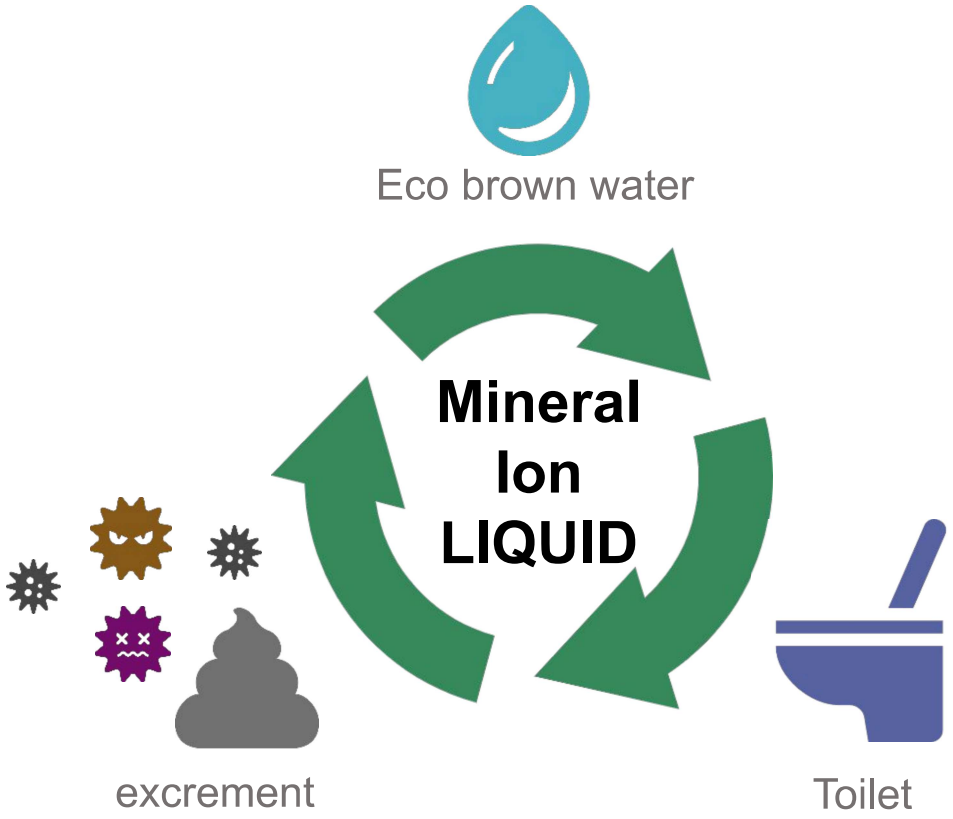
The Best Environmental and disaster Solution

Mineral Ion System



Lepton Labo

Always clean water all over the world
Mineral ions that save the world

HITACHI Co. LTD.

Beautiful water isn't everywhere

As of 2020, approximately 2 billion people worldwide lacked access to safely managed drinking water. Among them, over 100 million individuals relied on untreated surface water sources, such as lakes, rivers, and irrigation channels. This situation not only impacts access to drinking water but also has far-reaching effects on hygiene environments, including bathing and toilet facilities, sometimes posing life-threatening challenges.

The Sustainable Development Goals (SDGs) have outlined a commitment to creating a world where everyone can enjoy safe water and sanitation.

Our company's groundbreaking mineral ion technology contributes significantly to water purification across diverse sectors. With the overarching mission of "Providing beautiful water to people worldwide at all times," HITACHI is actively engaged in addressing this pressing global issue.

One remarkable outcome of this technology is the development of the Mineral Ion Toilet—a next-generation, high-tech solution for improved sanitation.

SDGs Goal 6 "Clean Water and Sanitation for All Worldwide."

Ensure the availability and sustainable management of water and sanitation for all people.

