

## Denka Group CSR REPORT 2016

Denka Company Limited  
[www.denka.co.jp/eng](http://www.denka.co.jp/eng)



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# Denka's Corporate Philosophy

Now in the 101st anniversary year since its founding, Denka has established "The Denka Value," a corporate philosophy serving as the cornerstone of its business activities for the next 100 years. Looking ahead, the Denka Group will take on the challenge of expanding the possibilities of chemistry, thereby living up to the expectations and earning the trust of society.

## The Denka Value (Corporate Philosophy)

The Denka Value consists of the Denka Mission, which represents our uppermost mission statement, and the Denka Principles, a set of precepts guiding actions taken by every Group employee.

## The Denka Mission

**Taking on the challenge of expanding the possibilities of chemistry to create new value and contribute to sound social development.**

## The Denka Principles

We:

1. Boldly confront challenges with determination and sincerity.
2. Think and take action today with the future in mind.
3. Deliver new values, and inspire customers through innovative *monozukuri*.\*
4. Respect the environment and create a cheerful workplace that prioritizes safety.
5. Contribute to a better society, whilst taking pride in being a trusted corporate citizen.

\*Japanese-style craftsmanship

## The Corporate Slogan

**"Possibility of chemistry."**

We established this slogan to summarize our corporate philosophy and to convey it to the general public more effectively.



# CONTENTS

Denka's Corporate Philosophy.....	2
To Our Stakeholders.....	4
Business Overview .....	6
<b>Special Feature</b>	
Denka's Healthcare-Related Operations .....	8
<b>CSR Management</b>	
Denka Group's CSR.....	10
<b>Local Communities</b>	
Engaging with Society.....	14
Revitalizing Local Communities by Promoting Sports Activities .....	16
<b>Safety</b>	
Our Initiatives to Maintain Safe Operations.....	18
<b>Environmental Conservation</b>	
Caring for the Global Environment.....	20
Initiatives to Secure Our Electricity Supply .....	22
Resource Recycling through Cement Production .....	23
<b>Engaging with Our Stakeholders</b>	
Human Resource Development .....	24
Developing Comfortable Workplaces .....	26
Quality Management: Working with Our Supply Chain .....	28
Engaging with Shareholders .....	29
<b>Governance</b>	
Corporate Governance .....	30
Dialogue between Outside Directors .....	32
<b>Our Business Strategies</b>	
Denka100 New Growth Strategies .....	34
Elastomers & Performance Plastics.....	36
Infrastructure & Social Solutions .....	38
Electronics & Innovative Products .....	40
Life Science & Environmental Products .....	42
Denka's R&D Activities.....	44
Creating Shared Value (CSV): How Denka Products Help Resolve Social Issues.....	46
<b>Site Reports Summary</b>	
Japan .....	50
Overseas .....	52
<b>Our CSR Initiatives Overseas</b> .....	54
<b>Third-Party Opinion</b> .....	55

## Main Points of the 2016 Edition

1. Healthcare-related operations, one of the Group's key priority fields, are outlined in "Special Feature (pages 8 to 9)."
2. Showcasing CSR management, the current status of our CSR promotion structure, which grew from Responsible Care activities, is discussed (pages 10 to 13). Also featured is a dialogue among outside directors, whose number was increased to three in June 2016 with the aim of enhancing corporate governance (pages 32 to 33).
3. Focusing on communication with local communities, our initiatives to support the NIIGATA Albirex BB Rabbits are introduced as a demonstration of our commitment to revitalizing local communities through sports activities. This section features interviews with Mr. Shunya Nagasaki, the director of NIIGATA Albirex who is in charge of the BB Rabbits, and Ms. Chikako Umeki, the captain of the team, who concurrently serves as a Denka Seiken employee (pages 16 to 17).
4. To present the Denka Group's vision for future business creation, we have included an interview with the managing executive officer in charge of R&D (pages 44 to 45).

