



Chemistrify the Bonds

ARAKAWA CHEMICAL INDUSTRIES, LTD.



Message from the President

We have made continued and tireless efforts for more than 140 years since the company's establishment in 1876, with pine chemical - chemistry of the natural resin gum rosin (pine resin) as its core technology. This has been achieved through the support of all parties with stakes in our company including our shareholders, business partners, and the local community. As such, we would like to express our deepest gratitude for the support offered by all parties.

We have developed and provided our customers with products that contribute to daily life such as chemicals for paper manufacturing, resins for printing inks, and resins for adhesives, by means of sustainable materials represented by rosin and our proprietary technologies cultivated over years.

Arakawa Chemical Group is determined to become a chemical manufacturer that supports the "REAL" and "DIGITAL" world. For our further growth, we produce materials related to life science in a sustainable ecosystem. In addition, we have been reorganizing our business portfolio as well as reinforcing our core technologies such as water-based polymer and hydrogenation technology.

Beginning in April 2021, we have commenced our 5th medium-term management plan, whose slogan is "**V-ACTION for sustainability**". We will promote KIZUNA management according to our code of

conduct. We will strive to achieve the following targets.

There are five V's we are eager to work on.

- Vector—safety as a core, strengthen sustainability
 - Value—boost value with a winning portfolio
 - Variety—promote a diverse workplace and inspire innovation
 - Venture—proactively take on social challenges with our speciality technology
 - Vitality—create a rewarding work environment for growth
- With safety as our top priority, we pursue high quality and environmental friendliness, as well as enhancement of our corporate governance system, and contributions to the society. We believe that considering SDGs (such as carbon-free society) is crucial for the company to continue to grow together with our customers. Through these efforts, we will be able to meet the expectations of all our stakeholders and become an even more trusted company.

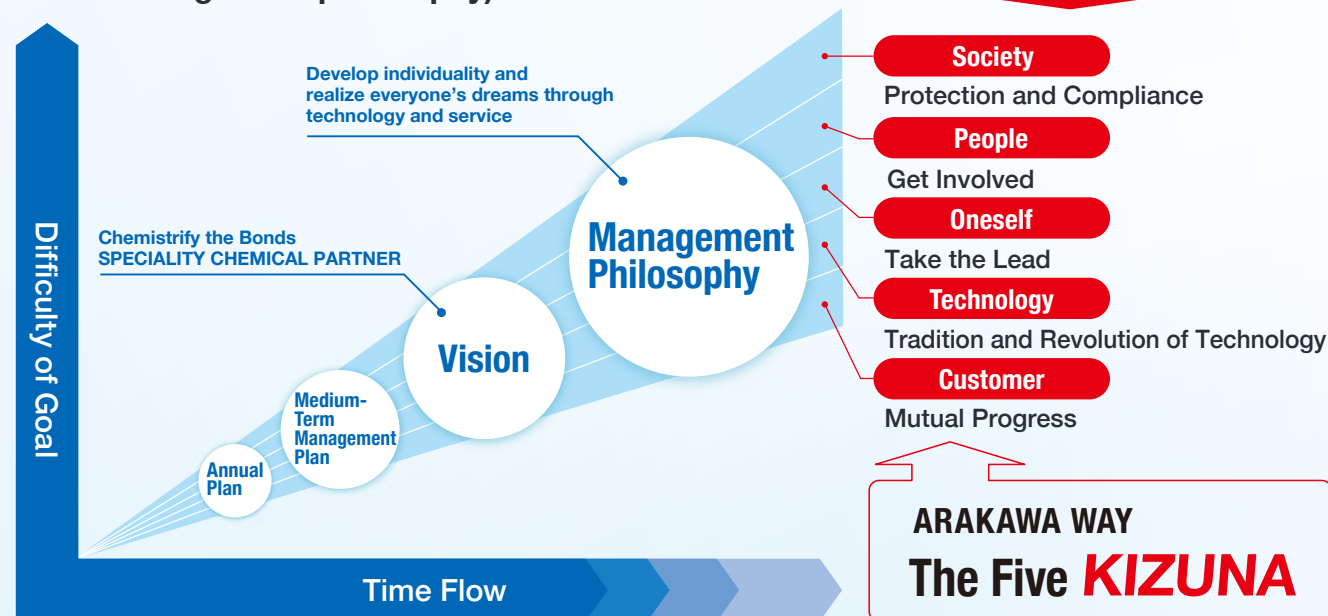
We look forward to your further support and cooperation.