More than 40% of the global population faces challenges related to water scarcity, leading to life-threatening situations. Additionally, issues such as consuming unsafe water as drinking water contribute to crises, often stemming from conflicts and other causes.

Our Purpose "Save the World with Hitachi's Mineral Ion Technology"

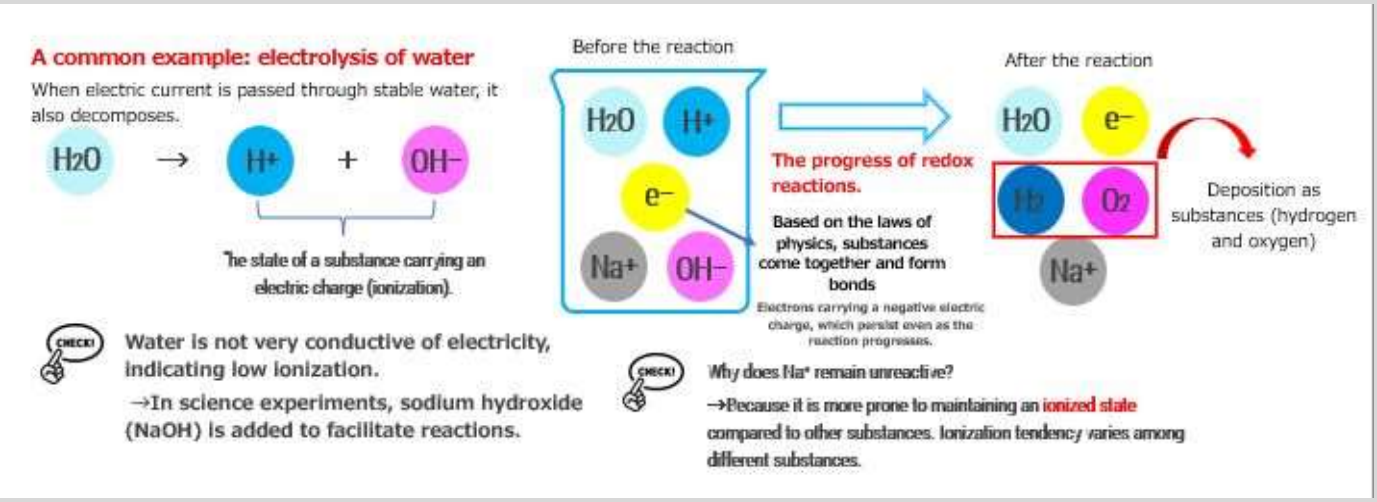
What is the Mineral Ion System ?

The Mineral Ion System encompasses a wastewater purification framework leveraging a composite mineral ion solution developed by LEPTONLABO. Through the application of this system, wastewater undergoes a process of separation into water and sludge, concurrently achieving odor elimination and fungal sterilization.

The compound mineral ion solution functions as a catalyst, specifically designed to expedite decomposition reactions. Upon introduction to water (applicable to diverse water sources, encompassing municipal water supplies as well as natural bodies like lakes and rivers), the solution transforms the water into electrolyzed water. Through sophisticated ion exchange mechanisms, it systematically degrades organic constituents.

This transformative process extends to hazardous substances, inducing a metamorphosis into inert compounds. Bacteria and malodors, when examined on the microscopic scale, are recognized as organic entities. The Mineral Ion System represents an avant-garde paradigm in water treatment, founded upon a departure from conventional methodologies.

New technology: Decomposing substances through ion exchange



Utilizing the Mineral Ion System to chemically treat toilets

Hitachi operates with the purpose of "Saving the World with Mineral Ions"

Mineral ions represent a groundbreaking invention applicable to every field related to water.

Providing Comfort and Safety:

An odorless and hygienic toilet experience.

Disaster Preparedness:

Even when lifelines are disrupted, the toilet remains functional.

Reducing Caregiver Burden:

Significantly reducing the burden of toilet management.

Contributing to the Environment:

Maximizing resource utilization through recycling.

