



HARIMA

CHEMICALS GROUP

COMPANY GUIDE

HARIMA CHEMICALS GROUP, INC.

www.harima.co.jp/en



Leading the Way with Pine Chemicals

Harima Chemicals Group is a chemical manufacturer built on products developed using pine chemical resources like rosin, fatty acids, turpentine and other materials all obtained from pine trees.

We transform these key active ingredients into daily essentials.

Our products are used in a variety of fields, as resins for printing inks, paints and adhesives, emulsifiers for synthetic rubber, paper chemicals, solders used in electronic devices, and flavor and fragrance ingredients.

Indispensable everyday products derived in some way from pine trees are all around us:

- Printed items such as newspapers, books and catalogues
- Paints used to coat buildings and cars
- Adhesives used for glues and packing tapes
- Synthetic rubber used in car tires
- Paper goods including notebooks, books and cardboard
- Electronic devices such as computers and mobile phones
- Cosmetics and perfumes, etc.

And now with an international network of manufacturing bases in 11 countries, we meet the needs of our customers all over the world.



Rosin (Refined)

ROsin

An Ageless Renewable Resource

Rosin is obtained by refining pine tree resin. Pine trees have been used by humans for a diverse range of activities over the ages. The natural sticky property of rosin in rosin bags helps baseball players grip the ball better and violin players creates beautiful sound by stabilizing the bow on the stringed instrument. Anyone who has read the bible may recall how pine resin was used to waterproof Noah's Ark. And the ancient Greeks used it for lighting and in religious ceremonies. Pine resin has been integral to human life for more than two millennium and we continue to make use of rosin in a multitude of modern conveniences that include resin products, various chemicals for papermaking, electronic materials and other useful everyday items.



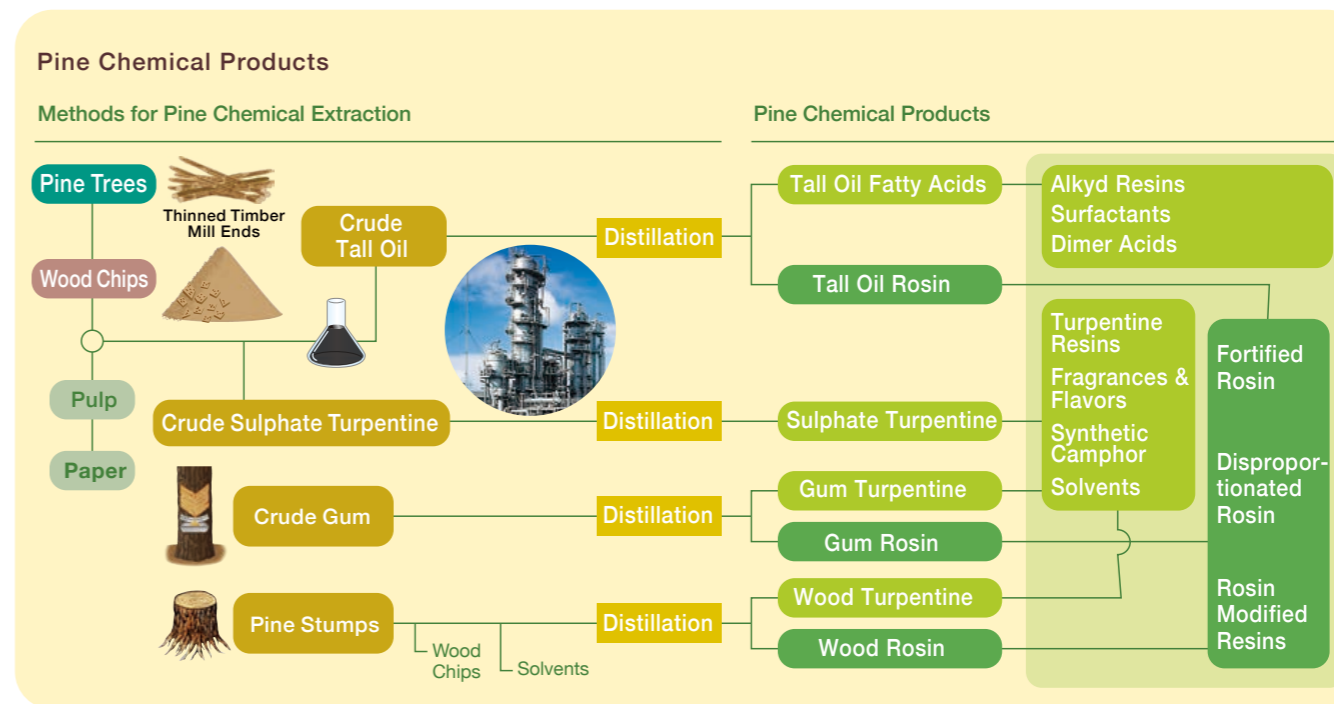
Working with Pine Chemicals

Harima's business was built on pine chemicals.

