



Annual Environmental Report

2018 Edition

Tianma Japan, Ltd.



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Message from the President

**Based on a keen awareness of our natural environment,
Tianma Japan strives to achieve earth-friendly
production methods.**

Effective July 1, 2017, we changed the company name to Tianma Japan, Ltd. Under our new name and as a member of the Tianma Group, we will strive to provide products and services that meet the needs of our customers even better than before.

We proactively and consistently address environmental issues as a cornerstone of our corporate social responsibility (CSR) activities. One major consequence of our 2017 environmental activities is the acquisition of ISO 14001 certification for the 2015 version. In January 2017, we started operating an environmental management system corresponding to the 2015 version. We underwent audit in November, and in December we acquired the 2015 version.

We are making progress in the following areas under the company slogan, to achieve earth-friendly production methods, based on an awareness of nature. These efforts are based on a keen awareness of the impact company activities have on the natural environment.

- Contributing to the development of an energy-conserving society by developing applications for LCD displays with low environmental impact, such as low energy consumption and light weight.
- Creating environmentally sensitive products in various ways, including green procurement and compliance with RoHS directives.
- Continuing initiatives to reduce the environmental impact of manufacturing activities at our plants.

We intend to continue contributing to the development of a sustainable society by appropriately directing the knowledge and experience of all our employees.

We welcome frank comments and opinions from our stakeholders to help guide our future actions in the area of environmental management.



Deshu Yu, President
Tianma Japan, Ltd.

Company Overview

Name: Tianma Japan, Ltd.

Address: Shin-Kawasaki Mitsui Building West Tower 28F
1-1-2, Kashimada, Saiwai-Ku, Kawasaki, Kanagawa, Japan

Established: April 1, 2003

President: Deshu Yu

Capital: 1 billion yen

Lines of business: Research, development, design, manufacture, sale, and maintenance of color / monochrome display modules and related electronic devices

Number of employees: Approximately 600

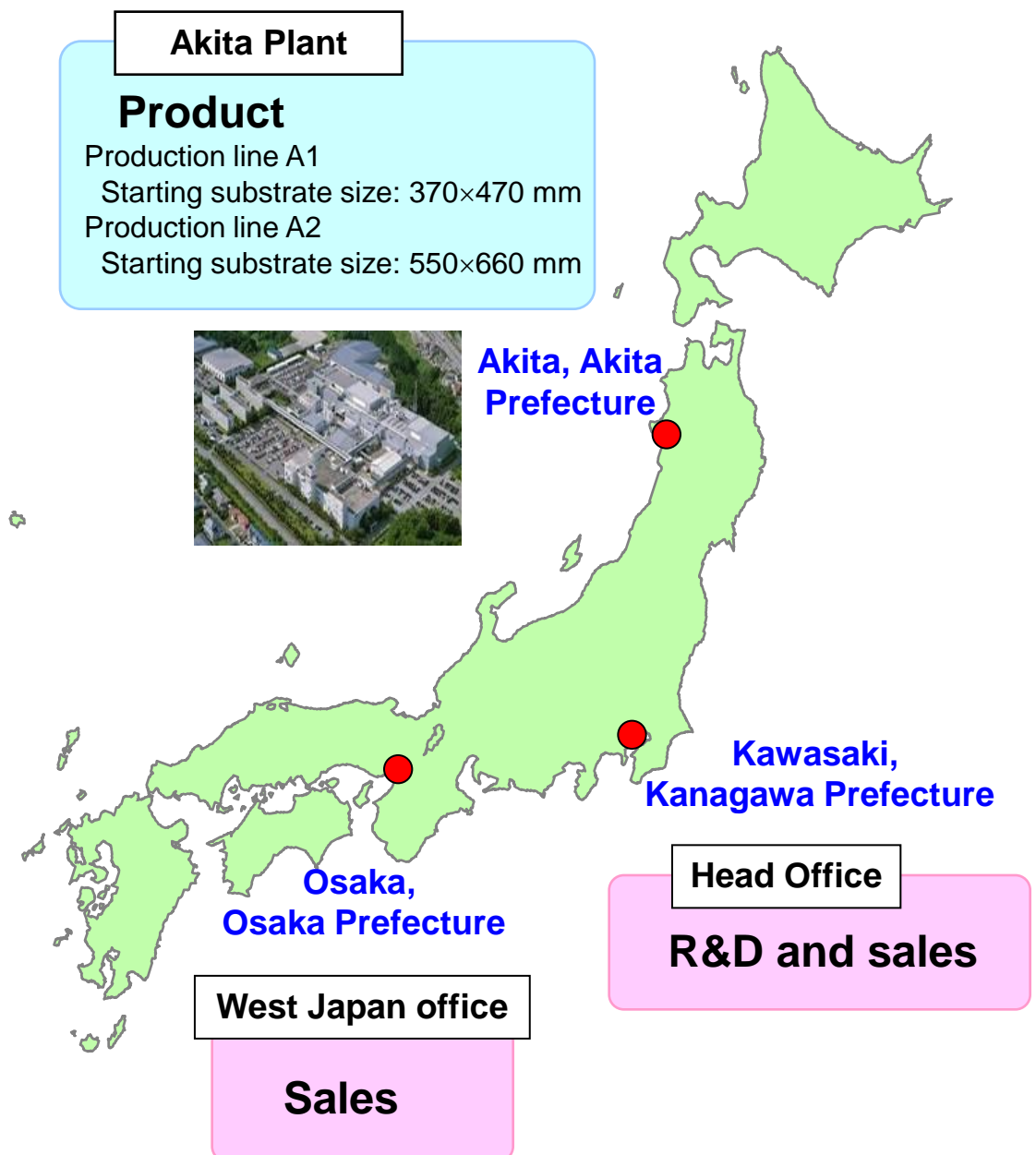
[History]

