

Material to Future

Guide to
Tsuruga Research and Production center,
TOYOBO CO.,LTD.



Ideas & Chemistry

**Tsuruga Research and Production Center,
TOYOBO CO.,LTD.**

10-24, Toyo-cho,
Tsuruga-shi, Fukui
914-8550, Japan
TEL: +81-770-22-7600
<https://www.toyobo-global.com/>



Ideas & Chemistry

Welcome to Tsuruga Research and Production Center – Creating the Future

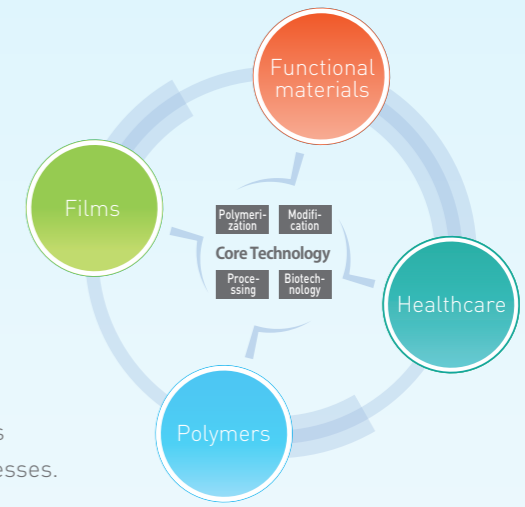
The comfortable and secure life you envision is born here.

TOYOBO's Tsuruga Research and Production Center started in 1934 with the production of rayon and has since changed with the times to produce films, bioproducts and high-functional products. It has now grown as a base for high-functional products and forms a key business base for our company with structures covering all processes from research to production. What is required now is functionality that has previously unknown value to create the future.

We will continue to pursue the possibilities for materials in order to realize a more comfortable, secure and sustainable society.

The four business segments and core technology of the Tsuruga Research and Production Center

We use a new technology system that combines our core technologies to commercialize new products and to accelerate the creation of new specialty businesses.



Automotive
Resin for automotive parts

Automotive
Airbag fabrics

TV, PC, and smartphone
Films for liquid crystal displays

Beverage
Labels for PET bottles

Films for food packaging
(Coffee, Snacks, and Retort Foods etc)

Marine vessels
Mooring rope

Building materials
Nonwoven fabric for building roof waterproofing

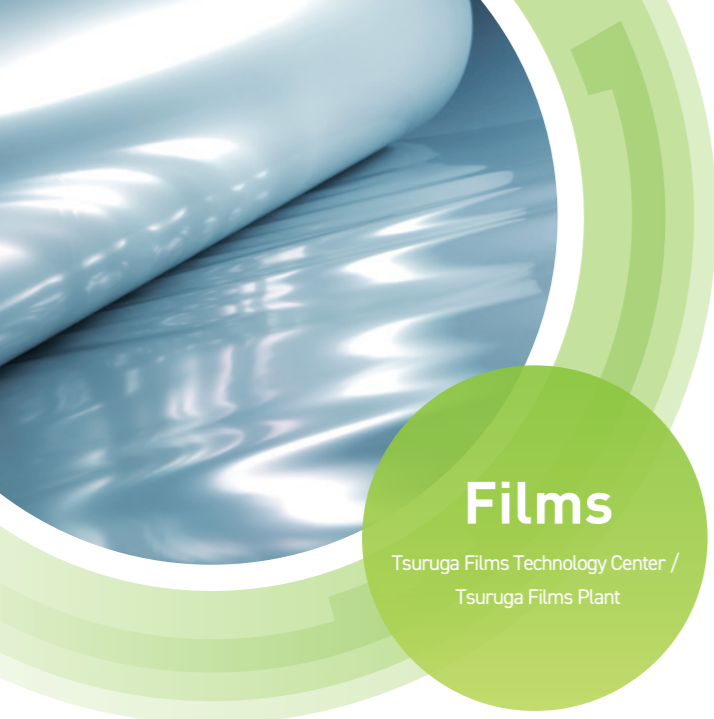
Firefighter garment
Highly heat resistant fibers