ARAKAWA CHEMICAL INDUSTRIES, LTD.
President

Takashi Une

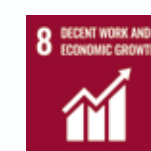
Management Philosophy of Arakawa Chemical Group

Using "The Five **KIZUNA**" as our value and code of conduct, we aim to achieve each of our goals (practice management philosophy).



SUSTAINABLE DEVELOPMENT GOALS

The Arakawa Chemical Group's efforts to improve our corporate values are connected to the sustainable development goals (SDGs) driven by the United Nations.



Promote inclusive and sustainable economic growth, employment and decent work for all.

Arakawa Chemical Group Initiatives

- Working environment filled with enthusiasm
- Diversified human resources
- Organization-wide safety culture



Responsible Production and Consumption

Arakawa Chemical Group Initiatives

Appropriate control of chemical substances and activities for industrial waste disposal



Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss

Arakawa Chemical Group Initiatives

"Forest of Matsutaro" project, which contributes to local pine forest restoration through planting pine trees



Obtaining a quality education is the foundation to improving people's lives and sustainable development.

Arakawa Chemical Group Initiatives

- Holding events for elementary school students
- Overseas training programs for junior staff and mid-career staff
- Scholarship programs of advanced education in developed and developing countries



Investments in infrastructure are crucial to achieving sustainable development.

Arakawa Chemical Group Initiatives

Developing new technologies to provide products which enhance the convenient and comfortable lives



Climate change is a global challenge that affects everyone, everywhere.

Arakawa Chemical Group Initiatives

Greenhouse gas reduction activities aiming specific target figures

We will contribute to our everyday life with rosin.



Rosin is a natural resin that is obtained by refining crude gum from pine trees. We will be committed to sustainable natural resources and provide environmental friendly material with high added-value.

Contributing to society with unique products filled with the spirit of **KIZUNA**

Origin

The origin of Arakawa Chemical was built with wisdom and effort.

1876 - 1926

- 1856 Our founding father, Arakawa Masahichi established "Tamaya", a drug company
- 1876 The trade name was changed to "Arakawa Masahichi Shoten". This is recognized as the founding of the company.
- 1894 After the death of Arakawa Masahichi II, his wife Hatsu continued the family business.
- 1910 Rosin named "Toyo-chan" released on the market
- 1914 Shigino Plant established, manufacturing of rosin began
- 1915 For the first time in Japan, pine resin was used to make gum and turpentine oil
- 1916 Rosin was exported to Russia (the first export of Japan-made rosin)
- 1918 Arakawa Shotaro opened the route for direct imports of pine resin produced in China.
- 1926 The Arakawa mark "▲" was registered as a trademark

Hatsu's Struggle

Hatsu was the oldest daughter of company founder Arakawa Masahichi and the wife of Arakawa Masahichi II. After her husband's early death, Hatsu struggled to manage the family business. She aggressively went after business with foreign traders and responded to the strict bid conditions set by the military with her originality and ingenuity, while large companies hesitated to bid. Her flexible mindset and ability to take action opened up one sales channel after the other. At one point, after incurring a huge debt, she faced difficulties, but found a way to safely overcome it. She also raised her two sons to become company executives. It is not too much to say that Hatsu created the foundation for today's Arakawa Chemical.



Pioneering

More main products produced one after the other

1927 - 1966

- 1927 Rosin ester "ESTER GUM" launched
- 1931 Reorganized to a limited partnership company ARAKAWA SHOTEN
- 1936 Imafuku Plant (the current Osaka Plant) established
- 1937 Rosin-modified phenol resin "TAMANOL" launched
- 1943 Company name changed to ARAKAWA FOREST CHEMICAL COMPANY
- 1954 Rosin sizing agent "SIZEPINE" launched
- 1956 Reorganized as ARAKAWA FOREST CHEMICAL INDUSTRIES, LTD.
- 1957 R&D center established
- 1959 Fuji Plant established
- 1960 Paper strengthening agent "POLYSTRON" launched
- 1965 Hydrogenated hydrocarbon resin "ARKON" launched for first time in the world

Helped by Good Customers

The reason the company was able to overcome the Great Kanto Earthquake and the world depression in the early part of the Showa Era was because of the total trust and warm response our customers gave Arakawa Shoten during those difficult times. There was trust with our trading partners. Loyal Shotaro and his brother Kikujiro cultivated trusting relationships with integrity and thoroughness.