40 years since the invention of Mineral Ion. After two decades of research, we are now harnessing its applications.

The Mineral Ion Toilet has been developed

Utilizing the Mineral Ion System to chemically treat toilets

Toilets equipped with the Mineral Ion System address not only the traditional challenges of **"odor"** and **"hygiene"** but also solve **"ecological"** issues by promoting resource recycling and address concerns related to "disaster preparedness."

Eliminating Bacteria and Odors:

Bacteria and odors, traced to the microscopic realm as organic matter, are instantly decomposed through ion exchange reactions, resulting in **a sterile and odor-free environment.**

Resource Circulation and Reduced Environmental Impact

Achieving water conservation through the **recycling of wastewater.** The amount of energy and chemicals required per unit of purification is significantly reduced compared to existing methods.

The "star" in chemically treating toilets is the Mineral Ion!

Composite Mineral Ion Solution (LEPROX):

LEPROX is a reaction catalyst liquid derived from ionized natural minerals. When added to wastewater, the composite ions react with water, working actively with hydroxyl radicals to facilitate oxidation and reduction reactions. This process precipitates substances from wastewater, effectively separating and removing targeted pollutants.

CHECK!

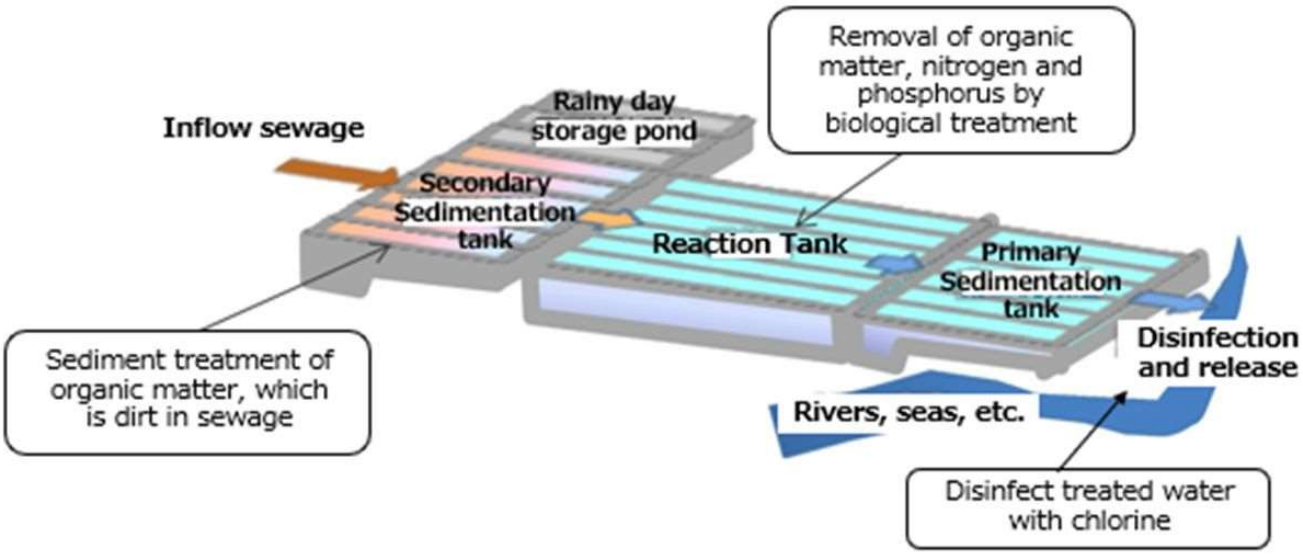
Instead of solidifying and precipitating pollutants, they are decomposed into harmless substances by ion exchange and precipitated by specific gravity separation, so that the ions remain in the water and the decomposition reaction does not immediately converge, which is a unique technology.

Mineral Ion System toilets differ from conventional high-tech toilets in what ways?