- | | |
|------|---|
| 1989 | Color LCD Development Promotion Headquarters established. |
| 1992 | Color LCD Division established. |
| 1993 | Acquired ISO 9002 certification. |
| 1994 | Acquired ISO 9001 certification. |
| 1997 | Acquired ISO 14001 certification. |
| 2003 | NEC LCD Technologies, Ltd. established as independent company. |
| 2007 | NEC Akita and NEC Kagoshima were merged into NEC LCD Technologies. |
| 2009 | Production consolidated at Akita Plant. |
| 2011 | Joined to Tianma Group and changed the company name to "NLT Technologies, Ltd." |
| 2014 | Acquired ISO/TS 16949 certification. |
| 2016 | Became a wholly owned subsidiary of Tianma. |
| 2017 | Changed the company name to "Tianma Japan, Ltd. " |

Map of Tianma Japan Business Sites

Our activities at our Kawasaki Head Office focus on research and development. We produce products for sale to our customers at our Akita Plant and at the production facilities of our parent company, Tianma Micro-Electronics Group, and other members of its group of companies.

We're deepening collaborative efforts with Tianma Micro-Electronics Group and other members of its group of companies across a broad range of spheres, including research, development, design, production, and sales.



Main Products

Shown below are some of the main products. These products are characterized by energy-conserving performance achieved through low power consumption.



<Monitors>

These are used as monitor panels in high-end and professional fields: for example, as high-definition monitors for the medical and graphics applications.



<Industrial use>

These are used across a wide range of fields, including panel computers and measurement equipment and broadcasting.

Environmental Policy

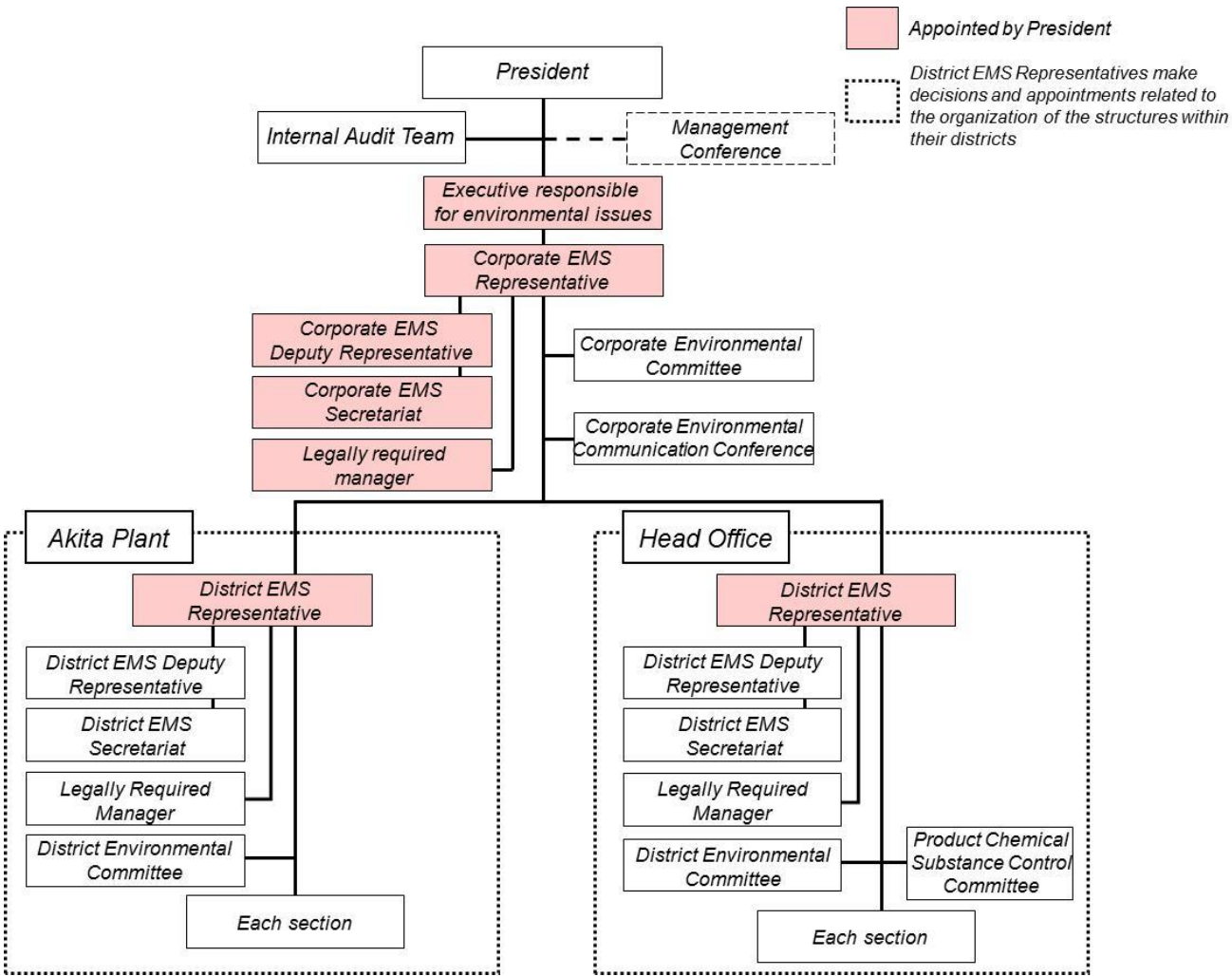
One of our goals as a global corporation is to help achieve a sustainable society. We are actively engaged in global environmental preservation activities in the development of our display products and production technologies. Key objectives of our environmental policy are:

1. Make continual improvements to Tianma Japan's environmental management system to enhance our environmental performance.
2. Reduce the environmental impact associated with our products and manufacturing processes as far upstream as possible to prevent pollution and protect the environment.
 - i Throughout a product's life cycles, from material procurement to disposal, Tianma Japan strives to save energy and purchase green whenever possible to provide green products, and minimize the environmental impact of our products and technologies.
 - ii Endeavor to reduce the environmental impact in our manufacturing processes using measures such as energy and resource conservation and waste reduction.
3. Comply with applicable legal requirements and with other requirements to which Tianma Japan subscribes related to its environmental aspects.

