Research & Development/Intellectual Property

Research & Development

28 Technological Platforms

SEKISUI CHEMICAL Group recognizes that maintaining prominence in technology is the bedrock for creating value. In particular, six essential technology groups related to the Residential and Social Infrastructure Creation and Chemical Solutions business fields, as well as 28 more specific technological platforms (TPF), form the foundations of our value creation.

In 2014, SEKISUI CHEMICAL Group identified the TPF as the Group-wide basis for technology development. While refining our prominence in each of these technologies, we are developing products and services that reflect the collective strengths of multiple TPFs while anticipating changes in society and demand and are engaging in various activities including the development of technical human resources. In aiming for sustainable growth amid the changing business environment, we periodically revise the TPF when formulating each Medium-term Management Plan.

Achieving Peace of Mind Even during Disasters without Purchasing Electricity as far as Possible!

Energy self-sufficient homes

High-capacity solar power systems, film-type storage batteries, and home energy management systems (HEMS) are installed on modular frames with high earthquake resistance, high heat insulation, and high airtightness. Lifestyles that use natural energy as far as possible contribute to the global environment, and at the same time, allow evacuation to housing with peace of mind during disasters.

TPF
- Housing production/construction/method
- × Energy management
- × Acoustic/thermal/air quality management
- × Infrastructural/functional materials
- etc.

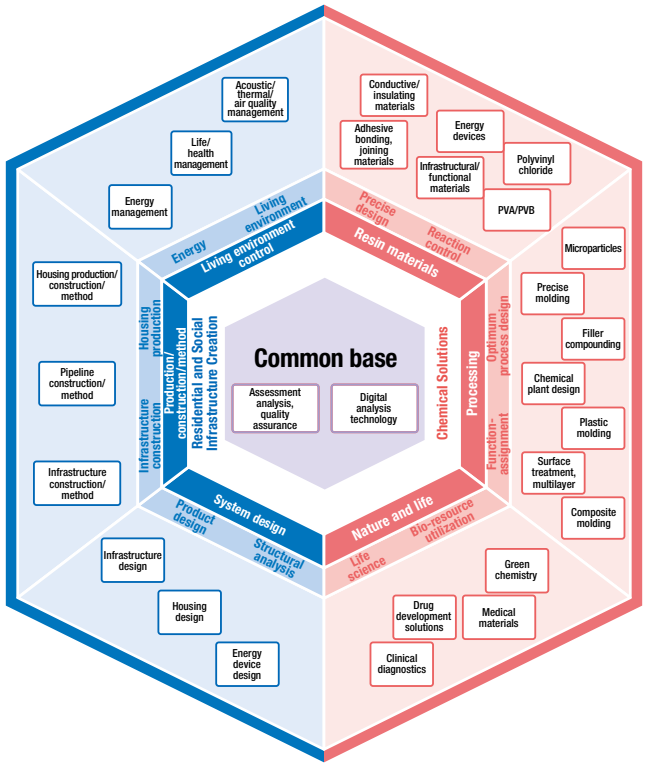
Proprietary Rain Water Drain Pipe Design Achieves High Drainage Performance, Ease of Installation, and Economy!

ESLON Large High-capacity Drainage System

The ESLON Large High-capacity Drainage System combines a Choshin rain gutter with a high-strength, low-expansion PET ultra-extruded sheet core and specially developed parts. The original drain system design uses the siphon principle to achieve high drainage capacity, which makes it possible to reduce the size and number of downpipes compared to earlier systems, offering exceptional ease of installation and economy and contributing to solving various social issues.

TPF
- Plastic molding
- × Surface treatment, multilayer
- × Infrastructure design
- etc.

28 Technological Platforms



Contributing to Higher Healthcare Quality through Faster and More Precise Testing

Nanopia IL-2R blood-soluble interleukin-2 receptor test reagent

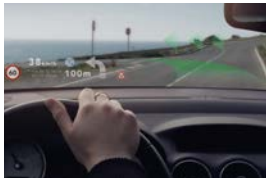
Highly precise fine particles (latex) and antibody acquisition and purification technology enable appropriate diagnosis and follow-up of blood cancers as well as simpler and faster testing.

