SEKISUIKASEI

Sustainable Product STAR

Introduction of Products

Sustainable Star Products

The Sekisui Kasei Group (SKG) is committed to practicing the "SKG-5R" which are the 3Rs that contribute to a recycling-based society and the 2Rs that are based on its unique technologies, in order to realize a sustainable society through its business activities.

SKG-5R

3Rs for the creation of a recycling-based society

Reduce
Reduce the use of resources and energy

Reuse
Reuse waste materials and energy

Recycle
Develop recycling technologies and systems to promote recycling

2Rs based on the Sekisui Kasei Group's unique technologies

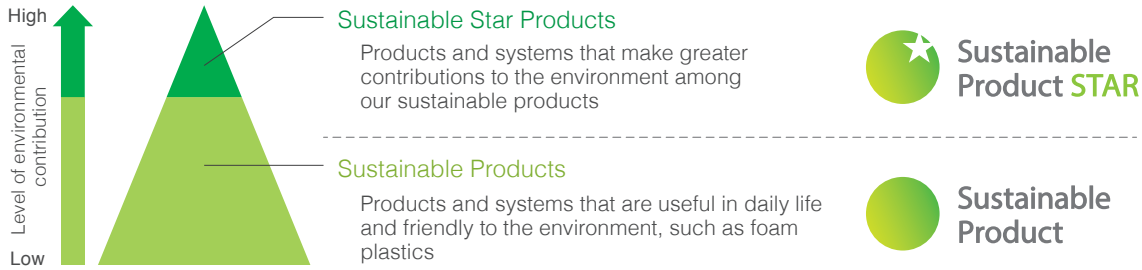
Replace
Promote replacement with sustainable materials and energy

Re-create
Re-Create value and functions to contribute to environmental improvement

The Sekisui Kasei Group defines "Sustainable Products" as products that take into consideration the reduction of environmental impact and the finiteness of resources throughout their life cycles, from the procurement of materials and use of the products to their disposal and recycling.

We certify those products among our sustainable products that make even greater contributions to the environment as "Sustainable Star Products", aiming to promote the creation and market expansion of those products.

Through "SKG-5R", we will continue to work on the improvement of existing products and practical applications of new materials with the goal of increasing the number of registrations to a cumulative total of 100 and the share of the sales of such products to total group sales to 20% by FY2030.



Create Sustainable Star Products and expand their market

Targets for FY2030

Total number of registrations	Share of total sales
100	20%

Examination / Certification

For a product to be registered as a Sustainable Star Product, the department in charge of the product will file an application to the Environmental Committee for its review. Products that have met the internal criteria will subsequently be submitted to the board meeting, and the products that are then approved by the president, directors and executive officers will be certified and registered as Sustainable Star Products. In addition, the validity of this certification and operation is evaluated by a third party.

Flow for examination, certification and registration

Development	Application	Examination	Approval	Certification / Registration
	Application filed by the dept. in charge	Examination by the Environmental Committee	Approval by the president, directors and executive officers at a management meeting	

Certification Criteria

We have set detailed criteria for each environmental contribution item for the certification. Products and systems that exceed certain predefined level shall be certified as “Sustainable Star Products.”

Environmental contribution item		Contribution at the development / design and raw material procurement stages	Contribution at the production stage	Contribute at the shipping (transportation) stage	Contribute at the use stage	Contribution at the disposal / recycling stage
Reduce	• Weight and space reduction • Reduction of the amount of waste after product use • Reduction of hazardous substances and volatile solvents • Reduction of greenhouse gases • Reduction of other environmental loads in development and design	●				
	• Energy saving and reduction of CO_2 emissions during production • Reduction of water resource use during production • Reduction of waste during production		●			
	• Energy saving during transportation (established as a system)			●		
	• Energy saving and improved durability (longer life) during use • Reduction of other environmental loads during use				●	
Reuse	• Reusability				●	
Recycle	• Use of recycled materials • Higher recyclability (e.g. easier to sort)	●				
	• Establishment of an independent recycling system					●
Replace	• Use of biomass raw material • Substitution of oil-derived materials	●				
Re-create	• Contribution to environmental improvement by the re-creation of new value and functions	●	●	●	●	●
Other environmental contributions	• Offset of environmental load and support for environmental conservation activities	●				

Introduction of Sustainable Star Products

Sustainable Star Products are widely used as products of our Human Life segment and Industry segment, and as materials used in these products.