Current Sewage Treatment Flow

Quoted from the Tokyo Metropolitan Sewerage Bureau.

Biological treatment system using microorganisms



The challenges faced by the current biological treatment systems

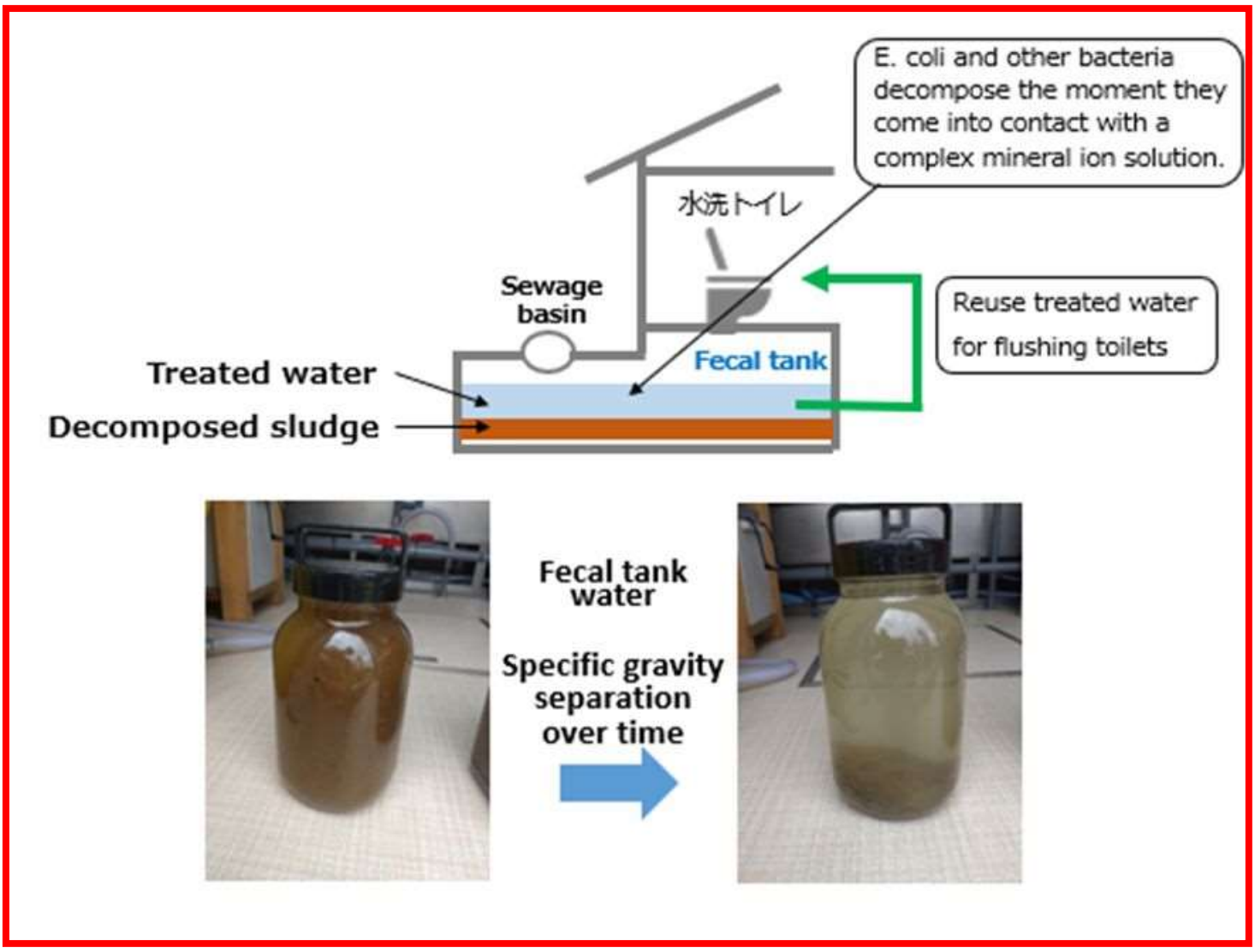
- ✔ Biological treatment requires a power source for stable processing, involving agitation of the treatment tank, temperature control, and the supply of oxygen to adjust environmental conditions.
- ✔ Biological treatment tends to take a relatively longer time for the decomposition of urine.
- ✔ Various treatment devices are necessary in the urine treatment process.