Employees of Arakawa Shoten at that time
(Kikujiro, Hatsu's second son, is on the left, front row. Shotaro is in the middle)

Growth

Business expansion at home and abroad

1967 - 1988

- 1967 TIENLI CHEMICAL INDUSTRIES, LTD. (currently TAIWAN ARAKAWA CHEMICAL INDUSTRIES, LTD.) established as a Taiwan-Japan joint venture
- MORITA KOATSU CHEMICAL INDUSTRIES, LTD. (the current KOATSU CHEMICAL INDUSTRIES, LTD.) joined Arakawa Chemical Group
- 1968 Taipei Representative Office opened
- Kushiro Plant established
- 1970 Tsurusaki Plant and Mizushima Plant established
- 1977 In commemoration of our 100th anniversary, changed our name to ARAKAWA CHEMICAL INDUSTRIES, LTD.
- 1982 Arakawa Chemical (USA) Inc. established
- 1987 Photo-curable resins "BEAMSET", Colorless rosin derivatives "PINECRYSTAL" launched

Rapid Growth of ARKON

The Hydrogenated Hydrocarbon Resin "ARKON" went on sale in 1965. It expanded the market as a hot-melt adhesive that could smoothly melt and bond with heat. Around 1975, this adhesive was adopted for use with disposable diapers and sales went through the roof. Expanding each facility to increase production capacity, we were able to meet the rapidly increasing demand. This product continues to advance as one of the mainstay products of Arakawa Chemical.



Hydrogenated Hydrocarbon Resin "ARKON"

Shigino Plant Established

Amid the ups and downs of the marketplace, Hatsu's eldest son, Shotaro, anticipated the bright future of the rosin business. He saw beyond the domestic demand for pine resin and had the insight to produce it in China as well. He established the Shigino plant (currently located in Shigino-nishi, Joto-ku, Osaka) where they embarked on making rosin and turpentine oil. This became the opportunity for the company to go from drugstore business to manufacturer.



Overall View of the Shigino Plant

Laying the Foundations for a Research System

In 1956, the company was reorganized as a corporation and the company name was changed to ARAKAWA FOREST CHEMICAL INDUSTRIES, LTD. Heading into a period of strong economic growth, it focused on expanding its business as a comprehensive chemical manufacturer. Laying the foundation for a research system was an urgent issue. A year later, a research facility was built adjacent to Imafuku plant (the current in Tsurumi-ku, Osaka). Even though it was just a single-story house, it was equipped with high-performance testing machines and devices at that time.



Research Center, Exterior View

PINECRYSTAL to the Global Marketplace

After this colorless rosin derivatives was launched, it became known for its expensive manufacturing cost, but a complete normal pressure method and the development of decolorization technology proved a turning point, driving the cost down. Under the brand name of PINECRYSTAL, full-scale market development began. Today, it is used in electronic and optical materials, adhesives and PSA, plastic modifiers and other sectors as the only product of its kind in the world with expanding global demand.



Colorless Rosin Derivatives "PINECRYSTAL"

The Leap

Becoming global

From 1989

- 1989 Onahama Plant established
- 1990 Electronics cleaning agent "PINE ALPHA" launched
- 1993 Tsukuba R&D center established
- 1995 Wuzhou Arakawa Chemical Industries, Ltd. established
- ARAKAWA CHEMICAL (THAILAND) LTD. established
- Hong Kong Arakawa Chemical Ltd. established
- 1996 XIAMEN ARAKAWA CHEMICAL INDUSTRIES, LTD. established
- 1998 Arakawa Europe GmbH established
- 2003 Listed on the first section of the Tokyo Stock Exchange
- NIPPON PELNOX CORPORATION (the current PELNOX, LTD.) joined Arakawa Chemical Group
- Shanghai Representative Office opened
- 2004 Nantong Arakawa Chemical Industries, Ltd. established
- Guangxi Arakawa Chemical Industries, Ltd. established
- 2008 Guangxi Wuzhou Arakawa Chemical Industries, Ltd. established (Integration of Wuzhou Arakawa and Guangxi Arakawa)
- 2011 ARAKAWA CHEMICAL (CHINA), LTD. established
- 2012 POMIRAN TECHNOLOGY, LIMITED established
- 2014 ARAKAWA CHEMICAL (TAIPEI), LTD. established
- 2015 YAMAGUCHI SEIKEN KOGYO CO., LTD. joined Arakawa Chemical Group
- 2018 Chiba Arkon Production Limited established
- 2019 ARAKAWA CHEMICAL VIETNAM CO., LTD. established