Train
Cushion material for seats

Hospital
Material enzymes for in-vitro diagnostics

Fishing line
Ultra-high-strength polyethylene fiber

Medical and research institutions
IVD medical devices



Films

Tsuruga Films Technology Center /
Tsuruga Films Plant

Related SDGs

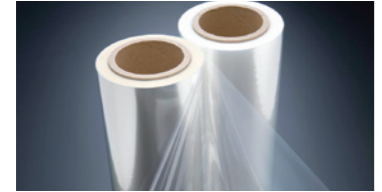
Contributing to a wide range of products from liquid crystal displays to PET bottle labels

The search for new raw material polymers and the development of film production technologies are our foundations and we combine the technologies and features of these to work on the development of a wide variety of new products. We produce polyester film in a cleanroom and the high quality film with little foreign matter has been selected for a wide range of packaging and industrial applications.

Films for packaging

Biaxially oriented polyester film
"TOYOBOESTER® Film"

This is a biaxially stretched film made by PET. It has excellent heat resistance, dimensional stability, transparency and mechanical properties. "ESPET® Film," which has improved adhesive properties and color printability, is also mainly used as a packaging base material for printing uses.



Polyester film superior in low-temperature shrinkability
"SPACECLEAN®"

This is made from polyester resins, which are the same material as PET bottles, so it is ideal for recycling as it greatly reduces the contamination of recycled bottles. In addition to its high shrinkability at low temperatures, it also has excellent transparency and gloss, and usages for down gauging, so it is suitable for a wide range of packaging applications.



Plant-based film
"BIOPRANA®"

This product is made from partially bio-based material, so it contributes to the reduction of fossil resource use. The physical properties and quality are the same as those of petroleum-based PET, so it can be processed under the same conditions.



Industrial film

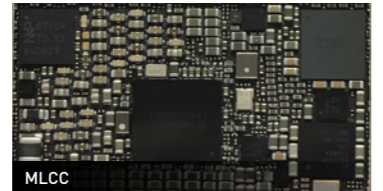
Super retarder film
"COSMOSHINE SRF®"

This film is used for liquid crystal displays. It has the same water resistance and durability characteristics as PET and despite it being a stretched film, it eliminates the problem of rainbow unevenness due to birefringence. It has excellent adhesion to various materials.



Release film for MLCC (ceramic capacitors)
"COSMOPEEL®"

This is a release film for use in the MLCC manufacturing process. It is produced in integrated manufacturing from the film casting to the release coating processing. We have proprietary technology for the smoothness required for high-end products and processing facilities that maintain a clean environment.



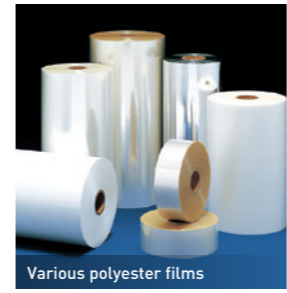
PET based synthetic paper
"Crisper®"

This is a white opaque biaxially oriented polyester film that has voids inside. It is an environmentally friendly synthetic paper that is made using recycled materials, including recycled PET bottles, and also achieves a lighter weight.



Polyester (PET) resin

This resin is produced efficiently and with stable quality, using proprietary polymerization technology. It is processed into films, engineering plastics and others. The "VYLOPET®" resin for injection molding has excellent heat resistance, rigidity, chemical resistance and electrical characteristics. It is used in automotive parts, electrical and electronic components and mechanical parts.