Material

Reduce Replace Re-create

ELASTIL™ BIO

Thermoplastic elastomer foam

Biomass content 45% or more

Biomass Mark No.190138

Biomass Mark:
This mark is attached to eco-friendly products that are certified by the Japan Organics Recycling Association as conforming to relevant laws, regulations, standards, criteria, etc. in terms of quality and safety through the use of resources derived from organisms.

ELASTIL BIO is a foam molded product of beaded thermoplastic elastomer with a Biomass content of 45% or more, using a plant-derived material made from castor beans.

This product maintains the features of ELASTIL, which is as light as expanded polystyrene, as elastic as rubber, and as soft as polyurethane, enabling a 50% reduction in product weight compared to competitive non-foamed products using a petroleum-derived material.

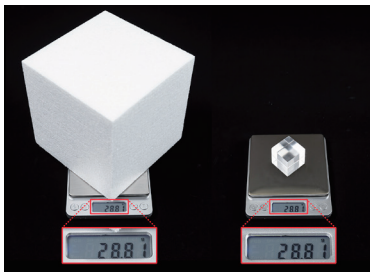
Material

Reduce

ESLEN Beads HCMH Foam with 100 times expansion rate

Product weight 10% reduction

ESLEN Beads HCMH is polystyrene bead foam that has achieved an expansion ratio of 100 times. Conforming to the positive list system for food utensils and containers/packaging, this product reduces the weight by a further 10% compared to conventional foam molded products of high expansion ratio (90 times) as well as reducing the amount of plasticizer added by 36%.



Foam with 100 times expansion rate

Non-expanded polystyrene resin

As a buoyancy material for aquatic solar systems

The foam with 100 times expansion rate, which has excellent buoyancy and rigidity, contributes to the popularization of aquatic solar systems as a buoyancy material.

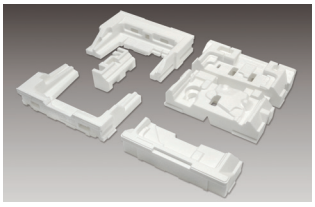
Material

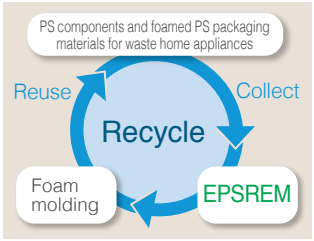
Reduce Recycle

EPSREM™

Expandable polystyrene beads made from 100% recycled materials

Recycled materials 100% used





EPSREM is 100% recycled expandable polystyrene beads made from polystyrene (PS) components and expanded polystyrene molded products used in discarded home appliances such as TVs and refrigerators, which were collected and converted into raw materials using our unique recycling system.

Compared to commonly used expandable polystyrene beads using virgin raw materials, this product reduces CO_2 emissions by 62% in the entire process from raw material production to commercialization.

Eco Mark certification achievable with EPSREM molded products

It is possible to obtain the Eco Mark certification as products using recycled materials with EPSREM molded products.

- Eco Mark product: NFB (EPSREM Returnable Box)

Eco Mark Product

Eco Mark:
This mark is attached to products and services that are recognized by the Japan Environment Association as instrumental in achieving environmental conservation.

*The values shown below are calculated and compared by our company.