The term 'pine chemicals' refers to the rosin, fatty acids, turpentine and other useful chemical resources obtained from the pine tree.

We regard the pine tree as a genuine gift from nature and thus, our valued partner.

As such, we seek to find a harmonious balance between technology and nature in efforts to maximize our utilization of the chemical resources it has to offer.



Pine Trees Are a Remarkable Renewable Natural Resource

Unlike fossil fuels like oil and coal that will eventually run out, forestation makes the pine tree a truly renewable resource with a life cycle of 20 to 30 years. Our business involves taking the numerous chemical resources offered by pine trees and developing them into an array of products ranging from resin products and the various chemicals used for papermaking, to electronics materials and other useful everyday items.



Types of Rosin

Rosin is classified into three types based on the method of extraction. Gum rosin is obtained from distilling crude gum collected from live pine trees. Tall oil rosin is obtained from distilling crude tall oil* which is a by-product of the craft pulp making process. Wood rosin is obtained by the solvent extraction of wood chips from pine stumps that is then distilled.

Gum rosin is the oldest and most consumed rosin in the world today. Harima is the only commercial producer of tall oil rosin in Japan and the leading manufacturer in the pine chemicals field based on the collective use of gum rosin and tall oil rosin. We effectively manage the use of the two types of rosin depending on their specific properties and application, to produce and supply products of high quality.