Established: July 1, 2017
Deshu Yu, President
Tianma Japan, Ltd.

Environmental Management Organizational Structure

We established the environmental management organization outlined below to advance activities in accordance with our environmental management system (EMS). The President appoints the Corporate EMS Representative, Deputy Representative, District EMS Representatives, Corporate EMS Secretariat, Chief Auditors and others. The District EMS Representatives make decisions and appointments related to the organization of these structures within their districts, establishing clear roles and responsibilities of each position through in-house rules.



Environmental Management System

We acquired ISO 14001 certification for the 2015 version in December 2017.

We perform the following audits to accurately identify and confirm aspects of various issues, such as the state of compliance with ISO 14001 standards, environmental impact reductions, environmental conservation, and the control of chemical substances occurring in products: environmental internal audits performed by in-house audit teams; and environmental management system audits performed by third-party auditing agencies.

We share information on issues and improvements in each district to promote sustained improvements.



CERTIFICATE OF REGISTRATION

This is to certify that the management system of:

Tianma Japan, Ltd.

Main Site: Shin-Kawasaki Mitsui Building West Tower 28F,
1-1-2 Kashimada, Saiwai-Ku, Kawasaki-Shi, Kanagawa Pref., Japan
See appendix for additional sites and additional site scopes
has been registered by Intertek as conforming to the requirements of:

ISO 14001:2015

The management system is applicable to:

Research, development, design, manufacture, sale and maintenance of
color / monochrome display modules and related electronic devices

[Head Office]
Research, development, design, and sale of color / monochrome
display modules and related electronic devices

Certificate Number:
09642-03

Initial Certification Date:
13 August 2013

Date of Certification Decision:
13 December 2017

Issuing Date:
13 December 2017

Valid Until:
21 December 2020




Kiyo Sakai
GM, Japan

Intertek Certification Limited, 10A Victory
Park, Victory Road, Derby DE24 8ZF, United
Kingdom

Intertek Certification Limited is a
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schedule of accreditation no. 014.



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An EMS audit at Akita Plant

Certificate Number : 09642-03
Original Issue Date : 13 August 2013
Certificate Expiry Date: 21 December 2020

2017 Results

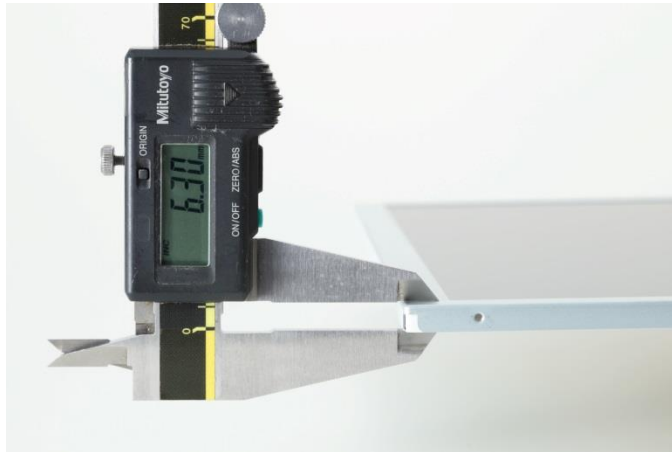
Summarized below are the results of 2017 initiatives. 2018 initiatives will be based on these results.

◆Assessment◆ ○: Achieved △: Achieved at rate of 80% or higher ×: Achieved at rate of under 80%

Items	Targets	Results	Assessment
Maintaining a 100% green procurement rate	100%	100%	○
Maintaining 100% compliance with RoHS	100%	100%	○
Reduction in energy-derived CO ₂ emissions	116.8 kg-CO ₂ /m ² or less*	93.8 kg-CO ₂ /m ²	○
Reduction of chemical substances	6.9 kg/m ² or less*	4.8 kg/m ²	○
Reduction in waste emissions	3.2 kg/m ² or less*	2.2 kg/m ²	○

Environmentally Friendly Products

■ Development of a thin and lightweight 15.0-inch LCD module



Tianma Japan, Ltd. has developed “NL10276AC30-53D”, a thin and lightweight 15.0-inch LCD module with XGA resolution (1024 x 768 pixels) for industrial applications such as POS and ATMs.

The developed module utilizes, a slim LED backlight supported by optimized design of its backlight system. Accordingly, it has achieved a thinner and lighter body having a width of 6.3mm and weight of 640g, which are approximately half as compared to conventional modules in the same size range.

Further, the new LED backlight with excellent luminous efficiency enables less power consumption. Typically, a thin LCD module results in an inefficient light use, leading to a tendency of power consumption to increase. However, the new module utilizing the high efficiency backlight can prevent the increase associated with the thin body and, therefore, excellent performance of 500cd/m² luminance and 8.5W power consumption can be achieved.

POS systems are widely used for sales management in distribution, retail, and other industries, and more compact footprint and improved design are much demanded for terminal equipment. Consequently, thinner, lighter, and more power-saving display modules are also in need. In addition to wide operating temperature range and long-life required for industrial use, the development of the thin and lightweight model meets the market need by enabling more compact design of devices to which the LCD module is to be mounted, which will eventually contribute to improved convenience for users.