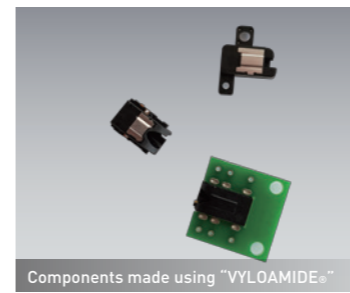
Polyamide resin

We use our original technology to produce products such as MXD6, high melting point polyamide and transparent polyamide. In products such as "GLAMIDE®," polyamide resin is compounded with mineral fillers and glass fibers and processed into engineering plastics and other products provided with the properties required.



Biomass polyamide resin
"VYLOAMIDE®"

This is a biomass-based polyamide resin that is made from non-edible castor oil. It has a high melting point of 315°C, which puts it at the highest level when compared with conventional high melting point polyamides. It has excellent dimensional stability due to its low water absorption. It is used for electrical and electronic components and for high heat resistant components in the automotive sector.



Products in action! "Drink warmer"

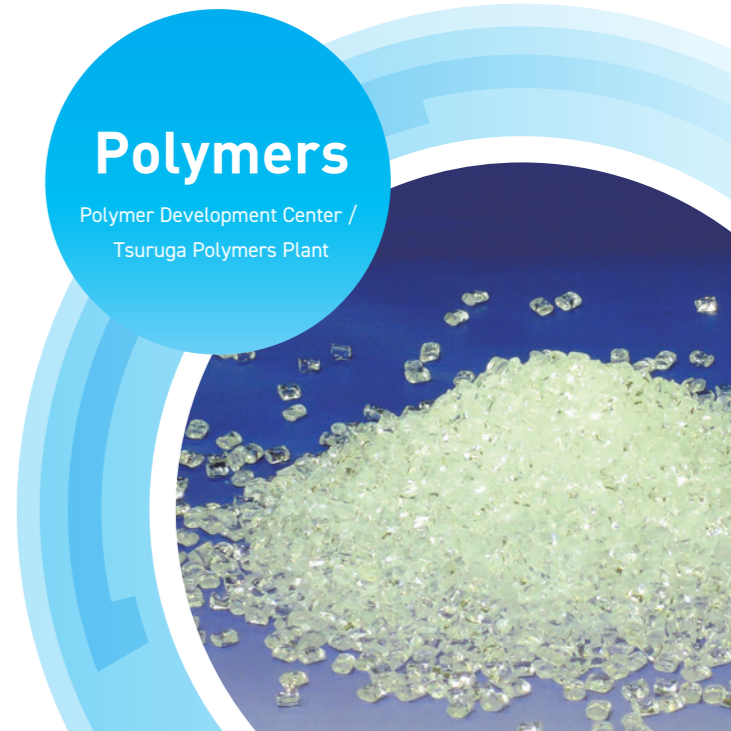
MXD6 nylon resin has excellent gas barrier properties and is used as the barrier layer on drinks bottles for drink warmers.



Aiming to improve order response and production technology and development

In addition to developing manufacturing technologies, new polymers and new processes, we are also working to improve the productivity and quality of existing polymers. We also use polymerization and modification technologies to produce polyester and nylon resins that can be used in a wide variety of applications, including automobiles and electrical and electronic components.

Related SDGs



Airbag Fabrics

We supply various types of uncoated and coated airbag fabrics utilizing our state-of-the-art spinning, weaving and coating technologies. Our products contribute to more light-weight and compact automobiles maintaining high quality and reliable performance. Together with our technologies, we have gained customers' trust over the years.



Three-dimensional cushion material "BREATHAIR®"

This is high-performance cushion material with a three-dimensional spring structure made by spinning and forming technology with polyester elastomer(special polymer). The material has excellent air permeability and durability and it can be recycled. It is used in a wide range of applications, especially for bedding and car seats. breathability and durability and it can be recycled.



Polyester spunbond nonwoven fabric Spunbond

Spunbond nonwoven has excellent physical properties. It is widely used in building materials, automotive parts, geotextiles and other industrial use. We are also combining it with other materials to develop materials for the removal of heavy metal.