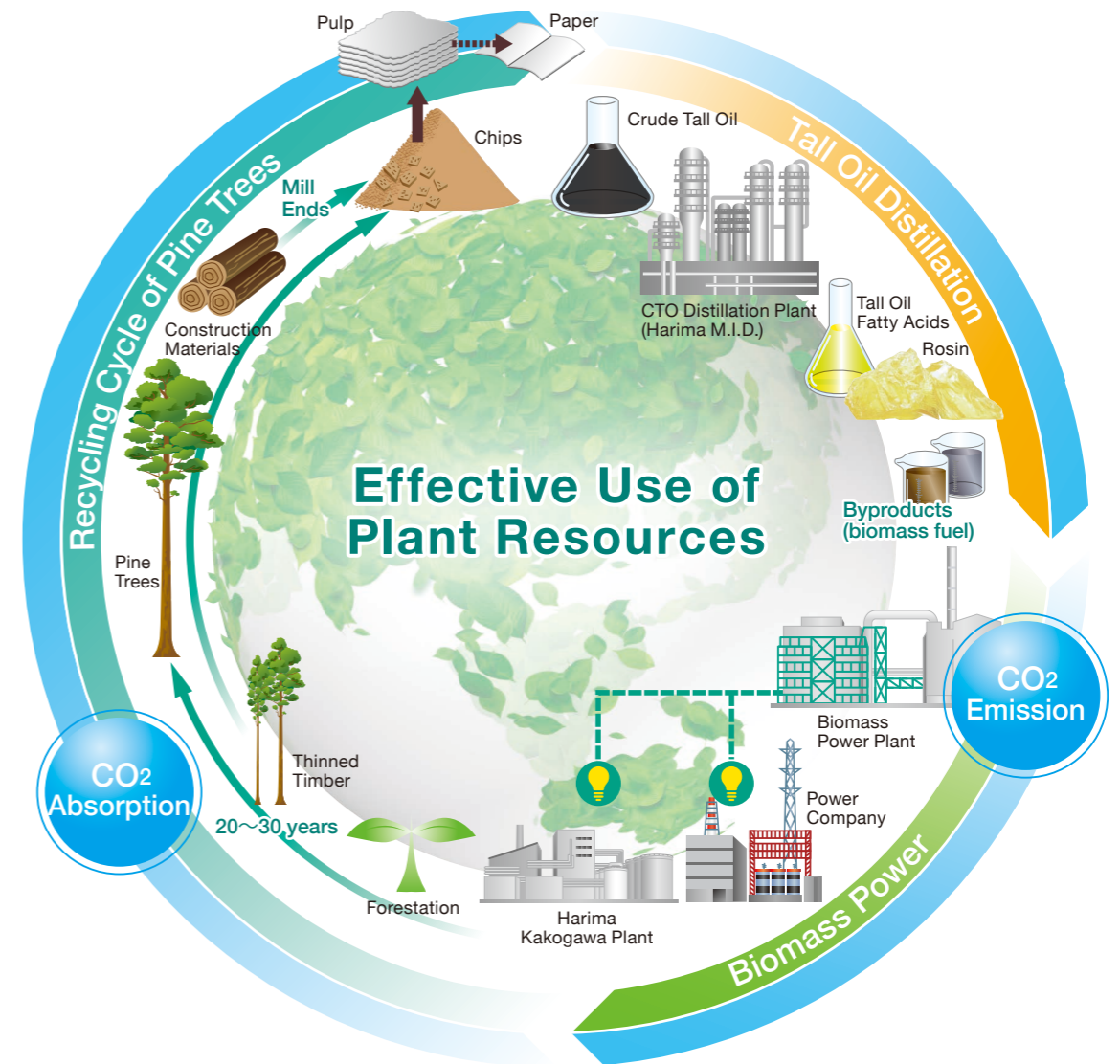


*The term tall oil comes from the Swedish word Talloja which means pine oil.



Nature-Born Green Chemistry

Harima Chemicals Group is a pine chemical manufacturer that utilizes natural and renewable resources to their full potential, creating an extensive portfolio of items used in daily essentials. We take pride in Green Chemistry (Green Sustainable Chemistry), the eco-friendly engineering technology we apply to create these products, which we have continuously nurtured since our inception. Indeed, Harima has been born and bred as a truly green company and will continue our mission to contribute to the realization of a sustainable society.



Creating Harmony Between People, Nature and Technology

Our legacy dates back to 1958 when we began operations as the first company in Japan to specialize in crude tall oil refinery, further extending our value in 1973 by establishing the world's first closed-loop tall oil distillation plant. In 2000, Kakogawa Plant, Harima's main production facility in Japan, was certified with the international standard for environmental management (ISO 14001); this prompted a series of initiatives to increase the number of eco-friendly products, while also reducing energy and waste at all our manufacturing plants.



Tall Oil Distillation Plant

Going Even Greener

Kakogawa Plant has long used components resulted during crude tall oil distillation, as fuel to power its steam turbine generators. In Mar 2005, we established our very own biomass power plant here with the capacity to fulfill all steam and power needs of the site, and any surplus power is supplied to local electricity companies as green energy so that nothing goes to waste.



Biomass Power Plant

Pioneering R&D Work Creating New Value

Harima's R&D puts a focus on creating new product value that contributes to building the future, and on speedily transforming research results and technologies into marketable products.

We will continue to meet ever-changing market needs, always ready to challenge new and unexplored realms with an eye on the future.



Creation of New Technology through Human Resource Development and Vitalization

We foster a research environment that encourages originality through talent development and corporate vitalization. A number of educational training opportunities, international exchanges and overseas dispatch programs are in place to strengthen collaboration with prominent research institutes around the world. We also have an award system that recognizes particularly remarkable company projects, as a way to stimulate innovation and motivation. In addition, we promote cross-industry and industry-academia-government interaction in an effort to develop talent who lead the way to the next generation of technologies.

R&D with an Eye on the Future

Harima actively incorporates leading-edge technology into the development of new, eco-friendly products with energy and resource-saving properties. Tireless research efforts bear fruit in the form of a diverse product lineup for which we receive widespread global recognition. Our Central Research Laboratory at Kakogawa, and Tsukuba Research Laboratory in the heart of Tsukuba Science City form the backbone of domestic R&D activities. Using the latest equipment and analytical tools, we conduct research that pushes the boundaries of our knowledge and business. With the significant boost of R&D capability in 2011 with the addition of LAWTER and its research facilities located worldwide, as well as in 2022 with the acquisition of the solder materials business of German manufacturer Henkel, the Group is fully utilizing its diverse network to meet the ever-changing needs of the global market. The passion and dedication we put into our unique technologies are the driving force behind what enhances the quality of life for all.