Industry segment

Reduce Re-create

CMT bathtub pan

Unit bath flooring

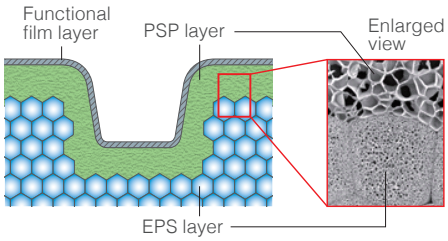
Product weight 75% reduction

The CMT bathtub pan is a composite molded product that combines the bead method expanded polystyrene foam (EPS) and the extrusion method expanded polystyrene sheet (PSP) with a film layer laminated on the surface. This product has EPS's properties such as high heat insulation, lightweight, and shape-imparting, and PSP's properties such as surface designability and waterproofness.

It is a highly heat-insulating bathtub flooring material that improves the heat retention performance of the bathtub and is approximately 75% lighter than competing FRP products.

■ CMT (Composite Molding Technology)

Configuration cross section



Human Life segment

Reduce

AQUAROAD™

Rainwater storage infiltration tank

CO_2 57% reduction

AQUAROAD is a rainwater storage infiltration tank to prevent damage from flooding of roads and overflowing of rivers in the event of torrential rains.

In addition to making effective use of the underground space of the road, this product reduces CO_2 emissions by 57% in the entire process from the production of raw materials to the completion of construction compared to conventional concrete water storage tanks.

Human Life segment

Usage image

Reduce Re-create

EPS Slope

Lightweight leveling ramp

CO_2 79% reduction

EPS Slope is a lightweight leveling ramp that was jointly developed with Metropolitan Expressway Co., Ltd. to enable rapid emergency recovery of damaged parts caused by an earthquake.

Since this product is lightweight, it can save energy during construction without the need for heavy machines, and it can also be stored and transported in sections.

This product reduces CO_2 emissions by about 79% (about 1,390 kg-CO_2) per set for 30cm level difference elimination compared to the conventional method of level difference elimination using sandbags and laid iron plates.

Industry segment

Reduce

TECHEATER™

TECHEATER is a self-output control, parallel-circuit tape-like heater that uses PTC ceramics as a heating element. Since its output is self-controlled in response to environmental temperature, it does not consume unnecessary power and there is no worry of overheating. Thus, this product can be safely used in various applications such as snow melting, anti-freezing, and temperature control. Compared to the combination of a commonly used electrothermal heater and a thermostat, CO2 emissions during product use can be reduced by approximately 30%.

Reduce Re-create

ST-LAYER™ Wind power generation blade

ST-LAYER is a composite foam molded product that combines fiber-reinforced plastic and foam molded product. This product is made from a tough structural material with a high level of strength that can contribute to weight reduction and can be adapted to various applications.

The wind power generation blade made with ST-LAYER is 80% lighter than steel ones and 60% lighter than aluminum ones when comparing the same strength, contributing to improving the durability of wind turbine generators and saving resources.

Reuse

PIOCELAN™ Flat-panel TV glass panel transporting container

The flat-panel TV glass panel transporting container molded with PIOCELAN can be reused repeatedly as a transporting container with excellent impact resistance and shock absorption properties. This product can improve the loading efficiency with our proprietary design technology, which contributes to energy saving during transportation.

PIOCELAN is a high-performance foamed resin that combines polystyrene and polyolefin using Sekisui Kaseis' proprietary polymer hybrid technology.

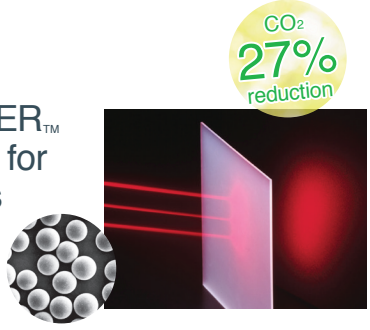
Reuse

PIOCELAN™ Packing material for transporting automobile parts

The packing material for transporting automobile parts molded with PIOCELAN can be reused repeatedly as a transporting container with excellent impact resistance and shock absorption properties. By the efficient packing design that meets various transportation conditions while maintaining the function to safely transport automobile parts without damage, this product improves the loading efficiency and contributes to energy saving during transportation of automobile parts.