The Mineral Ion Toilet has addressed these challenges

Application of the Mineral Ion System to Toilet Wastewater Treatment

Mineral System Sewage Treatment Flow

Chemical treatment method using complex mineral ions solution



Mineral ion treatment involves a simplified process where the toilet tank is filled with initial water and a composite mineral ion solution acting as a reaction catalyst. Once the tank reaches a specified level, it is simply emptied through pumping.

″Benefits of the Mineral Ion Toilet as Seen in Demonstrated Cases″

″Off-grid Module

Mineral Ion Flushing Toilet ‘Tolestar T’″

"Abiko City, Chiba, Tega-numa Waterside Square"

Since its installation in February 2023 until December of the same year, approximately 12,000 individuals have utilized the facility. Since its introduction, it has received high praise as a practical disaster preparedness facility for everyday use.

The features of the Mineral Ion System Toilet

1. Chemical Processing Method
2. Continuity
3. Safety (Infectious Disease Measures)
4. Water Conservation
5. Resilience

1. Chemical Processing Method

Treating toilets chemically

Rather than solidifying and settling pollutants, the process involves decomposing them through ion exchange, resulting in harmless substances. Subsequently, sedimentation occurs through gravity-based separation.

Add LEPROX to the septic tank.

Composite Mineral Ion Solution (Product Name: LEPROX)

LEPROX is a reaction catalyst solution created by melting and ionizing several natural minerals, imparting them with electrical properties. When added to wastewater, the composite ions react with water (H2O), actively working alongside hydroxyl radicals generated from water. This process facilitates the oxidation and reduction reactions of organic substances dissolved in wastewater, leading to the precipitation and separation of materials.

Differences from Bio-Treatment Methods:
- Not influenced by environmental factors such as temperature and humidity.
- Swift processing speed.

2. Continuity

Power Sources:
- Solar Panels: 380W × 2
- Lithium-ion Batteries: 12V, 120Ah × 3

Adoption of a hybrid system that can receive power from an external source as well.

"Abiko City, Chiba Prefecture – Toilet Operational Status Report"

During the rainy season and adverse weather conditions:
⇒ **Confirmed operational for two consecutive weeks.**

Lake Tega Fireworks Festival:
⇒ August 6, 2023, 17:00 to 21:00
Usage Count: 205 times
No issues observed even with approximately 1.2 minutes of continuous usage.

Energy-saving operational innovations:
- Activation of the device only during toilet use using motion sensors.
- Reduction of power consumption to 42.5W per operation through proprietary processing technology.

3. Safety (Infectious Disease Measures)

Used toilet tank water for 3,600 flushes

株式会社 常 陸

現場名 手賀沼親水広場

試料名 自己完結型トイレ3600回使用器腹水

計量の結果は下記の通りです。

有限会社 ケイ・エヌケミスト
〒277-0863 千葉県柏市高田1114番地5
TEL04-7141-0622 FAX04-7141-0623
計量証明事業登録 千葉県 第656号
計量管理者 環境計量士 奈部川英則