Contributing to a Safer and more Beautiful Lifestyle

Harima's resins and tall oil products business taps into its abundance of advanced technologies and know-how to satisfy the numerous functional and performance-related demands of the printing inks, paints, adhesives, synthetic rubbers and various other consumer items. The addition of LAWTER to Harima Chemicals Group in 2011 facilitated the organization of a broader global distribution network for our core products in these fields: printing ink resins, adhesive resins, and synthetic rubber emulsifiers. As a leading manufacturer of these products, we offer people around the world a safer and more beautiful lifestyle.

[Business and Products] Harima Technology is all around us

| Printing Ink Resins | Paint Resins | Adhesive Resins | Synthetic Rubber Emulsifiers

Printing Ink Resins

Printing inks used to display information and colors in newspapers, magazines, flyers and posters mainly consist of a variety of colored pigments, synthetic resins used to uniformly disperse and adhere these pigments to media such as paper, and solvents which regulate the ink's fluidity. By combining the rosin's superb pigment dispersing property with phenolic resin's excellent adhesive property through our uniquely developed technology, we have developed new rosin modified phenolic resins. The resins in this series possess such features as easy solubility, quick-set, stable emulsion of printing ink as well as eco-friendliness. With these competitive ink resins spread widely, we have gained a leading share of the global market. We will continue to refine the rosin modification techniques we have cultivated since the company's beginning in pursuit of even higher quality printing ink resins for the realization of innovative eco-friendly printed material that is safer, more vivid, and capable of printing at higher speed and lower cost.



Paint Resins

Paints are used to protect various objects from rust and deterioration and to enhance the appearance of all kinds of man-made objects ranging from automobiles, industrial products and buildings, to small everyday items. Paints comprise three main components: pigments which give colors, synthetic resins which provide adhesion for these pigments to the target substrate and doubles as a surface protector, and solvents used to regulate the paint's viscosity. Harima offers an extensive lineup of fully customizable purpose-specific paint resins designed to meet customers' needs whether it be sealers for direct application to surfaces such as metal, plastic and concrete, intermediate coating for recoating, or top coating for weatherproofing and beautification. Recently, we are vigorously pursuing the development of eco-friendly products with less Volatile Organic Compounds (VOC) such as high solid paint resins and water-based paint resins.



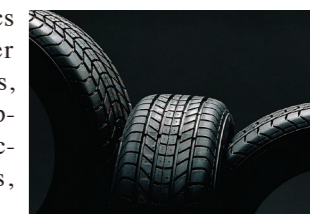
Adhesive Resins

Natural stickiness of rosin makes rosin derivatives an ideal adhesion enhancer when added to adhesives and pressure sensitive tapes. By adjusting the type and quantity of rosin derivatives (tackifiers), it is possible to give adhesives a variety of special properties. We offer customers around the world a diverse range of rosin-based tackifier resins and tackifier dispersions to meet their every purpose and need.



Synthetic Rubber Emulsifiers

One method of manufacturing synthetic rubber is emulsion polymerization. Emulsification is a technique involving the dispersion of insoluble substances in water, and rosin's natural chemical structure makes it an ideal emulsifier. Our rosin-based synthetic rubber emulsifiers have contributed greatly to improvements in the performance of automobile tires, many of which commonly incorporate a synthetic rubber called SBR (styrene butadiene rubber). Rosin-based synthetic rubber emulsifiers are also vital in the manufacture of CR (chloroprene rubber), a synthetic rubber boasting many characteristics which are not seen in other natural and synthetic rubbers, such as low flammability. Applications of CR include electric wire, automobile parts, driving belts, and adhesives.



Overview of LAWTER

The pioneer of quick-set printing inks Daniel J.Terra and his financial partner J. Lawson founded Lawter Chemicals in Chicago in 1940, the name Lawter being a combination of their last names Lawson and Terra. The company went on to expand its business in America and Europe as Lawter International Inc., eventually establishing itself as a leading global manufacturer of printing ink resin. The name Lawter all but disappeared after successive acquisitions by Eastman Chemical Company in 1999 and then Momentive Specialty Chemicals (previously Hexion Specialty Chemicals) in 2004 until Harima Chemicals acquired it in January 2011. The well-known LAWTER brand was subsequently reestablished and the company was returned to its rightful position as a leading global player.

Improving the Quality of the Paper We Use Everyday

Harima products known as paper chemicals are utilized in a large number of everyday paper items. We offer a wide array of products including sizing agents for preventing (water-based) inks from bleeding, paper strengthening agents for structural fortification, and coating agents for improving and reinforcing paper surfaces. Another priority we are pursuing is engineering innovative new chemicals such as those for reducing what would have been wasted paper by increasing the recycling rate of used paper.