TPF
- Clinical diagnostics
- × Microparticles

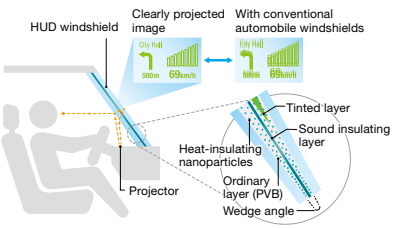
Contributing to the Enhanced Safety and Comfort of Automobiles!

S-LEC Sounds and Solar Film-W: Wedge-shaped sound insulation/heat shielding interlayer films for Head-up Displays (HUDs)

Wedge-shaped interlayer films for HUDs are used to display necessary information on automobile windshields and also have sound and heat insulating functions. By combining various technologies including wedge angle control technology, multilayer extrusion technology, and raw material mixing and nano-dispersion technology, we achieved multiple functions at high levels, contributing to the enhancement of automobile comfort and safety.



TPF
- PVA/PVB
- × Microparticles
- × Precise molding
- × Surface treatment/multilayer
- etc.



Research & Development/Intellectual Property

R&D and Intellectual Property Management System

Under our Long-term Vision, we have identified four domains. We are undertaking the challenge of innovations that leverage our core technologies in each domain with the aim of expanding existing businesses and creating new businesses.

The R&D and intellectual property management system that supports this is in place in each segment to enable timely activities in line with each business environment, and is consistent from the stage of acquiring customer needs to the creation of products and businesses by incorporating the perspective of solving social issues in R&D.

Corporate Headquarters is now in charge of medium- to long-term themes, the R&D Center specializes in breakthroughs, and the New Business Development Department is in charge of promoting commercialization. After launching each theme as a business, a system is in place that facilitates the prompt transfer of control to a divisional company.

In addition, the Innovation Promotion Group and the CVC Team* are investing in venture companies as a part of efforts to actively promote exchange and the development of businesses. This in turn is aimed at creating new businesses.

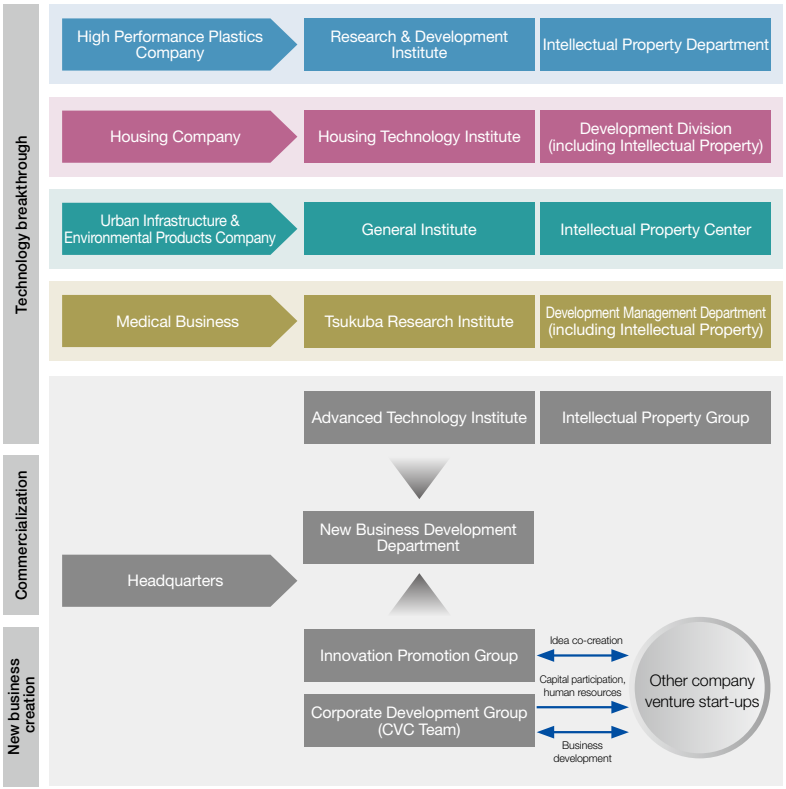
* Corporate Venture Capital (CVC): Venture investment activities by business companies.

Treatment of Human Resources Engaged in R&D

In addition to paying monetary incentives for inventions made by employees, the Technology Award and Invention Grand Prize have been established as a part of our efforts to ensure researchers and engineers receive the evaluations and recognition they deserve.