試料の由来	令和 5年 5月 15日に(株)常陸様にて採取・持ち込み。			
計量の対象	計量の結果	定量下限値(単位)	計 量 の 方 法	外注した事業所名及び登録
p H	2.40(20℃)		JIS K 0102 12.1	
B O D	752	0.5(mg/L)	JIS K 0102 21	
C O D	903	0.5(mg/L)	JIS K 0102 17	
塩化物イオン	603	1(mg/L)	JIS K 0102 35.1	
硝酸態窒素及び亜硝酸態窒素	42.0	0.5(mg/L)	JIS K 0102 43.2.1	
アンモニア態窒素	130	0.1(mg/L)	JIS K 0102 42.1・42.2	
色度	1000	1(度)	JIS K 0102 11	
濁度	100	1(度)	JIS K 0101 9.1	
臭気	不快臭		JIS K 0101 8.1	
大腸菌※	不検出		厚生労働省告示第261号別表第二	
大腸菌群数※	<20	個/ml	JIS K 0102 72.3	
	以 下 余 白			

収集し尿および収集浄化槽汚泥の性状[3]

分		収集し尿			収集浄化槽汚泥		
		非超過確率			非超過確率		
		50%	75%	84%	50%	75%	84%
pH		8.0	8.4	8.6	7.0	7.4	7.4
BOD	(mg・l⁻¹)	11,000	13,000	14,000	3,500	5,500	6,800
COD	(mg・l⁻¹)	6,500	7,900	8,600	3,000	4,500	5,600
浮遊物質	(mg・l⁻¹)	14,000	18,000	20,000	7,800	13,000	16,000
蒸発残留物	(mg・l⁻¹)	27,000	32,000	35,000	10,000	16,000	19,000
全窒素	(mg・l⁻¹)	4,200	4,900	5,200	700	1,100	1,400
全リン	(mg・l⁻¹)	480	610	680	110	190	250
塩化物イオン	(mg・l⁻¹)	3,200	3,800	4,200	200	360	540

(注) 浮遊物質は，2 mmメッシュ篩を通過した試料を分析した値〔日本環境衛生センター資料〕

Citation: Nakanishi, Hiroshi Advancements in Urine Treatment: Page 768

拡大

p H	2.40(20℃)
B O D	752
C O D	903
塩化物イオン	603
硝酸態窒素及び亜硝酸態窒素	42.0
アンモニア態窒素	130

Regarding the sewage treatment system, Significantly improved values were measured.
No progression of corrosion was also confirmed.

大腸菌※	不検出

4. Water Conservation

When considering with Truster T in Abiko City, Chiba Prefecture

Truster T
Initial Input Water: 2,000L

Conventional flush toilet:
Approximately 8L × 6,000 times = 48,000L

Water-saving effect of 46,000L (46m3)

Bath: Approximately 153 cups

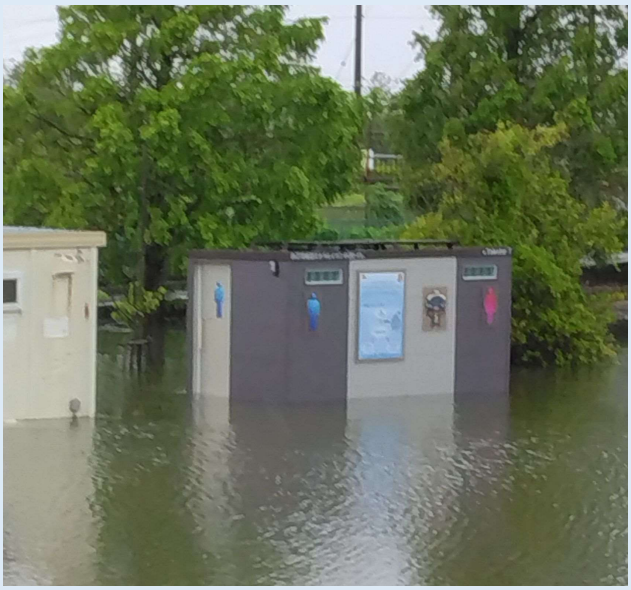
Utilizing recycled water

Reusing treated water for flushing toilets

Required initial input water: Reserved rainwater, Lake and river water – interchangeable with any type of water

5. Resilience

On June 2,2023 , the toilet was flooded due to heavy rain and Typhoon No. 2.