[Business and Products] Harima Technology is all around us

| Sizing Agents | Paper Strengthening Agents | Coating Agents & Chemical Specialties

Sizing Agents

Sizing agents control the water absorbency of paper to prevent ink bleed and thus provide good writing performance and printability to the paper. The high water repellency property of rosin makes it a useful sizing agent in its natural state. However, we use independently developed techniques to further refine rosin and produce sizing agents specifically customized to a diverse range of paper manufacturing processes. Rosin sizing agents are generally referred to as internal sizing agents, something that is added to the pulp and water mixture (raw material) during the papermaking process. In addition to internal sizing agents, we also engineer, manufacture and sell surface sizing agents applied to surface of the finished paper.



Paper Strengthening Agents

Used paper has become a common ingredient in the raw materials for newspapers and paperboard known as recycled papers. Paperboard, which is to become corrugated cardboard, and newspapers rank first and second of all paper products in recycling ratio. However, repeated use reduces the strength of recycled paper. Paper strengthening agents have the important task of strengthening paper-based products containing a large percentage of used paper. The main constituent of these agents are water-soluble polymers. We have successfully applied our unique water polymerization techniques acquired over many years to engineering highly functional paper strengthening agents that improves the strength of paperboard and newspapers. As is the case of sizes, these agents can be added during the papermaking process or to the paper surface. We are proud to play a part in improving the quality of paper products with our vast lineup of paper chemicals tailored for specialized manufacturing processes.



Coating Agents • Barrier Coatings

Coating agents are applied to the surface of finished paper products to improve their performance. Our extensive product portfolio can enhance paper strength, slip resistance, water repellency and water resistance. Water-based barrier coatings are applied to paper surfaces, in lieu of plastic conventionally used to laminate paper, thereby improving product sustainability.



Process Improvement Agents • Pitch Control Agents

Retention aids used for pulp deinking (DIP) applications are added to recycled paper to remove printing inks and other unwanted elements, enhancing paper recyclability. Pitch control agents inhibit pitch deposits which can appear in the paper making process, which improves process productivity and quality of finished products.



Making Safer, more Evolved Electronic Devices

Harima's electronic materials business covers the development, manufacture and sale of items like solders and conductive pastes used to mount microchips and form electronic circuits for today's increasingly compact high-performance electronic devices.

Harima technology can be summed up as one that is both Clean (eco-friendly) and Fine (compact and highly functional). We conduct our daily business activity with this philosophy in mind and bring value-added proposals to customers. Whether it is the low-cost micro soldering technologies that contribute to miniaturization, or independently developed multifunctional materials capable of shortening the production time of electronic devices, we offer the latest innovations.

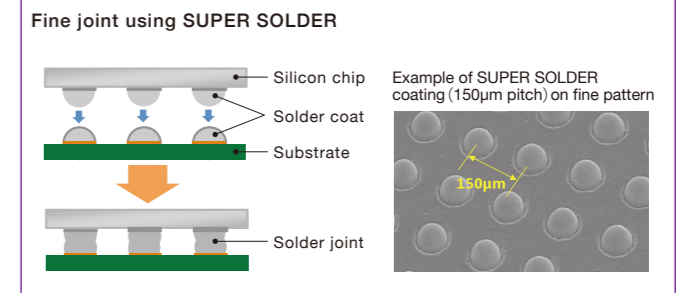


[Business and Products] Harima Technology is all around us

| Solder Materials | Materials for Printed Circuit Boards | Brazing Materials for Heat Exchangers

Solder Materials

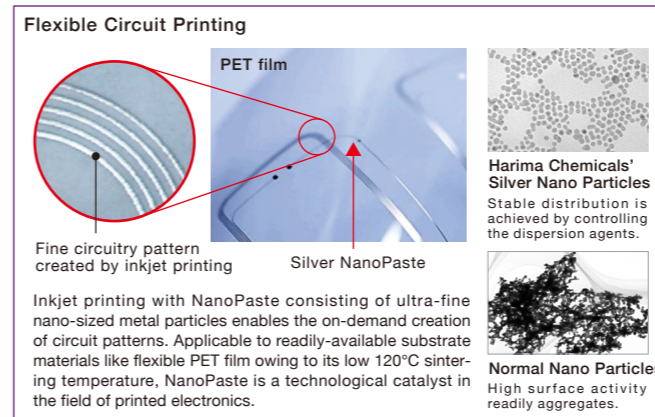
Solder is a material used to form a joint between electronic parts and substrates during the manufacture of electronic devices such as mobile phones and computers. One variety called solder paste is a creamy mixture of fine metal powder and other materials which include rosin. We have applied the decomposing effect of rosin on metal oxides to develop unique solder pastes by mixing metal powder with rosin derivatives. We believe it is our duty to protect the environment, and as such were one of the first to develop lead-free solder pastes as a means to prevent the devastating impact that lead has on the environment when it leaches from old or discarded electronics due to acid rain. Ever since our lead-free solder pastes were used to produce the world's very first lead-free MD player in 1998, it has become widely adopted.