## Other Reporting Media

This CSR Report is issued as a printed brochure and online via our corporate website (digital book and PDF formats). Also provided online are associated references and Site Reports (digital book and PDF formats). Descriptions of "The Denka Group's Environment-Friendly Products and Technologies," which had been included in previous web-based CSR Report references, have been incorporated into the 2016 edition of printed CSR Report brochure and re-titled "Creating Shared Value (CSV): How Denka Products Help Resolve Social Issues" (pages 46 to 49).

The Site Reports, which showcase CSR activities undertaken by the Group's production and R&D sites around the world, include the newly added manufacturing and research facilities: Denka Performance Elastomer LLC (U.S.A.); Icon Genetics GmbH (Germany); Denka Advanced Materials Vietnam Co., Ltd. (Vietnam); Denka Infrastructure Malaysia Sdn. Bhd. (Malaysia); Denka Inorganic Materials (Tianjin) Co., Ltd. (China); and Denka Electronics Materials Dalian Co., Ltd. (China).

## Coverage

Fiscal 2015 (April 1, 2015, through March 31, 2016) in principle; this report includes additional information on some initiatives undertaken subsequent to the fiscal 2016 year-end while presenting data on numerical targets for and performance statistics from the past several fiscal years.

## Scope

Unless stated otherwise, performance statistics presented in this report encompass the business sites of Denka and key affiliates listed below.

- Business sites: Six production sites (Omi, Omuta, Chiba, Shibukawa, Ofuna and Isesaki) and four R&D institutes (the Advanced Technologies Research Institute, the Life Innovation Research Institute, the Infrastructure & Solutions Development Research Institute at the Denka Innovation Center and the Polymer & Processing Technology Institute) Denal Silane Co., Ltd. and Denak Co., Ltd. at the Omi Plant as well as TOYO STYRENE Co., Ltd., and Taiyo Vinyl Corporation at the Chiba Plant
- Key affiliates:

## Guidelines

- The G4 Sustainability Reporting Guidelines of the Global Reporting Initiative (GRI)
- The Environmental Reporting Guidelines 2012 of Japan's Ministry of the Environment

## Website-Only Content

For CSR reporting, Denka utilizes both printed booklets and online references that are prepared in digital book and PDF formats and posted on its website.

While the former present the latest examples of Denka's initiatives aimed at achieving sustainable growth, the latter cover information on its long-standing CSR activities. In addition, the Global Reporting Initiative (GRI) Content Index is attached to the web-based references to the Denka Group CSR Report 2016.

Please see also Site Reports (posted on the website in digital book and PDF formats) for detailed information on each business site and affiliate. <http://www.denka.co.jp/eng/sustainability/>

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## Striving to Realize “The Denka Value”— Our New Corporate Philosophy—We Are Furthering the Development of Society by Delivering the Greater Possibilities of Chemistry



### 1. Initiatives to Support Areas Affected by the Kumamoto and Great East Japan Earthquakes

We would like to express our deepest condolences to those who have lost loved ones in the April 2016 Kumamoto Earthquake in southern Japan while extending our sincere sympathy to all those affected by the disaster.

At present, Denka is dispatching and supporting employee volunteers consisting mainly of staff from the Omuta Plant, which is situated near the area that bore the brunt of the earthquake. We are truly appreciative of the support local communities have lent our day-to-day operations over the years and are determined to do our utmost to reciprocate by supporting those who have suffered from this disaster.

Up north, we continue to dispatch employee volunteers to Minami Sanriku-cho, Miyagi Prefecture, which was devastated by the 2011 Great East Japan Earthquake. Having begun dispatching volunteers to the region as soon as the earthquake struck, we have been strongly backing the efforts of employees who aspire to support the victims of this unprecedented disaster.

We sincerely wish for the earliest possible recovery of these devastated areas.

### 2. Review of Our Fiscal 2015 Operations

In 2015, Denka celebrated the centennial of its founding. I would like to once again express my wholehearted gratitude to our stakeholders because this accomplishment was only possible due to their support and cooperation.