Chemical Substances Contained in Products System (1)

■ Green Procurement

We do our part to further green procurement, in this way helping to establish a recycling society. We do this by expanding markets for green products, promoting the development of environmentally sensitive products, and raising awareness among designers and developers. Green procurement prioritizes the purchase of materials with low environmental impact. We have established green-procurement requirements for parts and materials and a green certification program for suppliers who meet these requirements. Since 2005, we have maintained a green procurement rate of 100%. In 2018, we continue to make 100% of our purchases from green certified suppliers.

Essential Condition for Green Procurement of Parts and Materials

Category	Items to Be Checked
Approach Environmental management	Establishment of environmental management system
	Non-use of substances banned from manufacturing Process
	Establishment of system for examination of chemical Substance content
Products	Non-use of substances banned from products

■ Restrictions on the Purchase of Substances Prohibited from Use in Products

In addition to green procurement, we provided a list of environmental substances restricted by Tianma Japan. These restrictions also include chemical substances prohibited by specific customers and other individually designated chemical substances. Copies of these restrictions are distributed to suppliers of parts and materials under the title *Common Specification of Green Procurement*. We ask suppliers to assess the chemical substances found in parts and materials delivered to us, based on design diagrams and the *Common Specification of Green Procurement*. The data collected in this way is registered into an internal database and shared for use in selecting parts and materials at the design stage, as well as for product assessment. Procurement restrictions also apply to chemical substances occurring in shipping and packaging materials, for which similar surveying, data registration, and materials selection are conducted.

Chemical Substances Contained in Products System (2)

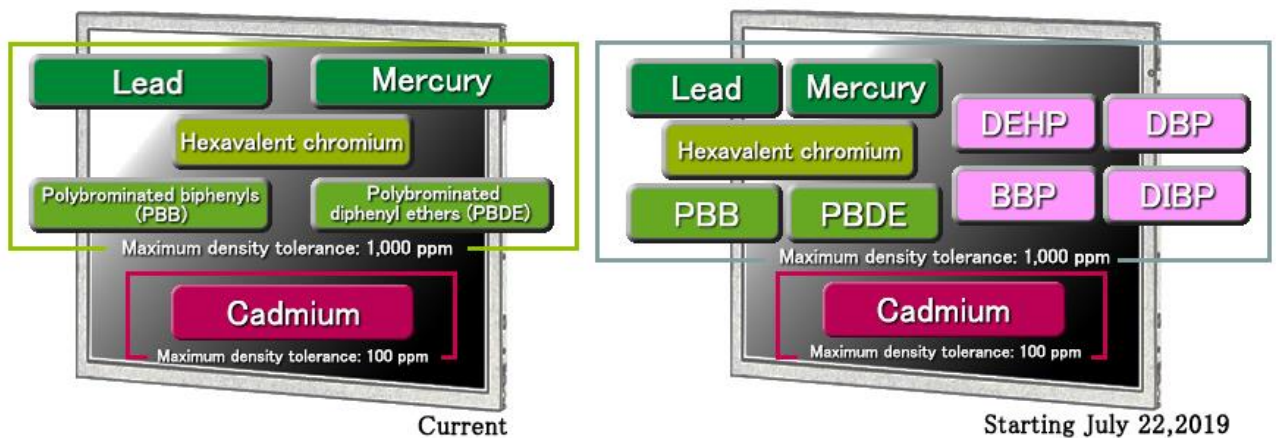
■ Our products are RoHS compliant

The European Union (EU) issued a RoHS Directive,^{*1} taking effect from July 1, 2006, that restricts the use of certain hazardous substances. As a result, electrical and electronic equipment containing any of the six target substances (lead, mercury, cadmium, hexavalent chromium, PBB^{*2} and PBDE^{*3}) is restricted from the EU market.

Out of concern for the environment, Tianma Japan began reducing the use of hazardous substances in our LCD modules prior to the RoHS directive. We have eliminated the six substances targeted in the RoHS directives as well as other substances we have identified as potentially hazardous, so that our products are now RoHS compliant.

The RoHS Directive underwent major revisions in July 2011. The updated RoHS Directive (RoHS II) went into effect in January 2013.

In June 2015, the *Official Journal of the European Union* also announced that the number of restricted substances would grow from six to ten substances and that the addition of restrictions on four phthalates^{*4} would enter into effect on July 22, 2019.^{*5} We remain committed to meeting all RoHS II requirements, including restrictions on phthalic acids.



^{*1} RoHS: The Restriction Of The Use Of Certain Hazardous Substances
In Electrical And Electronic Equipment

^{*2} PBB: Poly brominated biphenyl

^{*3} PBDE: Poly brominated diphenyl ether

^{*4} Four phthalates

DEHP: Bis (2-ethylhexyl) phthalate

DBP: Dibutyl phthalate

BBP: Butyl benzyl phthalate

DIBP: Diisobutyl phthalate

^{*5} The restriction shall not apply to monitoring and control instruments placed on the market before 22 July 2021.

Chemical Substances Contained in Products System (3)

■ Compliance with chemical substances restriction (REACH regulations)

In place from June 1, 2007, the EU REACH*¹ regulations require the registration, evaluation, and authorization of all chemical substances entering the EU, based on factors such as volumes imported or produced.

For molded products containing substances of very high concern (SVHC*²) and SVHC candidates in concentrations of 0.1% or more, a system must be in place throughout the supply chain to communicate information such as substance names, volumes included, and information enabling safe use.

To comply with REACH regulations, we are currently developing a management system that incorporates BOM*³ management of the parts and materials used in products, surveys of the chemical ingredients used therein, and processing of the data collected.