Related SDGs



Cutting-edge technologies such as microbial fermentation and genetic testing for advancing medical care

We contribute in various fields, including highly functional substances such as clinical diagnostic enzymes and cosmetic materials, also clinical diagnostic reagents, medical equipment and research reagents for life science. As the main plant of our BIO business, we are expanding our business areas with our core technologies of microbial fermentation and genetic testing.

Healthcare

Tsuruga Institute of Biotechnology /
Tsuruga Biochemicals Plant



Ultra-high-strength polyethylene fiber "IZANAS®"

This is a super fiber produced using original gel spinning technology method to spin and draw ultrahigh molecular weight polyethylene. It has high strength and high modulus, but it is extremely lightweight. It is used in fishing lines, protective gloves and mooring ropes.



High strength polyethylene fiber "Tsunoooga®"

This is a high strength fiber made from high molecular weight polyethylene by using the melt spinning method. It has excellent durability against water, light and chemicals and it is easy to color, so we are promoting it for protective gloves and also working to develop new markets.



PBO fiber "ZYLON®"

This is an "ultra" super fiber that has the highest strength and elastic modulus in the world* and also achieves the highest levels of heat resistance and flame retardance. The uses for it are expanding limitlessly.
*Comparative data on existing organic fibers (According to a survey conducted by Toyobo in May 2015)



Raw material enzymes for in-vitro diagnostics

Enzymes are highly functional molecules derived from organisms. They are utilized for in-vitro diagnosis in hospitals or medical laboratories. We are also working on the development of highly functional substances other than enzymes, to meet the increasingly sophisticated medical needs.



Raw material enzymes for in-vitro diagnostics



Raw materials for cosmetics

IVD medical devices

We contribute to better medical care with our "GENECUBE®" automated gene analysis system whose process from extraction by gene amplification and detection is full automated, and our "USCANNER Premio®" urine sediment analyser.



USCANNER Premio®



GENECUBE®

Functional Materials

Tsuruga Functional
Materials Plant

Using original technology to pursue "strong," "lightweight" and "nonflammable" functional characteristics

We develop functional materials for the industrial materials sector. We are promoting the development and production of products that satisfy our customers, including fibers that are light enough to float on water but are stronger than steel, and uncoated airbag materials.

Related SDGs

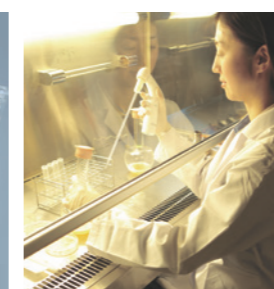


Reagents for life science research

We contribute to gene research, genome-based drug discovery and antibody drug development by providing life science research reagents such as gene amplification (PCR) reagents and high-expression vectors. We support doctors and researchers involved in cutting-edge research in the sectors of medical care and life sciences.



Accelerator for antigen-antibody reactions



Products in action! "Enzyme for blood glucose measurement"

The enzyme "FAD-GDH" realizes more rapid and accurate blood glucose measurement than before and takes the top share of the market in Japan and overseas.



"FAD-GDH" enzyme for glucose meters

Affiliated company

Xenomax-Japan Co., Ltd.

Manufacturing of highly heat-resistant films with the world's highest dimensional stability

We established Xenomax-Japan Co., Ltd. in a joint venture with Nagase & Co., Ltd. The company commercialized the "XENOMAX®" polyimide film, which has heat resistance and dimensional stability* at the highest level in the world, and constructed a production plant within the Tsuruga Research and Production Center. The film is being developed as a substrate material that can replace glass, silicon wafers and ceramics, for applications such as electronic paper displays, organic EL displays and various sensors.