Materials for Printed Circuit Boards

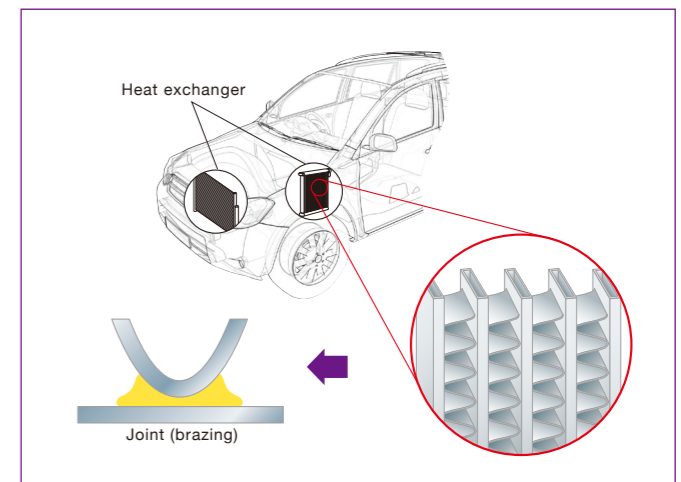
Conductive paste is, as the name suggests, an electrical-conductive adhesive. Harima's extensive knowledge acquired in the fields of coating and adhesion resins has made it possible for us to create conductive pastes that, for example, facilitate the release of heat generated by electronic devices (thermal conductivity) to allow for higher density of parts to be mounted. Also characterized by its high reliability and compatibility with various printing methods, conductive pastes have become an indispensable soldering material in the parts assembly of next-generation electronics devices such as solar cells and smart phones. Another of our conductive pastes is NanoPaste, a stable distribution of nano-sized* metallic particles in ink-form that only needs to be applied and heated to form a highly reliable metallic membrane for a wide-range of joint and wiring applications. NanoPaste's applicability to various printing methods, including inkjet, has made it a prime candidate as a core material in the area of printed electronics.

*Nano-size denotes one billionth of one meter.



Brazing Materials for Heat Exchangers

Brazing technology used to join aluminum is another application of Harima's extensive know-how. Aluminum brazing materials used in the manufacture of all kinds of aluminum products contribute to enhanced quality and reduced costs. Aluminum is commonly employed as a weight-saving measure in heat exchangers, which are an essential part of engine cooling and air conditioning in automobiles, making it necessary to braze aluminum parts of varying shapes together. Conventional manufacturing methods involved spraying the materials needed for brazing on to the entire surface of heat exchanger member and then heating. However, the aluminum brazing material we engineered is an extension of our pre-coating technology and only requires that a minima amount of brazing material be supplied just to the immediate brazing area, realizing drastic cost reductions and higher quality.





Companies outside Japan

Europe
 <Czech Rep.>
Harimatec Czech, s.r.o.
 Head Office/Plant
 ■ Electronic Materials

<UK>
HARIMA UK LTD.
 Head Office/R&D

<Belgium>
LAWTER - Kallo
 R&D/Plant
 ■ Resins and Tall Oil Products

<The Netherlands>
LAWTER - Maastricht
 R&D/Plant
 ■ Resins and Tall Oil Products

Asia
 <China>
Harima Chemicals (Shanghai) Co., Ltd.
 Head Office
 Management and support of Group companies in China

Harimatec Hangzhou Co., Ltd.
 Head Office/Plant
 ■ Electronic Materials

Hangzhou Hanghua Harima Chemicals Co., Ltd.
 Head Office/Plant
 ■ Paper Chemicals

Dongguan Hanghua Harima Paper Chemicals Co., Ltd.
 Head Office/Plant
 ■ Paper Chemicals