Reduce

TECHPOLYMER™ Microparticles for lighting covers



TECHPOLYMER is spherical polymer microparticles with excellent light transmission and adjustable refractive index. A lighting cover using TECHPOLYMER as a light-diffusing material can achieve the same brightness with less power consumption than a lighting cover using inorganic particles, thus reducing CO_2 emissions by 27% when lighting is used.

Reduce

TECHPOLYMER™ Cosmetic grades

TECHPOLYMER Cosmetic grades are used as an additive for cosmetic products by improving its safety for living body. Its residual monomer has been reduced to less than 1/100 compared to TECHPOLYMER Industrial grade, which contains very small amount.

Reduce

TECHTELAS™

TECHTELAS is an LED lighting system that utilizes the optical know-how accumulated through the development of spherical microparticles TECHPOLYMER. This product reduces CO_2 emissions during lighting use by 50% compared to fluorescent lamps and is available in various types to solve problems in a variety of lighting-related situations.

Reuse

ST-gel™ Electrodes for low-frequency therapy equipment

Electrode pads with minimal skin irritation using our hydrogel technology. This pad can be reused repeatedly by washing it with water.

Recycle

CELEPET™ F

CELEPET F is a packing material thermoformed from a foamed PET sheet that uses 80% or more of used plastic bottle flakes as a raw material. This product is a recyclable package with a small environmental load.

Reduce

NEO-MICROLEN™ SHE

NEO-MICROLEN SHE is a non-cross-linked, highly foamed polypropylene sheet with a long-lasting antistatic function. This product can be used as a surface protection material for digital home appliances and electronic components. Through the development of our proprietary foaming technology, a weight reduction of 30% or more compared to conventional products has been achieved by further increasing the foam expansion rate while maintaining the required quality of the product.

Re-create

FRAHASANA™

FRAHASANA is a jelly-type face pack that contains three extracts: naturally derived yogurt extract, marine collagen, and squalane. As a cause-brand product, FRAHASANA contributes to animal welfare and protection activities by donating a part of sales proceeds.

Human Life segment

Recycle

ESLEN Wood Panel RC Panel

Eco Mark Product

These panels are made of expanded polystyrene processed into a flat plate, and it is an Eco Mark certified product that uses more than 50% recycled resin as a raw material. It has the same processability and quality as conventional panels using virgin raw materials, and the whiteness of the finished product remains unchanged. It can be widely used for POP, advertising, displays, store presentations, models, crafts, etc.

Recycle

ESLEN Sheet Product made from recycled materials

ESLEN Sheet is an extrusion method expanded polystyrene sheet that uses 25% or more of recycled polystyrene as a raw material. This product has the same heat insulation properties and processability as conventional sheets using virgin raw materials; therefore, it can be used as a panel base material.

Reuse

ESLEN Container

ESLEN Container is an insulated container that uses foamed polyurethane with excellent heat and cold retention properties as the core material, and non-foam polypropylene for the interior and exterior.

This product is highly impact resistant, hygienic, durable, and adhesive-free, so it can be safely reused repeatedly as a container for food delivery or temporary food storage.

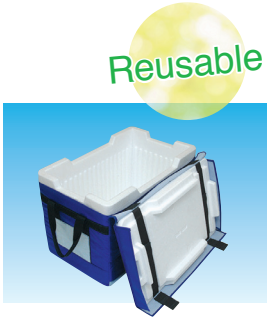
Reuse

Insulated Foldable Container

Insulated Foldable Container is a container that can be easily folded while maintaining the features of the ESLEN Container such as excellent heat insulation, hygiene, and reusability. This product can be folded to save 60% of space when not in use as a container, contributing to energy saving during transportation by reducing storage space and improving loading efficiency.

Reuse

SET BOX™



SET BOX is a collective transporting container for frozen food that can be reused repeatedly by using PIOCELAN, which has excellent impact resistance.