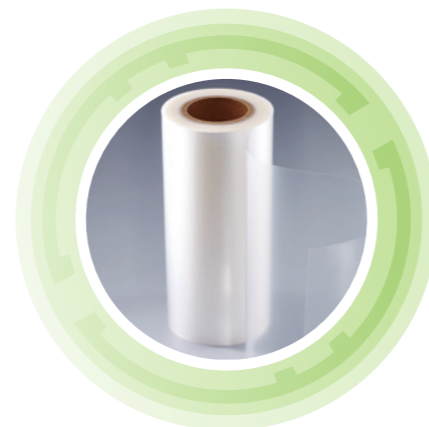
*Dimensional stability: The property that a dimensional (size) change is not likely to occur on a substance (material) due to temperature change.



Cast Film Japan Co., Ltd.

Manufacturing of casted films used widely in food packaging applications

Cast Film Japan Co., Ltd., is a joint venture with DIC Corporation. It uses polypropylene and polyethylene as raw materials for the manufacturing of films for food packaging, such as for confectionery, bread, rice seasoning and dried foods, and films for industrial applications. The "PYLEN® Film" (polypropylene) has excellent transparency, gloss, heat resistance and moisture resistance, etc., and the "LIX® Film" (polyethylene) has excellent heat sealing performance, chilled usability and rupture resistance. These products have been selected by a large number of customers.



We have concentrated core technologies of TOYOBDO at two sites and we are promoting research, development and production for the future in each field.

Functional Materials

- Tsuruga Functional Materials Plant



Films

- Tsuruga Films Technology Center
- Tsuruga Films Plant



Polymers

- Polymer Development Center
- Tsuruga Polymers Plant



Healthcare

- Tsuruga Institute of Biotechnology
- Tsuruga Biochemicals Plant

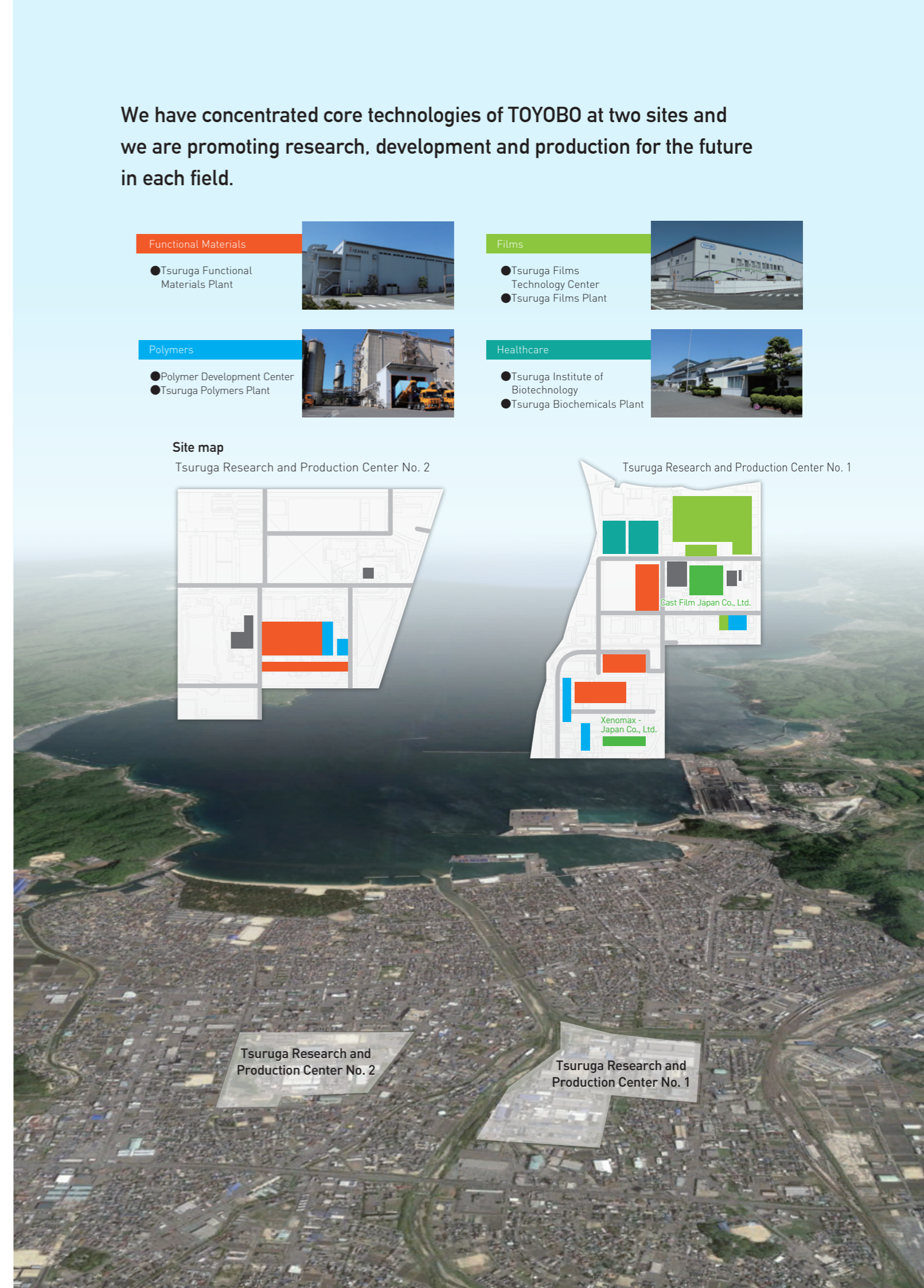
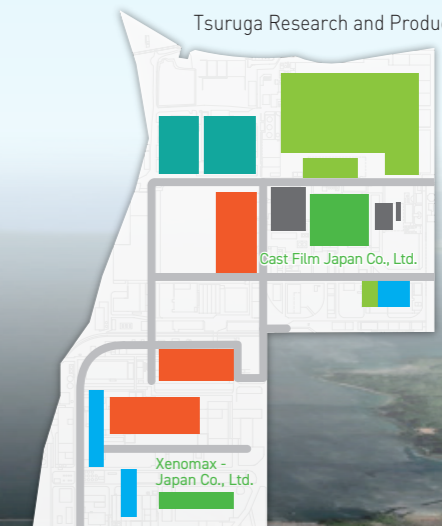