The Group has also established a specialist position system for researchers and engineers with highly specialized skills.

We appoint prominent human resources with a high level of expertise that is competitive both within and outside the Company to specialist positions. In deepening their skills and developing future employees, these human resources serve as the main source of added value that will become the wellspring of our competitiveness. As of July 2022, 38 people have been appointed. Moving forward, we are promoting technology platform strengthening initiatives with a long-term perspective.



Reference 28 Technological Platforms

Category			Technological Platform	Overview
Residential and Social Infrastructure Creation	System design	1	Infrastructure design	Builds long-lasting, earthquake-resistant pipe systems and other infrastructure.
		2	Housing design	Provides safe, secure housing that is resistant to natural disasters for both new and renovated houses.
		3	Energy device design	Develops energy creation and energy storage systems to achieve a sustainable society.
	Production/ construction/ method	4	Housing production/construction/method	Further evolves the Unit Construction Method and provides high cost performance housing.
		5	Infrastructure construction/method	Develops simple construction methods and repair/reinforcement technologies that shorten onsite construction periods.
		6	Pipeline construction/method	Develops optimal pipe systems and develops pipeline rehabilitation methods for rehabilitating aging sewage pipes.
	Living environment control	7	Acoustic/thermal/air quality management	Provides quiet, comfortable living environments.
		8	Life/health management	Evaluates and designs products and environments that help increase the QOL of consumers.
		9	Energy management	Contributes to the environment through the effective use of solar panels and storage batteries, and protects daily life during natural disasters.
Chemical Solutions	Resin materials	10	Adhesive bonding, joining materials	Provides products with a good balance between tack, adhesion, and holding power according to the application.
		11	Conductive/insulating materials	Provides sheets and adhesives with conductive and insulation properties.
		12	PVA/PVB	Grants sound insulation, heat insulation, and other functions to interlayer films for laminated glass, etc.
		13	Polyvinyl chloride	Improves the durability, impact-resistance, chemical resistance, and other properties of PVC resin.
		14	Energy devices	Develops high-performance storage battery materials and solar cell materials.
		15	Infrastructural/functional materials	Further improves the functionality of products for the infrastructure that supports daily life and society.
		16	Microparticles	Provides microparticles with unique features through particle size control and functionalization.
	Processing	17	Precise molding	Extrusion, expanding, stretching, and other precision resin processing methods.
		18	Filler compounding	Expresses new functions by mixing resins with fillers of different sizes in an optimal manner.
		19	Chemical plant design	Develops agitation, separation, drying, and other process technologies that enable safe, consistent production of chemical products.
		20	Plastic molding	Develops extrusion, injection molding, and coating technologies for efficiently producing plastic products at low cost.
		21	Surface treatment, multilayer	Provides manufacturing methods, including optimal surface treatments and multilayers, that modify surfaces and grant functionality.
		22	Composite molding	Develops products with new functions realized by compounding different materials.
	Nature and life	23	Green chemistry	Aims to free resin raw materials from their dependence on petroleum to achieve a sustainable society.
		24	Clinical diagnostics	Provides medical diagnostics reagents in the priority disease areas of lifestyle-related diseases and infectious diseases.
		25	Drug development solution	Supports drug development using sophisticated technical skills in everything from screening tests to molecular tests.
		26	Medical materials	Provides pharmaceutical ingredients, medical amino acids, and other substances that serve as the active ingredients in pharmaceuticals.
Common base		27	Assessment analysis, quality assurance	Ensures quality through state-of-the-art assessment analysis for highly advanced materials and safe, secure product development.
		28	Digital analysis technology	Engages in innovative material development by leveraging materials informatics.

Research & Development/Intellectual Property

Intellectual Property

Fundamental Policy

The intellectual property derived from R&D activities is the source of competitiveness and an important management resource that underpins SEKISUI CHEMICAL Group's growth and revenue aimed at optimizing corporate value. At SEKISUI CHEMICAL Group, to utilize the prominence of our technology to its fullest potential and contribute to our business, we conduct competition environment analysis using information related to intellectual property, markets, and competition, and this serves as a starting point for our strategy development, intellectual property portfolio management, and other strategic intellectual property promotion activities.

In addition, we have been working on applications for digital transformation for some time and are now proactively branching out into new intellectual property trends such as materials informatics and AI.