Activation of Overseas Expansion

Until this point, we left sales of rosin-related products in the Taiwan market to our sales outlet, but to promote sales expansion in 1967, we established a joint venture called TIENLI CHEMICAL INDUSTRIES, LTD. Taking the momentum of Arakawa Chemical's first overseas expansion, we opened representative offices in the US and Germany to expand our business. In the Heisei Era (from 1989), we expanded into China, Thailand, and other Asian regions. Today, we expand our business with a view toward true globalization, and we established a new hub in Vietnam in 2019.



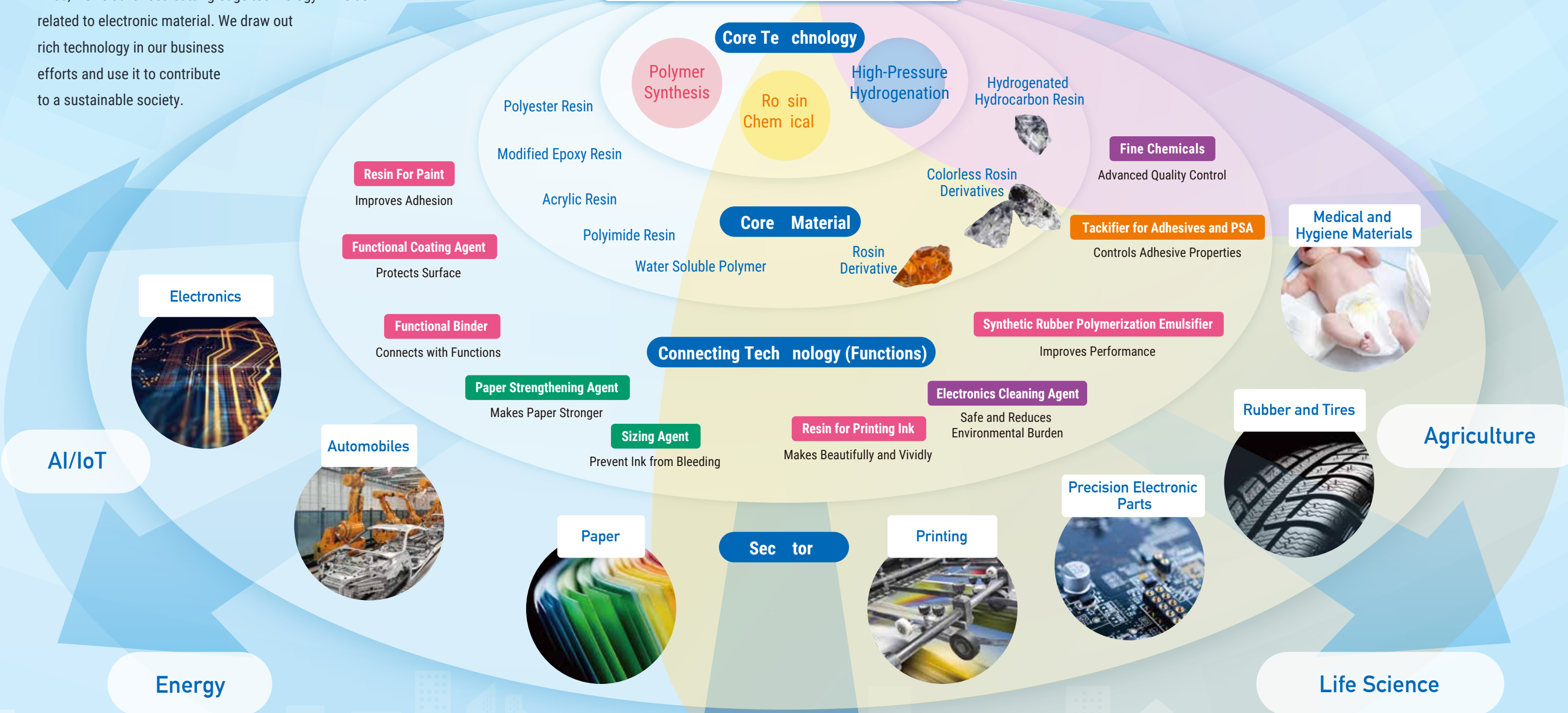
The Front Entrance of the TIENLI CHEMICAL Plant at that time