In fiscal 2015, Denka marked record-high results in terms of operating income, ordinary profit and profit attributable to owners of the parent. This was attributable to the depreciation of the yen, falling oil and raw material prices and other economic factors as well as the success of its proactive marketing efforts and exhaustive scrutiny of cost elements.

As we embarked on fiscal 2016, however, the outlook grew unclear due to the appreciation of the yen, the slowdown of growth in such emerging economies as China and the expected fallout from “Brexit”—the U.K.’s decision to leave the European Union.

Nevertheless, we are striving to achieve further growth over the next 100 years and, to this end, are strengthening our business foundation by transforming our corporate culture, executing organizational reforms and implementing the Denka100 management plan growth strategies. In these ways, we are building a stronger operating base that is resilient to change in the management environment.

#### New Corporate Culture and Organizational Reforms

We have changed our company name to Denka Company Limited as part of initiatives to transform our corporate culture and promote organizational reforms. At the same time, we established “The Denka Value,” a corporate philosophy serving as the cornerstone of all our business activities, while formulating such principles as the Basic Policy for Workplace Safety, Health, Security and Disaster Prevention and the Denka Corporate Governance Guidelines. These reform initiatives have been of significant importance to our efforts to build a more robust business foundation.

In particular, “The Denka Value” is intended to serve the key driver of our reform initiatives. With the establishment of this philosophy, we have identified “Taking on the challenge of expanding the possibilities of chemistry to create new value and contribute to sound social development” as the Denka Mission. Moreover, we have laid out the Denka Principles, a set of precepts every employee should refer to when they think about what must be done to fulfil this mission and what constitutes our responsibilities and future vision.

Meanwhile, we formulated the Basic Policy for Workplace Safety, Health, Security and Disaster Prevention. We have also created the safety slogan “Placing the utmost priority on safety, let us strictly comply with rules and decisively make necessary changes!” in conjunction with the launch of the new Safety Promotion Meeting. We are thus stepping up our safety assurance activities on a Groupwide basis. Based on lessons learned from the two major accidents that emerged at the Omi and Chiba plants in 2013, we are steadily implementing hazard prediction initiatives at each worksite while addressing potential points of danger. In this way, we are working together toward the elimination of all accidents and disasters—our ultimate goal in this pursuit.

#### New Growth Strategy Initiatives

In line with the Denka100 management plan, the final year of which has been set at fiscal 2017, we have been implementing a number of initiatives.

Having carefully scrutinized every cost element, we have realized significant cost reductions by improving production efficiency and reducing resource and energy consumption. In particular, the Chiba Plant was able to streamline its utilities usage, thereby achieving considerable reductions in the environmental impact of its operations.

To create the most optimal production system, we have established a more robust chloroprene rubber production network based on two locations in Japan and the United States. We also launched an overseas base for promoting the special cement additive business in China and Southeast Asia. Furthermore, we have downsized the ABS resin production facilities at the Chiba Plant.

Focusing our management resources on new growth drivers and the development of next-generation products, we stepped up healthcare-related operations in Japan and overseas, placing priority on disease prevention and health promotion. Simultaneously, we formed a matrix-type organizational structure for the development of next-generation automotive materials and relevant solutions. In addition, efforts are now under way to promote open innovation to drive R&D undertaken at the Denka Innovation Center.

These are but some examples of our key initiatives undertaken as part of our new growth strategies.

### 3. Our Sustainability Initiatives

In September 2015, the United Nations General Assembly adopted Sustainable Development Goals (SDGs) toward 2030, while in December, the 21st Conference of the Parties, or COP21: The 2015 United Nations Climate Change Conference, agreed to introduce a priority target framework for countering global warming. As such, 2015 was a milestone year amid an international trend toward sustainability strategies.