Shandong Hanghua Harima Chemicals Co., Ltd.
 Head Office/Plant
 ■ Paper Chemicals

LAWTER - Shanghai
 Asia Headquaters/Sales Office
 LAWTER Asia Headquaters and sales

LAWTER - Nanping Plant
 ■ Resins and Tall Oil Products

LAWTER - Fengkai Plant
 ■ Resins and Tall Oil Products

LAWTER - Nanning Plant
 ■ Resins and Tall Oil Products

<Korea>
LAWTER - Gunsan Plant
 ■ Resins and Tall Oil Products

<Malaysia>
Harimatec Malaysia Sdn. Bhd.
 Head Office/Plant
 ■ Electronic Materials

<Taiwan>
Harima Chemicals, Inc. Taipei Office
 Liaison Office

<India>
LAWTER - India Plant
 Liaison Office

Oceania
 <New Zealand>
LAWTER - Mt. Maunganui Plant
 ■ Resins and Tall Oil Products

North America
 <U.S.A>
Harima USA, Inc.
 Head Office
 Holding company of Plasmine Technology, Inc. and Harimatec Inc.

Harimatec Inc.
 Head Office/Plant
 ■ Electronic Materials

Plasmine Technology, Inc.
 Head Office/Bay Minette Plant
 ■ Paper Chemicals

LAWTER Global Headquarters
 LAWTER Global Headquarters

LAWTER - Elgin, IL R&D

LAWTER - Baxley, GA Plant
 ■ Resins and Tall Oil Products

South America
 <Brazil>
Harima do Brasil Indústria Química Ltda.
 Head Office/Parana Plant/
 Sao Paulo Office
 ■ Resins and Tall Oil Products

<Argentina>
LAWTER - Concordia R&D/Plant
 ■ Resins and Tall Oil Products

LAWTER - Buenos Aires South America Headquarters/Sales Office
 LAWTER South America Headquarters and sales

Companies in Japan

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Fuji Plant/Sales Office
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Nippon Filler Metals, Ltd.
 ■ Electronic Materials
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Seven Rivers, Inc.
 Manufacture and sale of industrial detergents and cleaning equipment
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Tokyo Branch
 6-17-8 Inari, Soka, Saitama 340-0003
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Harima Foods, Inc.
 Manufacture and sale of business-use foods, and sale of health foods and functional ingredients
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■ Company Overview

Company name	Harima Chemicals Group, Inc.
Founded	November 18, 1947
Representative	Yoshihiro Hasegawa, President
Tokyo Head Office	3-8-4 Nihonbashi, Chuo-ku, Tokyo, 103-0027, Japan TEL +81-3-5205-3080
Osaka Head Office	4-4-7 Imabashi, Chuo-ku, Osaka, 541-0042, Japan TEL +81-6-6201-2461
Capital Stock	10,000 million yen
Listing	Tokyo Stock Exchange
Business Description	Manufacture and sale of products developed using pine chemical resources such as rosin, fatty acids and turpentine.