Through the activities above, we are contributing to growth and creation for our business in the intellectual property field in the Medium-term Management Plan, Drive 2022.

Fostering an Intellectual Property Mindset

With the goal of increasing employee awareness of intellectual property, we started a system in fiscal 2010 that grants P-Badges to those who submitted a certain number of patent applications. Currently, our corporate culture considers it a matter of course for all engineers to earn one.

There are a variety of awards systems in place for intellectual property activity achievements, and in addition to awards for inventions that contribute to profits, there are others that use different criteria such as number of patent applications in a year, invention originality, and strength of the application network. We also give awards for actions utilizing licenses and rights, such as earning license revenue and blocking the entry of other companies. These awards systems are intended to increase employee motivation related to intellectual property.

Within this awards framework, there is a special company president award called the Invention Grand Prize, which recognizes the achievements of inventors whose inventions make major contributions to profit for the Group as a whole. The Invention Grand Prize is divided into four grades ranging from Special Class to 3rd Class, assigned depending on the extent of the invention's profit contribution, and there are bonuses awarded to winners for each grade. The Special Class bonus has no upper limit and is instead defined as a ratio of the profit contribution amount.

This system has been in place since fiscal 1999 and is now in its 22nd year. In fiscal 2021, a third-class certification was granted for a patent related to profiles for the SPR-SE method.

Intellectual Property Training for Employees

We have prepared several educational programs tailored to the level of each developer for engineers during their first three years that covers essential topics ranging from fundamentals of intellectual property to strategy development and is implemented at all companies.

In addition, we provide individual specialized education programs for each divisional company to cultivate practical skills in line with their business. For trademarks and branding issues, the target group for education programs is expanded to include marketing and sales staff as well.

Group-wide Intellectual Property Application (IP Landscaping)

SEKISUI CHEMICAL Group engages in analysis activities that combine markets and technology information with a focus on intellectual property (IP landscaping). This approach supports strategy planning and intellectual property portfolio enhancements in departments that work to strengthen the business competitiveness of existing products, as well as those that create new products and businesses. Meanwhile, it also aids decision-making when undertaking high-level management and business assessments, such as M&As, so we promote the use of this approach throughout the Group.

Performance Data

In each of the recent rankings for Patent Asset Scope and Ability to Restrain Other Companies announced by Patent Result Co., Ltd., the Company ranked fourth in the chemical industry. SEKISUI CHEMICAL has maintained a position in the top 10 for the past five years.

Patent Asset Scope 2020 Ranking

Ranking	Company name	Patent asset scope (points)	Number of patents
1	Fujifilm	60,665.0	1,188
2	LG Chem	25,886.0	658
3	Sumitomo Chemical	25,202.7	464
4	**SEKISUI CHEMICAL**	**19,694.4**	**507**
5	Kao	18,503.7	588
6	DIC	17,854.4	325
7	Mitsubishi Chemical	14,404.1	490
8	Nitto Denko	13,332.0	359
9	Asahi Kasei	13,129.0	315
10	Hitachi Chemical*	12,612.4	353

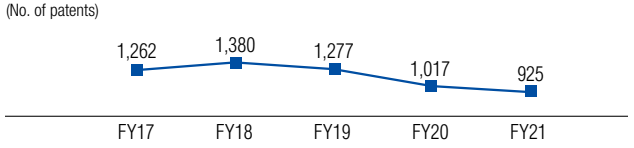
Source: Patent Result Co., Ltd.
"Chemical Industry: Patent Asset Scope 2020 Ranking"
* Currently Showa Denko Materials Co., Ltd.

Ability to Restrain Other Companies 2021 Ranking

Ranking	Company name	Number of patents
1	Fujifilm	4,001
2	Mitsubishi Chemical	1,887
3	Kao	1,597
4	**SEKISUI CHEMICAL**	**1,262**
5	Nitto Denko	1,165
6	Asahi Kasei	1,025
7	Showa Denko Materials	995
8	Sumitomo Chemical	968
9	DIC	755
10	Mitsui Chemical	734

Source: Patent Result Co., Ltd.
Chemical Industry: Ability to Restrain Other Companies 2021 Ranking

Number of Patent Applications (domestic)



Number of Patents Possessed (domestic and international)