*1 REACH: Registration, Evaluation, Authorization and Restriction of Chemicals

*2 SVHC: Substances of Very High Concern

*3 BOM: Bill of Materials

■ Joint Efforts with Suppliers

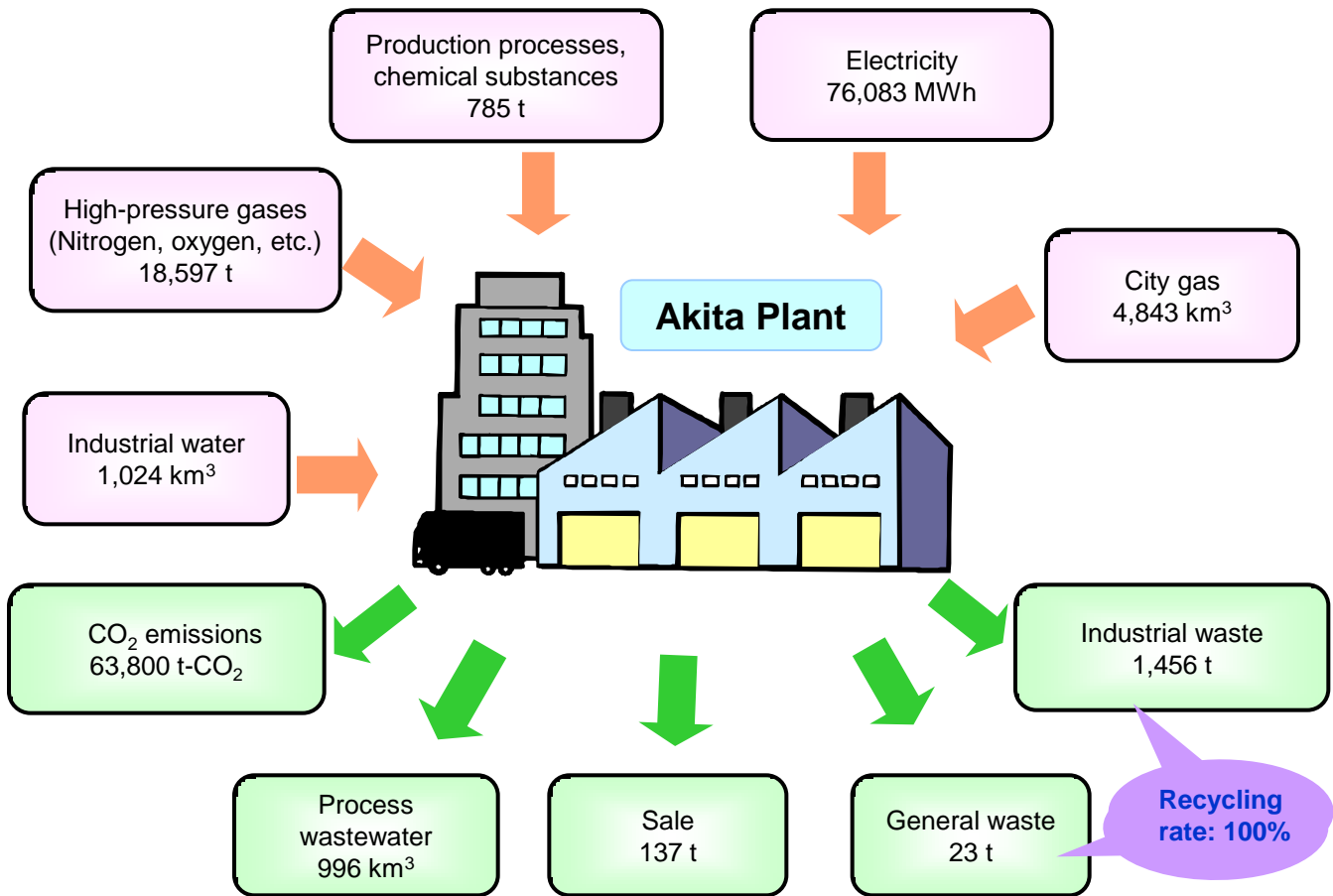
As required by various measures such as the European Union's RoHS directive, specifically designated harmful chemical substances occurring in products must be controlled. Each company in the supply chain must implement efforts to ensure proper control of the chemical substances found in various products.

As part of these efforts, we have developed an evaluation tool that promotes the proactive control of chemical substances occurring in products among the suppliers themselves. To ensure PMR*⁴ assessments, we distribute supplier assessment check forms to our suppliers. These forms are used to control various chemical substances occurring in products. Alongside spot inspections by Tianma Japan, such efforts improve supplier control systems by enabling supplier self-assessments.

*4 PMR: Process Management Review

Environmental Impact Mass Balance

The diagram below shows the resource volumes used in and the wastewater, carbon dioxide, and waste generated at the Akita Plant in 2017. In 2018, we will continue to strive to promote effective resource use; to promote energy conservation initiatives; and to reduce resource use and emissions still further.



Preventing Global Warming (Promoting Energy Conservation)

Recognizing global warming as an important environmental issue, we promote a wide range of efforts to reduce carbon-dioxide emissions, including reductions in energy used by plants, turning off lights when not needed, and using air-conditioning system in energy conservation mode at our offices.

We are also deploying energy conservation measures that apply the Ministry of Economy, Trade and Industry (METI)'s program intended to support rational energy use.