■ Company History

2023 Apr	Established a myrcene plant (Kakogawa Plant)
Mar	Established a floating solar power plant (Kakogawa)
Jan	Harima Foods, Inc. became a fully-owned subsidiary
2022 Jun	Acquired solder materials business from Henkel (Germany)
Jan	Established HARIMA UK LTD.
2020 Mar	Takasago International acquired shares in LAWTER
2018 Dec	Shandong Hanghua Harima Chemicals Co., Ltd. started operations (China)
Nov	Acquired additional shares in SunPine (Sweden)
2016 Jun	SunPine (Sweden) started full operation of a tall oil rosin plant, with an annual capacity of 20,000 tons
2015 Dec	SunPine (Sweden) started trial operation of a tall oil rosin plant
2014 Dec	Established a solar power plant (Takasago)
Nov	Established a nanoparticle plant (Kakogawa Plant)
Jun	LAWTER invested in a tall oil rosin business in Sweden
2012 Oct	Company name changed to Harima Chemicals Group, Inc. (holding company), with operations being carried out by newly established Harima Chemicals, Inc.
Jun	Harima Chemicals (Shanghai) Co., Ltd. established
2011 Apr	LAWTER Chicago Head Office established
Feb	Dongguan Hanghua Harima Paper Chemicals Co., Ltd. started operations (China)
Jan	Acquired ink adhesive resins division from Momentive Specialty Chemicals (U.S.A.) and established LAWTER
2009 Oct	Nippon Filler Metals, Ltd. became a fully-owned subsidiary
2008 Dec	Plasmine Technology (U.S.A.) acquired rosin sizing agents division from Georgia-Pacific Chemicals
2007 Mar	Nanning Harima Chemicals Co., Ltd. (now LAWTER - Nanning) started operations (China)
Feb	Harimatec Czech, s.r.o. established
2006 Jun	Acquired ISO 14001 certification (Ibaraki Plant)
2005 Mar	Established a biomass power plant utilizing byproducts of CTO distillation, with an annual capacity of 4,000kW (Kakogawa Plant)
2004 Jun	Acquired ISO 14001 certification (Tokyo Plant)
2003 Dec	Harimatec Malaysia Sdn. Bhd. established
	Harimatec Hangzhou Co., Ltd. started operations (China)
Sep	Harimatec Inc. established (U.S.A.)
2002 Aug	Established an electronic materials plant (Kakogawa Plant)
Apr	Acquired ISO 14001 certification (Fuji Plant)
2000 Jun	Acquired ISO 14001 certification (Kakogawa Plant)
1999 Jun	Acquired ISO 9001 certification (company-wide)
May	Hangzhou Hanghua Harima Chemicals Co., Ltd. started operations (China)
1997 Nov	50th anniversary of the founding
1996 Apr	Plasmine Technology (U.S.A.) became a fully-owned subsidiary
1990 Sep	Listed at Tokyo Stock Exchange 1 and Osaka Stock Exchange 1
Apr	Company name changed to Harima Chemicals, Inc.
Mar	Acquired shares in Plasmine Technology (U.S.A.)
1989 Mar	Listed at Tokyo Stock Exchange 2
1985 Nov	Listed at Osaka Stock Exchange 2
1983 Mar	Shorai Foundation for Science and Technology established
1980 Feb	Harima USA, Inc. established
1974 Aug	Harima do Brasil Indústria Química Ltda. established (Brazil)
1973 Aug	Established world's first closed loop CTO distillation plant
1972 Jan	Harima M.I.D., Inc. established
1958 Oct	Established Japan's first CTO distillation plant
1952 Jan	Started trial production of tall oil
1947 Nov	Founded as Harima Chemicals industries, Inc.



Floating solar power plant (2023)



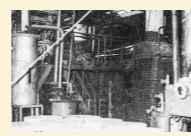
Biomass power plant (2005)



Present tall oil distillation plant



First domestic tall oil distillation plant (1958)



Distiller at Kakogawa Plant (around 1952)

A Symphony of Future Prosperity Played by Humans and Nature That is our Wish at Harima Chemicals

Harima Chemicals Group has consistently utilized its wealth of accumulated know-how to effectively transform chemical resources obtained from the natural pine tree into value-added products for the enrichment of people and industry. Our innovative lineup, a result of dedicated R&D since Harima's foundation in 1947, has been the driving force behind our constant success as a world-renowned pine chemicals manufacturer. We will continue to promote global business development, both domestically and overseas, as an advanced eco-friendly corporation who considers the earth to be one field. Furthermore, the establishment of the Shorai Foundation is the materialization of our wish to assist in the advancement of science and technology.

The essence of our work at Harima is summed up by our basic philosophy: "Live a better life with what nature provides."

It is our sincere hope that we can further enrich people's lives in harmony with nature and technology while pursuing the creation of a more prosperous society. With this firmly in mind, we will continue our endeavor to become a global leader in the field of pine chemicals by further deepening and maximizing the synergy between all companies within the group.

President
Yoshihiro Hasegawa



Shorai Foundation for Science and Technology

The Shorai Foundation for Science and Technology was established in March 1983 following the receipt of an award granted to then-president and Harima founder, Sueyoshi Hasegawa by the Japanese government for the company's contributions to the advancement of research and development on tall oil. Ever since, the foundation has actively promoted the advancement of science and technology, through subsidizing and encouraging research, study and international exchange. "Shorai" roughly translates as "the wind blowing through pine trees"; phonetically similar to the word "shorai" which means "future" in Japanese, it symbolizes the foundation's orientation to the future of technology and development of society.

Among the winning researchers are two Nobel Prize Laureates:
 •1986 grant winner, Dr. Ryoji Noyori Nobel Prize in Chemistry, 2001
 •1991 grant winner, Dr. Akira Suzuki Nobel Prize in Chemistry, 2010