Site map

Tsuruga Research and Production Center No. 2



Tsuruga Research and Production Center No. 1



Tsuruga Research and Production Center No. 2

Tsuruga Research and Production Center No. 1

We will continue to walk together with Tsuruga City for the development of society and the local community.

From 1933

Starting from rayon fibers

- 1882**
Osaka Boseki, the predecessor of TOYOBO, is founded by Eiichi Shibusawa
- 1914**
TOYOBO is established through the merging of the Osaka Boseki and Mie Boseki
- 1933**
Showa Rayon Co., Ltd. constructs a plant in Tsuruga (Currently: Tsuruga Research and Production Center No.1)
- 1934**
TOYOBO merges with Showa Rayon and begins the production of rayon fibers as the TOYOBO Tsuruga Plant



Eiichi Shibusawa



1933 Construction of the Tsuruga Plant

From 1960

The rise of synthetic fibers

- 1963**
Production of "ESPA®" spandex yarn begins
- 1964**
The Tsuruga Nylon Plant, Kureha Boseki Co., Ltd. is established (Currently: Tsuruga Research and Production Center No.2) and nylon fiber production begins
- 1966**
A merger with Kureha Boseki means that the plant becomes the TOYOBO Tsuruga Nylon Plant
- 1967**
Production of polyester filament begins
- 1969**
Production of the promix fiber "Chinon" begins



1964 Tsuruga Nylon Plant

From 1970

Expansion of non-fiber business

- 1973**
Suspension of rayon tire cord production
- 1976**
TOYOBO Spunbond's Tsuruga Plant begins operations
- 1978**
Establishment of the Tsuruga Enzyme Plant (Currently: Tsuruga Biochemicals Plant)
- 1981**
Establishment of the Tsuruga Film's Tsuruga Plant
- 1984**
Nippon Magphane's Tsuruga Plant begins operations (Currently: Tsuruga Films Plant)



