc.) from polluted water

2. Aggregation Theory

SUMI-NAX generates a strong flocculation effect with the following three synergy:

- 1) Electrovalent bond
- 2) Creation of complex salt
- 3) Encapsulation effect on target substances

Following are the difference of the aggregation theories between other flocculating agents and SUMI-NAX:

- 1) The theory in Europe and America
Applying for hydrolysis function by the electric charge of the heavy metals such as aluminum, iron and magnesium.
- 2) The theory of SUMI-NAX
Applying for hydrolysis function by the mineral electric charge instead of hydrolysis product of aluminum. Taking in contaminated substances by a hydroxyl group.

3. Features

- 1) Being a combination of compound substances
Both SUMI-NAX and other flocculating agents utilize the high electric charge in nature of hydrolysis product. While other flocculating agents hold the high electric charge with a single substance, SUMI-NAX holds it with a combination of compound substances.
- 2) Having a catalytic function
The compound substances contain mineral powder, which functions as a catalyst for flocculation when the trace element in the mineral powder is eluted in water. Utilizing this function enhances the effectiveness of flocculation.
- 3) High-speed reaction
Mineral-related trace element works as oxidation catalyst. It changes water-soluble organic substances to water-insoluble organic substances and enables to gather substances quickly as the deposition of solidification body. While other flocculation agents need about 10 to 30

minutes to completely flocculate substances, SUMI-NAX requires only about 2 minutes for coagulating sedimentation substance and it makes continuous driving possible.

4) Being suited for food waste liquid treatment

SUMI-NAX traps, flocculates and settles contaminants by the action of electric charge. At the same time, it also acts for stable substance which does not have electric charge.

This is the application of "Dr. Funayama's Theory." Dr. Funayama called for his own theory that neutrals are trapped by using hydroxyl group occurred under water. Using his theory made it possible to treat food processing waste water containing a large quantity of neutrals such as food waste liquids. Biological waste water treatment was the only method and any other treatment method had been seemed impossible till then.

5) Function of neutralizing water

SUMI-NAX has a nature of modifying both acidic contaminated drainage and alkaline contaminated drainage to make neutral. Therefore, pre- and post-treatment to neutralize contaminated drainage is unnecessary. This is also the unique feature that other flocculating agents do not have.

6) High dewaterability of generated sludge

Characteristics of flocculating agents in Europe and America:

- High density of generated sludge
- Dewatering performance is insufficient due to the small size of glob of sludge
- The quantity of sludge generated is seemingly small
- High transportation expense for the disposal of sludge containing large amount of water

Characteristics of SUMI-NAX:

- Sludge dewatering equipment is unnecessary.
- The only process, Gravitational Dehydration, dewater sludge easily.
- Low transportation expense for the disposal of sludge containing no water.

4. Others

Currently, only the Japanese version of SDS is available.

The composition of SUMI-NAX and its information on chemical ingredients are as listed below.

CAS numbers and Range of Concentration are also added for your reference.

Composition of SUMI-NAX : a mixture of chemicals

Generic Chemical Name	CAS Number	Concentration Range (%)
Natural Zeolite	1318-02-1	10 ~ 30
Sodium carbonate	497-19-8	10 ~ 30
Calcium Carbonate	471-34-1	10 ~ 30
Silicon	7440-21-3	5 ~ 15