This product contributes to quality control and energy saving in integrated logistics from precooling to cold storage, as the inside of the container can be quickly maintained at a constant temperature by using our proprietary design technology.

Reduce

KATAEMON™

KATAEMON is a heat insulation material that can be used as formwork for thermal storage tanks to form an underground thermal storage layer in office buildings, etc. This product is a heat insulating material made of expanded polystyrene that is strong enough to be used as a casting formwork, and it contributes to resource-saving and energy-saving (shorter construction period) by eliminating the need for dismantling and removing the formwork and disposing of the formwork plywood, which were previously necessary.

Reduce

ES Dan Mat LV

ES Dan Mat LV is a heat insulating material made of self-extinguishing bead method expanded polystyrene, which has high heat insulation properties even at low density. The content of volatile organic compounds (VOC) has been significantly reduced compared to conventional grades by improving the structure of the polymer and optimizing the formulation of foaming agents, etc.

Reuse

SUPER SOILEN SYSTEM™

Eco Mark Product

SUPER SOILEN SYSTEM is a greening method using New SOILEN (lightweight drainage material), which is made from 100% crushed grains of used expanded polystyrene. This product contributes to urban landscaping and heat island countermeasures by reducing the load on buildings with its lightweight artificial soil.

New SOILEN is an Eco Mark certified product.

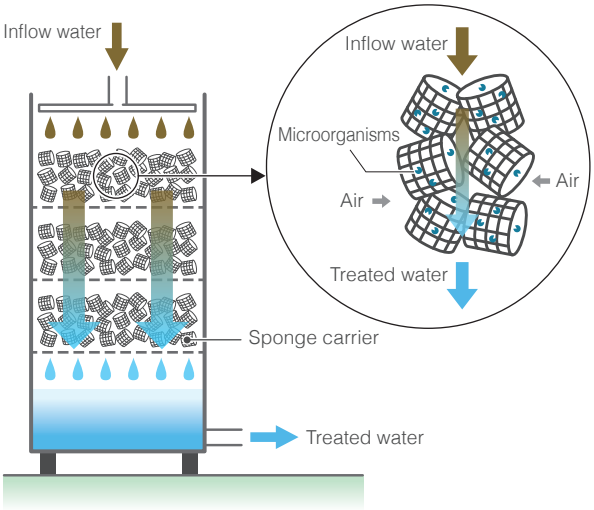
Reduce

Sponge carrier for DHS water purification system

This product is a sponge (polyurethane foam with a continuous foam structure) carrier for the DHS water purification system, which has excellent water retention capacity and can easily maintain a high concentration of microorganisms that purify sewage. It contributes to the reduction of environmental load in rivers and other water areas by efficiently purifying industrial wastewater and community domestic wastewater at low cost.

■ DHS : Down-flow Hanging Sponge

Conceptual diagram of DHS water purification system



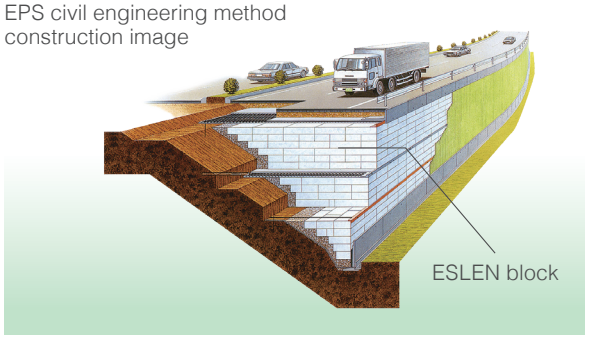
Reduce

ESLEN Block for EPS civil engineering method

The EPS civil engineering method is a lightweight embankment method in which large-sized expanded polystyrene (EPS) blocks are stacked to construct an embankment. The ESLEN blocks are lightweight*, portable by manpower, and self-supporting. By using these blocks as an embankment material, the lateral pressure acting on the wall surface is greatly reduced, and materials such as concrete used for retaining walls can be reduced. In addition, this construction method does not require large-sized heavy machines, so construction can be carried out in a short period of time without large-scale temporary construction even at sites with severe construction conditions, thereby contributing to energy saving during construction. Compared to the air bubble mixed lightweight soil used as a lightweight embankment material, CO_2 emissions can be reduced by 48% in the process from the production of raw materials to the completion of construction.