■ Promoting energy conservation measures by utilizing the METI's support program

As a Type 1 Designated Energy Management Factory under the Energy Conservation Act, the Akita Plant has drafted a medium-term plan to achieve targets for improvement in energy intensity. It is also studying and deploying related energy-conservation measures. Drawing on a support program funded by the METI, the Akita Plant has adopted the following four composite energy conservation equipment measures, which promise high returns on investment:

(i) Switching to LED lighting for the clean room, which operates 24 hours/day and has degraded over the years since its construction 25 years ago

(ii) Adding heat exchangers to outside air conditioner for clean room

This reduces fuel consumed for heating by preheating outside air using waste heat from cold water used in production line air-conditioning. It also reduces the electricity consumed by the centrifugal chiller that produces cold water through heat exchange with outside air.

(iii) Switching boiler water supply

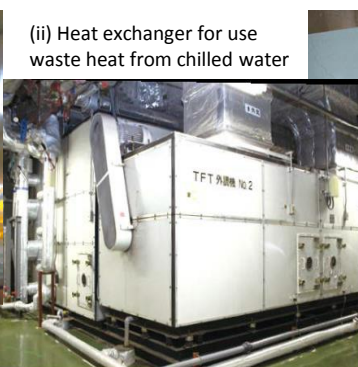
The supply water used in the once-through boiler for steam generation was switched from tap water to the high-temperature wastewater released from production lines. The switch reduces boiler fuel consumption.

(iv) Replacing the cooling water pumps and installing inverters on pure-water system

Before, Relief valves were used to control pressure and to pump water at uniform speed. Inverters are currently installed, and the pumps have been replaced.



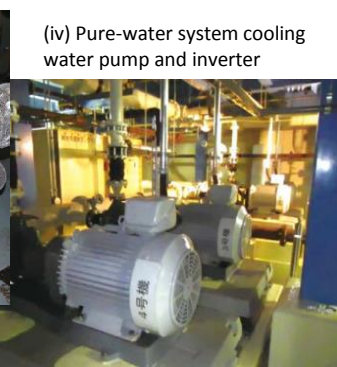
(i) Clean room LED lighting



(ii) Heat exchanger for use waste heat from chilled water



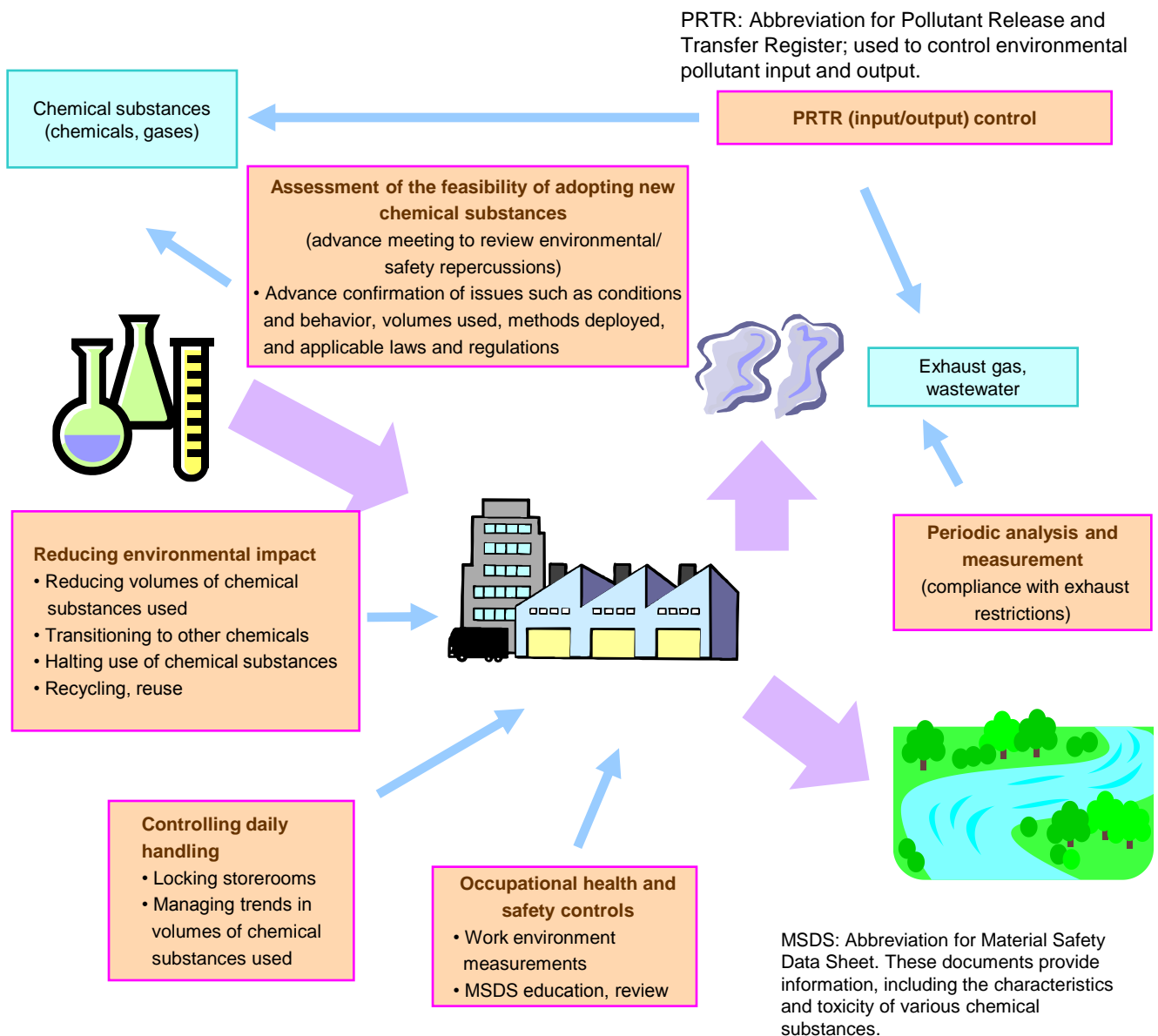
(iii) Boiler water supply pump



(iv) Pure-water system cooling water pump and inverter

Controlling Chemical Substances

Various chemical substances are used in processes related to manufacturing and processing wastewater and exhaust gas emitted from manufacturing processes. For purposes of monitoring environmental impact and control over handling safety, we maintain a control structure of chemical substances, reduce the volumes of materials used, and promote the transition to substances with lower levels of toxicity and environmental impact.