Technology that connects different materials. The possibilities open up new areas to advance into.

With rosin chemical technology as the starting point, we develop and deliver intermediate materials including resins used for paper chemicals, printing ink and adhesives.

Also, we've advanced cutting-edge technology in fields related to electronic material. We draw out rich technology in our business efforts and use it to contribute to a sustainable society.

Arakawa Chemical's materials work Products make the and add function
Chemistrify the Bonds



Toward Realizing A Sustainable Society

Making people's lives more enriched with a wide array of technology and quick solutions

We develop a wide range of products from daily commodities that are necessary in our daily life to high-value-added products that support advanced technology in the following four categories: functional coating chemicals, paper chemicals & environmental business, adhesive & biomass materials, and fine chemicals & electronics. We provide products with more convenience and comfort to contribute to a rich society.

How to See the Table

Business Segments

Application Name
[PRODUCT NAME]
Material Name



Functional Coating Chemicals



Expanding the electronics and automotive sectors with high-function and high-quality material.



Functional Coating Agent

Our lineup of functional coating agents features both photo-curable type, which is instantly cured when irradiated with UV (ultraviolet) or EB (electron beam), and thermosetting type. **Photo-curable resins "BEAMSET" and "OPSTAR"** are mainly used as anti-scratch and anti-reflection coating agents to protect the displays of smartphones and liquid crystal TVs. Thanks to their quick setting, these products contribute to energy saving and VOC (volatile organic compounds) reduction. Being developed as a film coating agent, **the releasing agent "ARACOAT RL"** has equivalent light releasability compared to silicone despite of being silicone free, and its demand has been expanding in the electronic parts

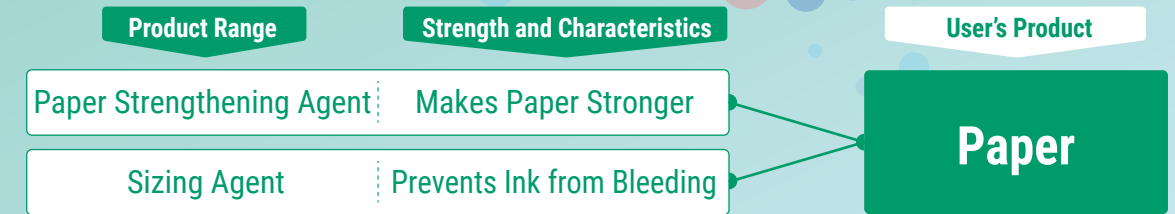
industry. Featuring excellent anti-fouling property and stretchability, **the self-repairing coating agent "ARACOAT SH"** is used for surface protection of automotive and building materials. Furthermore, we have developed various products to answer the market needs for diverse functionality, such as **anchoring agent "ARACOAT DA"** which is used for UV hard coats that are difficult to adhere to plastic film and for metal deposition, **matt coating agent "ARACOAT ML"** which helps control surface unevenness, and **anti-static coating agent "ARACOAT AS"** which provides great anti-static functionality even with a very thin film thickness of only several tens of nanometers.

Resins for Printing Ink and Paint

Arakawa has various resins that serve as important material in inks and paints that add color to your lifestyle. **Resins for printing inks** are used in magazines, newspapers, and food packaging, vividly reproducing colors. They also contribute to faster printing speed. **Resins for coating** are used on beverage cans, automotive parts, buildings, road markings and other items that are indispensable to our daily lives. In addition to having the conventional functionality of protecting exteriors and functions, in recent years, as we move toward using fewer VOCs, we are focused on developing water-based systems.