*The weight of a 1m x 2m x 0.5m ESLEN block (expansion ratio : 50 times) is 20kg.

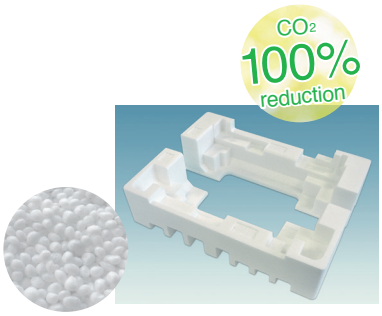
EPS civil engineering method construction image



Materials

Reduce Recycle

EPSREM™ ERX-ZERO



EPSREM ERX-ZERO is expandable polystyrene beads that eliminates CO_2 emissions during the production of EPSREM through carbon offsetting. Compared to commonly used expandable polystyrene beads made from virgin raw materials, this product is a carbon-neutral material that reduces CO_2 emissions by 100% in the process from raw material production to commercialization.

Reduce Re-create

ELASTIL™

ELASTIL is a beaded thermoplastic elastomer foam molded product that is as elastic as rubber, as light as expanded polystyrene, and as soft as polyurethane (PU). Taking advantage of its lightweight, flexibility, high resilience, elasticity, and other excellent properties, this product can be deployed in various fields and applications such as sports, nursing care, and welfare. The weight of the product can be reduced by 50% compared to non-foam PU/EVA* competitive products.

*EVA: Ethylene-Vinyl Acetate Copolymer

Reduce Re-create

ST-Eleveat™

ST-Eleveat is a heat-resistant, flame-retardant foam made mainly from engineering plastics and super engineering plastics, and it can reduce the weight by 80 to 90% compared to non-foam resin molded products. This product is especially suitable for use under high temperature environment, and is a highly heat-resistant, high-strength, lightweight structural member that can be used in areas subject to high temperatures, such as the engine compartment, which was difficult with conventional products.

Reduce Replace Re-create

ST-Eleveat™ BIO

Biomass Mark
No.200047

ST-Eleveat BIO is a product with a biomass content of 25%, by using a plant-derived high heat-resistant material as the base material of ST-Eleveat. By using our proprietary foaming technology, we contribute to the realization of a sustainable society by replacing petroleum-derived raw materials with sustainable plant-derived resources.

Replace

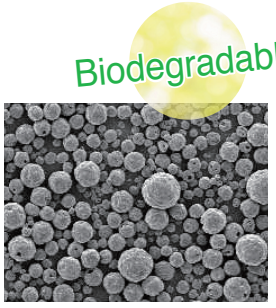
LIGHTLON™ BIO

Biomass Mark
No.190403

LIGHTLON BIO is a non-cross-linked, highly foamed polyethylene sheet that uses plant-derived polyethylene and has a biomass content of 10% or more. This product is a material as soft, cushiony and excellent in heat insulation, moisture and water resistance, and chemical resistance as conventional products, which can be used for various applications such as packaging materials, agricultural materials, and miscellaneous goods.

Reduce Replace

TECHPOLYMER™ BIO



TECHPOLYMER BIO is biodegradable polymer microparticles that are degraded in the natural environment. It has been developed from the perspective of global environmental conservation as a preventive measure against marine pollution caused by the increasing threat of microplastics in recent years. This product is available in grades with excellent degradation in water and in soil.