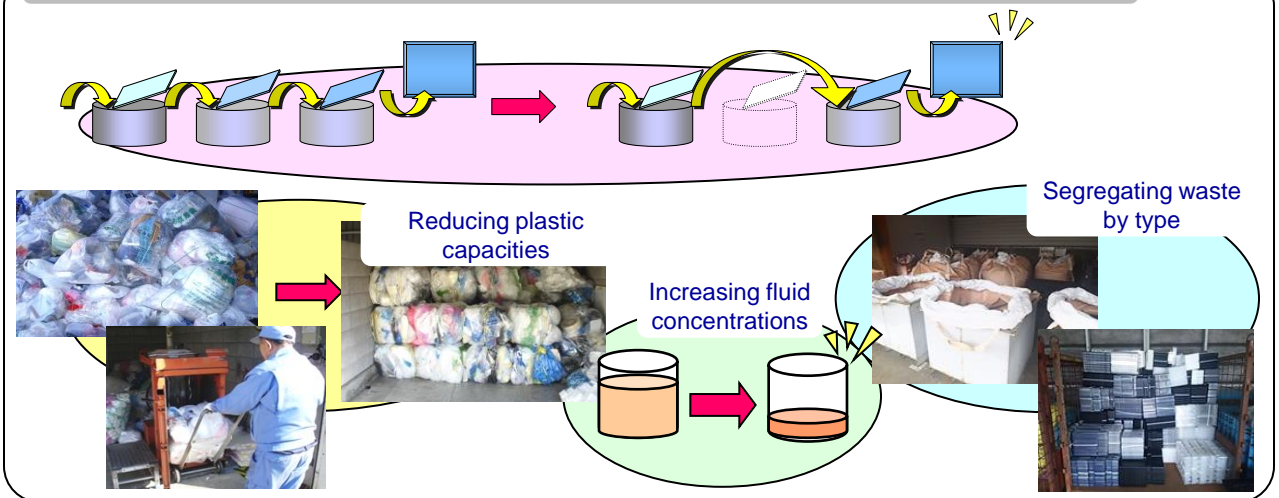
Waste Control

The Akita Plant continues to recycle all generated waste through waste segregation and the “three Rs” (reduce, reuse, recycle).

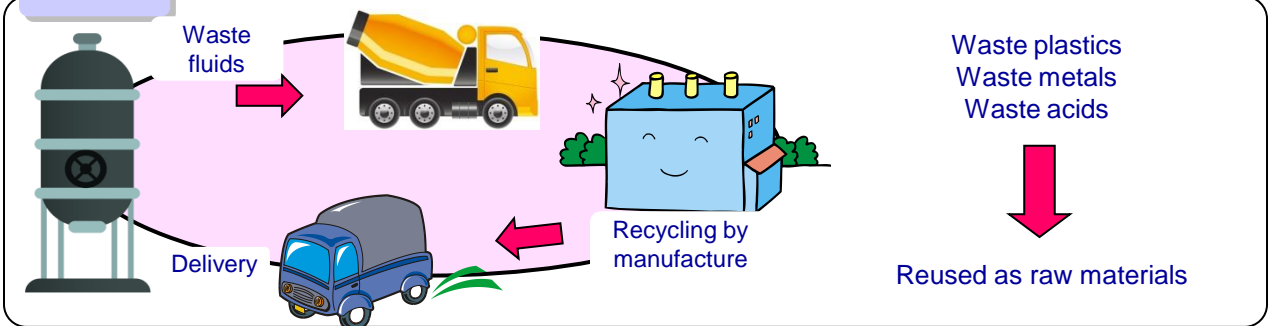
To ensure all waste is disposed of properly, waste processing is contracted out to licensed, specialized waste processing firms. Final processing is confirmed using manifests. In addition, waste-processing facilities are periodically subjected to on-site inspections.

In 2017, allowed us to sell waste plastics and waste acids. Since then, these waste materials have found effective use as raw materials.

Reduce: Streamlining processes, reducing volumes, reducing capacity, segregating waste



Reuse



Recycle



Adding one more "R" to the "3 R's"

Replace

- ◆ Shifting to lead-free solder
- ◆ Shifting to less toxic chemical substances

Reducing negative impact

Legal Compliance

We confirm legal compliance in various ways, including internal environmental audits, and environmental compliance audits. No notable problems emerged in 2017.

Results of analysis and measurement at the Akita Plant (2017)

<Wastewater measurements in mg/l (excluding pH)>

Subject	Item	Value established jointly by the company and Akita city	Self-imposed standard value	Measured value (average)
Industrial wastewater	Hydrogen ion density (pH)	6.0 to 8.5	6.2 to 8.3	7.4
	Biochemical oxygen demand (BOD)	25	20	3.6
	Chemical oxygen demand (COD)	25	20	4.9
	Suspended substances (SS)	30	15	2.0
	Nonvolatile oil (normal hexane) content	10	1	< 1
	Chrome content	1	0.05	< 0.05
	Hexavalent chromium compounds	0.1	0.05	< 0.05
	Fluorine content	8	6	1.7
	Phosphor content	To be measured	4	0.05
	Nitrogen content	To be measured	60	6.2