Paper Chemicals & Environmental Business



Utilizing with the characteristics of paper, a diversified product we can't live without.



Paper Strengthening Agent

"POLYSTRON", a paper dry strengthening agent that improves the strength of paper is used in a diverse array of products we need for our daily lives, from books to tissue paper, cardboard, etc. Also, when paper of recycled, the fiber quality weakens, and paper strengthening agents play the vital role in maintaining and improving the quality of paper products. In recent years, rapid expansion of Electronic Commerce and the economic growth throughout the Asian region have

led to a sharp rise in demand for packaging paper. Also, the degradation of the oceans caused by plastic products have had the effect of people re-evaluating paper products. Dry paper strengthening agents that contribute to paper recycling have continued to expand around the globe.



Sizing Agent

The sizing agent named **"SIZEPINE"** is used in printing paper, stationery, cardboard, etc. The chemicals keep ink from bleeding or penetrating to the back side of paper. The ink or water permeability of the pulp (raw material of paper) can be controlled through a sizing agent and good paper for all sorts of purpose can be made.

A comparative image of paper using a sizing agent (left) and paper not using the sizing agent (right)



Paper using a sizing agent



Paper not using a sizing agent

Environmental Friendliness

Increasing demand for water-based products can be expected along with increasing environmental awareness.

We, Arakawa Chemical Industries, Ltd. have been carrying out research and development of water-based paper

making chemical products such as paper strengthening agent and sizing agent over the past decades, and will continue to contribute to the society by applying our accumulated technologies and materials on plastic free and solvent free applications to reduce environmental burdens.

Adhesive & Biomass Materials



Arakawa's tackifiers are used in a wide range of applications from hot melt for packaging and hygiene applications to PSA tapes and labels, automotive adhesives, and medical applications.



Hydrogenated Hydrocarbon Resin

In 1965, **Hydrogenated Hydrocarbon Resin (HHCR)** "ARKON" was launched. The colorless transparent resin, with its excellent heat- and weather-resistance, is primarily used as a tackifier for hot melt adhesives material. ARKON received FDA (Food and Drug Administration) clearance for use in food packaging, medical patches, disposable diapers, and other sanitary products. In order to support growing global demand of HHCR, Arakawa has continued to grow our sales and production network. Specifically, Arakawa has recognized the

growing trend in hygiene market in emerging countries, this development has let Arakawa develop a new manufacturing hub in 2018 by establishing Chiba Arkon Production, Limited.



ARKON A Real Product Image on the Right (Pellet)

Rosin Derivatives

Rosin derivative is also primarily used as a tackifier as a hot melt adhesives and PSA, furthermore, they are also used in unique application such as modifiers for automobile tires, damping rubber, and chewing gum base. "SUPERESTER E Series" resin emulsions are increasingly used in order to create environmentally friendly product which comply with organic solvent regulations. The inherent property of rosin is that of an amber color which can limit use in applications where light color is required. Arakawa has innovated in order to overcome this obstacle, and in 1987, we produced **colorless rosin derivative with the trade name "PINECRYSTAL"**. PINECRYSTAL is produced under specifications that ensure few impurities and high safety levels, so that it can