1973 In-house magazine



1982 Construction of Nippon Magphane's the Tsuruga Plant

From 1990

Pursuit of highly functional products

- 1992**
Establishment of the Tsuruga Institute of Biotechnology
- 1993**
Production of nylon fiber for airbags begins
- 1996**
Production of three-dimensional cushion material "BREATHAIR®" begins
- 1998**
Production of PBO fiber "ZYLON®" begins
- 2002**
Reorganize the plants in the Tsuruga area as the Tsuruga Research and Production Center
- 2003**
Production of the "Dyneema" ultra-high-strength polyethylene fiber (currently: "IZANAS®") begins



The current Tsuruga Institute of Biotechnology

From 2000

Taking on the challenge of possibilities

- 2012**
130th anniversary of TOYOBO
- 2014**
Super-large scale production facility operation started at the Tsuruga Films Plant
- 2015**
Establishment of Cast Film Japan Co., Ltd. (Merger of Tsuruga Film Co., Ltd. and DIC Filtec Inc.)
- 2018**
Establishment of Xenomax-Japan Co., Ltd.
- 2019**
85th anniversary of Tsuruga Research and Production Center
New construction of manufacturing plant for mold releasing film for MLCC



The current Tsuruga Films Plant

Changes in Tsuruga City

1937

Tsuruga Town and Matsubara Village are merged to form a city

1945

Bombing of Tsuruga (100 or more deaths)
Simulated atomic bomb drop on the Tsuruga plant

1955

Merge with five surrounding villages to form the current Tsuruga City

1970

Tsuruga Atomic Power Plant begins commercial operations

1975

The Japanese National Railways Kosei Line is fully opened

1980

The Hokuriku Expressway between Tsuruga and Maibara is opened

1999

100th anniversary of opening of Tsuruga Port

2014

The Maizuru-Wakasa Expressway is fully opened

2018

The 73rd National Sports Festival is held in Fukui Prefecture

We aim to create a workplace environment where employees can work in a lively manner and we are striving to create a safe environment and improve our welfare and education systems.

Environment, safety and disaster prevention

At the Tsuruga Research and Production Center, we are working in accordance with the Center policy of "Safety First" and engaging in occupational safety and environmental disaster prevention activities on a daily basis. The aim of these is to create a safe and comfortable working environment for our colleagues and to reduce the risk of environmental accidents in the vicinity of the Center.

Labor safety activities



We are promoting a "Let's watch over others campaign" to raise the safety awareness of workers through the enforcement of "Keep safety!" by using the protective equipment appropriately, and by pointing and calling before starting work. In addition, we are implementing "Risk assessment activities" where we quantify and evaluate the work risks at worksites and we are promoting measures to ensure intrinsic safety with an emphasis on equipment measures.

Environmental disaster prevention activities



We are working to protect the environment by reducing the substances of concern emitted from our production sites and by producing environmentally friendly products. We are also promoting safety and disaster prevention by inspecting our equipment and work methods to prevent fires, explosions, spills and other accidents from occurring at our production sites. We have organized a self-defense organization for disaster prevention and conduct disaster prevention drills so that we can suppress disasters.

Facilities and system for employees benefits



We have a bright and open cafeteria as well as company housing and dormitories. We also have many facilities for physical exercise, including a gymnasium, tennis courts and sportsground. In addition to club activities such as soccer, basketball, tennis and baseball, we also hold many in-house events such as cherry blossom viewing and summer festivals.

Personnel education system

We continuously support employee growth by providing continuing education and follow-up interviews after employees join the company.



We have established systems that make it easier for employees to work and are registered as a "Company promoting women's activity in Fukui."