<Soot and smoke measurements>

Subject	Item	Value established jointly by the company and Akita city	Self-imposed standard value	Measured value (average)
Cogeneration	Sulfur oxide (SOx)	K = 5	K = 0.5	K = 0.12
	Nitrogen oxide (NOx)	130 ppm	120 ppm	71 ppm
	Soot particles	0.1 g/m ³ N	0.015 g/m ³ N	< 0.02 g/m ³ N
Once-through boiler	Sulfur oxide (SOx)	K = 5	K = 0.5	K < 0.1
	Nitrogen oxide (NOx)	150 ppm	120 ppm	39 ppm
	Soot particles	0.15 g/m ³ N	0.12 g/m ³ N	< 0.01 g/m ³ N
Smoke-tube boiler	Sulfur oxide (SOx)	K = 5	K = 0.5	K < 0.1
	Nitrogen oxide (NOx)	150 ppm	120 ppm	105 ppm
	Soot particles	0.15 g/m ³ N	0.12 g/m ³ N	< 0.01 g/m ³ N

<Exhaust gas measurements>

Subject	Item	Value established jointly by the company and Akita city	Self-imposed standard value	Measured value (average)
Acid/organic exhaust gas cleaning tower	Hydrogen chloride	To be measured	10 mg/m ³ N	0.28 mg/m ³ N
	Hydrogen fluoride	To be measured	10 mg/m ³ N	< 0.23 mg/m ³ N
	Isopropyl alcohol	To be measured	450 ppm	0.07 ppm
	Ammonia	To be measured	3 mg/m ³ N	< 0.05 mg/m ³ N
Acid exhaust gas cleaning tower	Hydrogen chloride	To be measured	10 mg/m ³ N	< 0.16 mg/m ³ N
	Hydrogen fluoride	To be measured	10 mg/m ³ N	0.23 mg/m ³ N
	Ammonia	To be measured	3 mg/m ³ N	< 0.05 mg/m ³ N
Separation exhaust gas cleaning tower	Isopropyl alcohol	To be measured	450 ppm	< 0.06 ppm

Risk Management

In-house facilities are inspected and swift countermeasures taken to prevent accidents. These activities incorporate information shared on cases arising common plant accidents across Japan.

We patrol facilities involved in environment activities and undertake periodic drills to ensure appropriate response to chemical leaks and other incidents. A certification system for operators based on certain standards has been established for firms involved in supplying or transporting chemicals or collecting or transporting waste fluids. Overall schedules are meticulously confirmed and comprehensive safety warnings issued.

Before using any new equipment or chemical substances, we undertake advance assessments and development procedures to closely examine aspects such as the potential impact of chemical substances on the environment, safety, and products.

Drills in responding to environmental incidents such as chemical or gas leaks



2018 Targets

Based on inputs and the results of activities in the previous year, our 2018 activities will have the following targets:

Items	Targets
Maintaining a 100% green procurement rate	100%
Maintaining 100% compliance with RoHS	100%
Reduction in carbon-dioxide emissions (from energy)	83.0 kg-CO ₂ /m ² or less*
Reduction of chemical substances	4.7 kg/m ² or less*
Reduction in Waste emissions	2.2 kg/m ² or less*

Tianma Japan, Ltd.

[Head office]

Shin-Kawasaki Mitsui Building West Tower 28F

1-1-2, Kashimada, Saiwai-Ku, Kawasaki, Kanagawa 212-0058, Japan

Contact:

TEL: +81-44-330-9933 (main switchboard)

E-mail : tmj-eco@tianma-jp.com

[Akita Plant]

3-1-1, Goshono Shimotsutsumi, Akita, Akita 010-1412, Japan

Information on our environmental initiatives is also available on the Internet:
<http://www.tianma.co.jp>

Published: March 2018 (subject: environmental activities in 2017)

Thank you for taking part in this survey.

Return to: Development Division, Tianma Japan, Ltd.
E-mail : tmj-eco@tianma-jp.com

Please answer the following questions concerning your reactions to and impressions of the Tianma Japan, Ltd. Annual Environmental Report 2018 Edition.

Q1. Did you find the Annual Environmental Report clear and easy to understand?

- ☐ Easy to understand ☐ Average ☐ Hard to understand

Q2. How comprehensive was the coverage of the Annual Environmental Report?

- ☐ Full ☐ Average ☐ Insufficient

Q3. Did you find any of the subjects of this year's report particularly interesting? (Chose all answers that apply.)

- ☐ Message from the President ☐ Company Overview ☐ Map of Tianma Japan Business Sites
☐ Main Products ☐ Environmental Policy ☐ Environmental Management Organizational Structure
☐ Environmental Management System ☐ 2017 Results ☐ Environmentally Friendly Products
☐ Chemical Substances Contained in Products System ☐ Environmental Impact Mass Balance
☐ Preventing Global Warming (Promoting Energy Conservation) ☐ Controlling Chemical Substances
☐ Waste Control ☐ Legal Compliance ☐ Risk Management
☐ 2018 Targets

Q4. Can you describe your relationship to the company and your perspective as a reader of this report?

- ☐ Active in business transactions with Tianma Japan ☐ Product user
☐ Government, administrative body ☐ Environmental NGO or NPO staff
☐ Corporate environmental staff ☐ Media ☐ Student or educational institution affiliate
☐ Other ()

Q5. How did you first learn about this Annual Environmental Report?

- ☐ Tianma Japan website ☐ Seminar, trade show ☐ Newspaper, magazine
☐ Other ()

Q6. Please provide any comments below on the Annual Environmental Report overall or on Tianma Japan's initiatives.

	Name		
	Address		
	Contact information	TEL	FAX
		e-mail	
	Occupation (name of employer, school, etc.)		

★ Please return this questionnaire after reviewing and consenting to the Privacy Policy.
(<http://www.tianma.co.jp>)

Thank you for your cooperation.