The toilet tank is full due to floor flooding (10 cm).

The electrical components in the machinery room are constructed with general-purpose parts

The restoration was achieved through resetting the toilet tank water and replacing parts. No complaints of unpleasant odors or issues were reported both inside and outside the toilet.

Mineral Ion System proves invaluable during disasters

Disaster operations

The mineral ions reduce feces volume to about **1/100,** turning it into a slurry, easily pumpable using a submersible pump. This process reduces odor, kills E. coli, allowing temporary storage in agricultural tanks until infrastructure is restored.

Final disposal of human waste should be based on administrative rules.

Building a distributed processing system

The flushing toilets we use every day are a system that can only be used when the infrastructure, including water supply, electricity, drainage and sewage treatment facilities, are all functional.

Mineral ion systems are suitable for areas where it is difficult to provide shelter or infrastructure in the event of a disaster because they save power, do not require water supply or drainage, and allow flush toilets.

Products

Tolestar

The mobile flush toilet series "Trestar" is designed to efficiently process a significant volume of waste without daily usage restrictions, even in locations without access to water and power facilities. Powered solely by solar panels and batteries, it can provide almost odorless and sanitary toilets in situations such as disaster shelters and large-scale events where a considerable number of people need access, without the requirement for plumbing or electricity.

Fixed Installation

We design and construct processing systems for fixed installations based on processing capacity and site conditions. It is possible to design systems for combined use with septic tanks and to process approximately 100,000 instances of fecal matter through once-a-year pumping, depending on the processing requirements and site conditions.

Nio1

The temporary booth-type recycling flush toilet "Nio1" series is compact yet capable of approximately 700 uses per processing water .

Hitachi will shape any toilet requests you may have.

Products

Lepott X

Portable Odorless Simple Flush Toilet

While being a portable toilet, it effectively reduces odors through the action of the mineral ion solution and can be used approximately 50 times per processing water. The processed water turns into a slurry, emphasizing ease of subsequent treatment.

Lepott

Portable Odorless Simple Urinal

The action of the mineral ion solution rapidly breaks down urine, achieving a comfortable temporary toilet without the unpleasant smell of ammonia. This results in a toilet that can be used approximately 100 times per processing water.

ZERON

Mineral Ion Deodorizing Solution

A groundbreaking deodorizing solution extracted from natural minerals. Its powerful oxidizing action breaks down microbes and organic matter, the sources of odors, ensuring a safe and effective deodorizing effect.

The Mineral Ion System Toilet has received high praise from toilet experts

“Mineral Ion Toilets Save the World!”

“SDGs Goal 6 aims to ″Ensure access to water and sanitation for all,″ recognizing the global issue of 400 million people practicing open defecation. However, the more pressing concern lies in the scattered disposal of waste, contaminating drinking water and living environments. Moreover, the current situation jeopardizes the lives of many workers involved in waste management.

The technology that transforms waste from a ″dangerous hindrance″ into a ″safe and useful resource″ offers hope in alleviating the suffering of those without proper sanitation and mitigating water conflicts arising from scarcity. This holds potential even in Japan, addressing disaster preparedness and providing comfortable toilet solutions in regions without established sewage systems. The prospect of this is so exciting that it keeps me up at night!”

Masako Shirakuta, Toilet Researcher

Experience the deodorant Toilet

One general incorporated association
Shigen Cafe Systems Representative Director
Naoki Asai Facebook post

″Chiba Daily″ Published Article
Published on August 1, 2023.


業日報 (日刊) 2023年（令和5年）8月1日（火曜日）

臭くない 鉱物溶液で排せつ物処理 きれい

ハイテクトイレが評判

研究者ら視察も

我孫子・手賀沼親水広場駐車場

Save the World
by
Mineral Ion Technology

Always clean water all over the world
Mineral ions that save the world

Manufacturing and sales

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