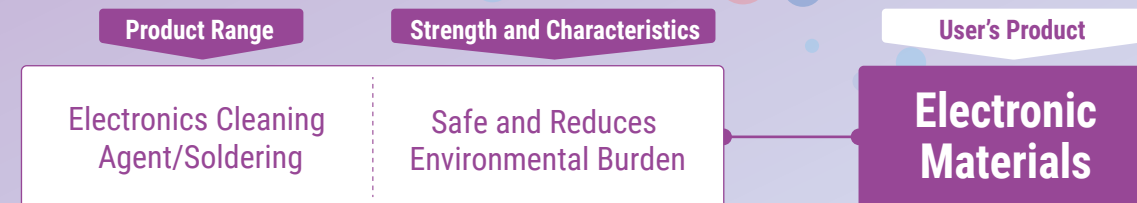
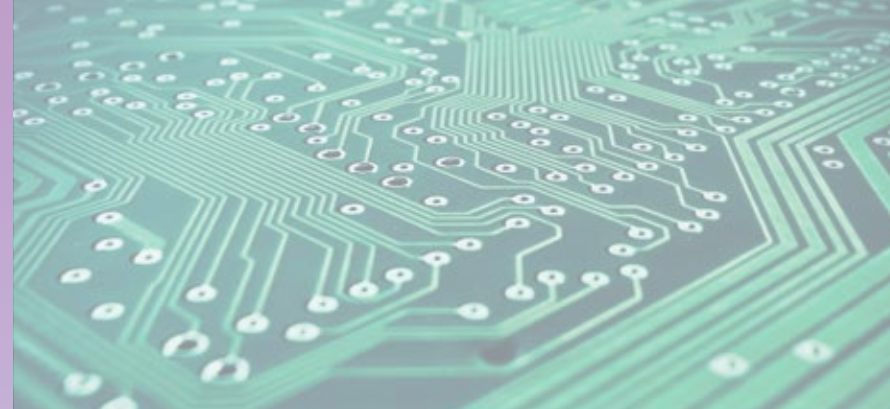
be used in medical patches. Also, due to these characteristics, it is used in applications with high quality requirements such as tackifier in transparent film labels, resin for solder flux, plastic additives, and 3D printer related materials.



Rosin

Colorless Rosin Derivatives [PINECRYSTAL]

Fine Chemicals & Electronics



Contributing to 5G and xEV innovation by developing electronic materials and precision chemicals.



Electronics Cleaning/Soldering Materials

The cleaning agent "PINE ALPHA", which clean camera modules and semiconductor-related parts, is based on the rosin technology. Since its launch in 1990, Arakawa has led the industry as a specified CFC substitute cleaning agent. The rosin technology is also applied for developing flux, which supports the soldering, and solder paste, which is environment friendly such as no halogen content. Arakawa branded **solder paste "Pine Solder"**, and **flux "Pine Flux"** is used in mobile and automotive applications. The slogan, "From Solder to Cleaning" is an idea of total solution and we have covered worldwide, especially focus on Asia market.

Binder for LIB

Based on the aqueous polymer synthesis technology, we have developed the binder resin, which is high positive potential for positive electrode, high power of negative electrode of Li-ion battery and high thermal performance for separator. It helps to create carbon circle society.

Low Dielectric Polyimide Resin

Using our original polymerization technology, **low dielectric polyimide resin, "PIAD"**, this resin for flexible substrate adhesives can adapt to 5G systems (The 5th generation mobile communication systems). It's superior adhesiveness with low roughness copper foil allows it to be used as an adhesive or a primer, and it is possible to make high-frequency substances excel in low transmission loss at low cost.

Fine Chemicals

Koatsu Chemical Industries, a subsidiary of Arakawa Chemical Industries, is known for being a skilled fine chemical contract manufacturer handling hydrogenated reactions, high-pressure reactions, and hydrothermal reactions. We cover a wide range of fields including electronics materials, inorganic chemicals based on the hydro thermal reaction, biomass, and environment related chemicals as a new field.