Sustainable Star Product List

34 registered items (as of the end of March 2021)

	Product name	Reduce	Reuse	Recycle	Replace	Re-create	Environmental contribution content (certification basis)
Industry segment	CMT bathtub pan	●				●	Weight reduced by approx. 75% compared to competitive FRP products
	TECHEATER™	●					Approx. 30% reduction in CO_2 emissions during product use [Comparison: Commonly used electrothermal heaters]
	ST-LAYER™ Wind power generation blade	●				●	80% lighter than steel ones and 60% lighter than aluminum ones when comparing the same strength
	PIOCELAN™ Flat-panel TV glass panel transporting container		●				Repeated use
	PIOCELAN™ Packing material for transporting automobile parts		●				Repeated use
	TECHPOLYMER™ Microparticles for lighting covers	●					27% reduction in CO_2 emissions compared to inorganic diffusing agents
	TECHPOLYMER™ Cosmetic grades	●					Residual monomer reduced to less than 1/100 [Comparison: Industrial grades]
	TECHTELAS™	●					250% reduction in CO_2 emissions during product use [Comparison: Fluorescent lamps]
	ST-gel™ Electrodes for low-frequency therapy equipment		●				Repeated use
	CELEPET™ F			●			80% of used plastic bottle flakes as a raw material
	NEO-MICROLEN™ SHE	●					More than 30% weight reduction by high foaming [Comparison: Conventional products]
	FRAHASANA™					●	Cause-brand product (A part of the sales proceeds is donated to animal welfare and protection activities)
Human Life segment	AQUAROAD™	●					57% reduction in CO_2 emissions from raw materials to product use
	EPS Slope	●				●	Newly conceived disaster recovery item without the need for heavy machines Approx. 79% reduction in CO_2 per set of 30cm level difference elimination [Comparison: Sandbags and laid iron plates]
	ESLEN Wood Panel RC Panel			●			25% or more recycled resin used (Eco Mark certified)
	ESLEN Sheet Product made from recycled materials			●			25% or more recycled polystyrene used
	ESLEN Container		●				Repeated use
	Insulated Foldable Container		●				Repeated use
	SET BOX™		●				Repeated use
	KATAEMON™	●					Ideas for eliminating waste without the need to dismantle formwork
	ES Dan Mat LV	●					73% reduction in CO_2 emissions from raw materials to product use [Comparison: No heat insulation material used]
	SUPER SOILEN SYSTEM™		●				100% crushed grains of used expanded polystyrene
	Sponge carrier for DHS water purification system	●					Environmental load reduction in water bodies
	ESLEN Block for EPS civil engineering method	●					48% reduction in CO_2 emissions from raw materials to product use [Comparison: Air bubble mixed lightweight soil]
Material	ESLEN Beads HCMH Foam with 100 times expansion rate	●					Product liability compliance and 36% reduction in plasticizer additives [Comparison: Molded products with 90 times expansion rate] 10% reduction in weight per cubic meter of molded product [Comparison: Molded products with 90 times expansion rate]
	EPSREM™	●		●			100% recycled resin + Proprietary recycling system
	EPSREM™ Returnable Box	●		●			EPSREM + Eco Mark certified product
	EPSREM™ ERX-ZERO	●		●			EPSREM + Carbon offset
	ELASTIL™	●				●	50% reduction in weight compared to non-foam PU/EVA competitive products
	ELASTIL™ BIO	●			●	●	ELASTIL + Biomass content of 45% or more (Biomass Mark certified)
	ST-Eleveat™	●				●	80 to 90% reduction in weight compared to non-foam competitive products
	ST-Eleveat™ BIO	●			●	●	ST-Eleveat + Biomass content of 25% (Biomass Mark certified)
	LIGHTLON™ BIO				●		Biomass content of 10% or more (Biomass Mark certified)
	TECHPOLYMER™ BIO	●			●		Biodegradable polymer microparticles decomposed in the natural environment

Sekisui Kasei Co., Ltd.
https://www.sekisuikasei.com/en

Contact Us
Investor and Public Relations Department, Corporate Strategic Headquarters
2-7-1 Nishi-Shinjuku, Shinjuku-ku, Tokyo 163-0727, Japan
TEL: +81-3-3347-9711

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