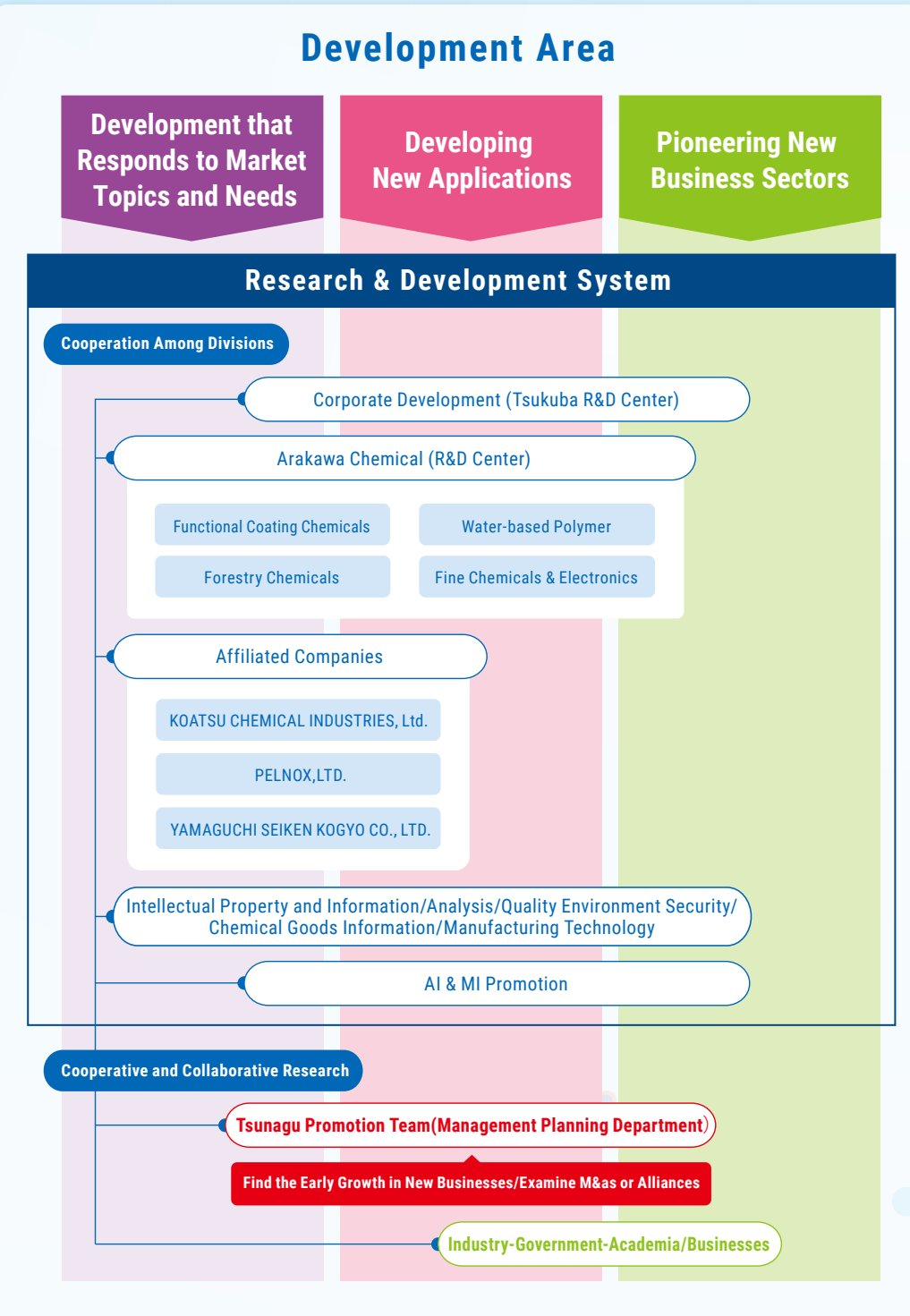
Feature of Koatsu Chemical Industries

High-pressure reaction equipment, pressure and corrosion-resistant equipment (Hastelloy), environmentally clean equipment

Looking to the future, we develop products with environmentally friendly material to contribute to society.

The market needs environmentally clean, low energy solutions with more diversity and speedy responses. We face each of these needs head on and make efforts to solve each problem. With the aim of realizing a sustainable society, we will continue our foundational research and our research into cutting-edge technology on eco-friendly materials such as rosin with our technology cultivated over many years.

We will continue to treat each of our employees' realizations with importance, activate those rich ideas and their ability to take concrete steps, and continue our excited research and development activities to commercialize products that contribute to society.



R&D center (Tsurumi-ku, Osaka City)



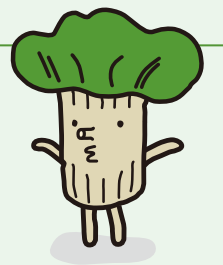
Tsukuba R&D center (Tsukuba City, Ibaraki Prefecture)



The Mascots of Arakawa Chemical Industries

Matsutaro

He usually lives in a pine forest. He was surprised to learn that rosin taken from pine trees has changed its appearance and is found in various places in the city, and to discover the rosin is useful in such places! Traveling around the city becomes more and more enjoyable. He likes to play hide-and-seek, so he may appear near you at any moment!



Rosina

She likes to read at home, but she also likes hanging out with Matsutaro. As she walks around to different places, she gets more and more excited and curious! She puts treasures she finds around town in her pochette, which is also packed with chewing gum and pieces of rosin. What will she find today with Matsutaro?