Because Denka uses resources and energy to manufacture chemical products, the reduction of environmental burdens attributable to its production activities should be the Company’s foremost goal. Moreover, Denka’s existence as a going concern is dependent on its continued ability to contribute to the sustainable development of society through manufacturing operations. Having positioned the environment, energy, infrastructure and healthcare as priority areas of focus for management resources, we are well aware of the fact that many of society’s pressing challenges lie in these fields, just as the aforementioned SDGs suggest. With this in mind, we will tackle these challenges by identifying areas where Denka can maximize its strengths. In this way, we will expand the possibilities of chemistry and create new value.

### 4. To Our Shareholders

The enactment of Japan’s Stewardship Code and Corporate Governance Code has drawn investors’ attention to ESG (environmental, social and governance) investment criteria. To

continue to earn the trust placed in us by our shareholders, investors and all other stakeholders, we will step up corporate governance and information disclosure while implementing our Policy on Shareholder Returns, which we established in fiscal 2014.

### 5. Employee Happiness and Diversity Promotion

Corporate growth is dependent on the personal growth of workers. Therefore, an essential part of our overall growth strategy is the creation of a working environment in which every employee can happily engage in rewarding tasks while being free to develop his or her potential. Given the low domestic birth rate and the graying of Japan’s society, Denka recognizes that there are many things the Company can do to support those who take on the challenges of child rearing and providing nursing care for family members. In particular, we are focusing on developing a workplace where younger staff and women can achieve success, thereby helping strike a healthy work-life balance and realizing employee happiness.

On the back of an increasingly globalized business environment, we believe that nurturing a diversity-oriented corporate culture is becoming ever more important. Understanding the challenges attributable to cultural or organizational differences, we will undertake the diversity initiatives that we see as key to successful global expansion. Specifically, we will recruit a growing number of foreign nationals while actively dispatching younger employees overseas. We will thereby nurture a new generation of Denka staff capable of driving business based on a global perspective.

### 6. The Future of Denka

Denka’s corporate culture is centered on being sincere in its dealings as it strives to fulfill customers’ expectations and maintaining a determined and unwavering attitude as it tackles and resolves the challenges before it. This corporate culture informs our strong awareness of the importance of precise quality maintenance and stable product supply. And this is exactly the source of Denka’s strength. We believe that this will be our key competitive edge enabling us to blaze a new path in the face of a globalized business environment and rapidly changing market needs.

Drawing on this strength, we will go on to facilitate an ambitious business approach that takes on challenging targets by rallying Groupwide efforts. I am confident that Denka’s technologies, which have been attuned to meet needs in each of its areas of specialty, will provide the solutions needed to resolve the challenges society is now confronting. As our corporate slogan “Possibility of chemistry.” asserts, we have committed ourselves to meeting society’s expectations through such pursuit.

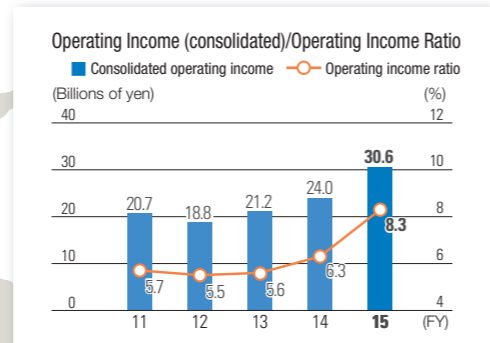
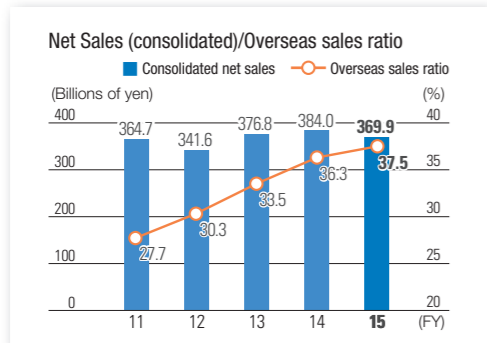
Guided by “The Denka Value” corporate philosophy, all Denka Group members will work as one to contribute to the well-being of people and sound development of society by expanding the possibilities of chemistry and creating new value.

We sincerely ask for your ongoing support for our Group operations.

Corporate Profile (as of October 1, 2016)

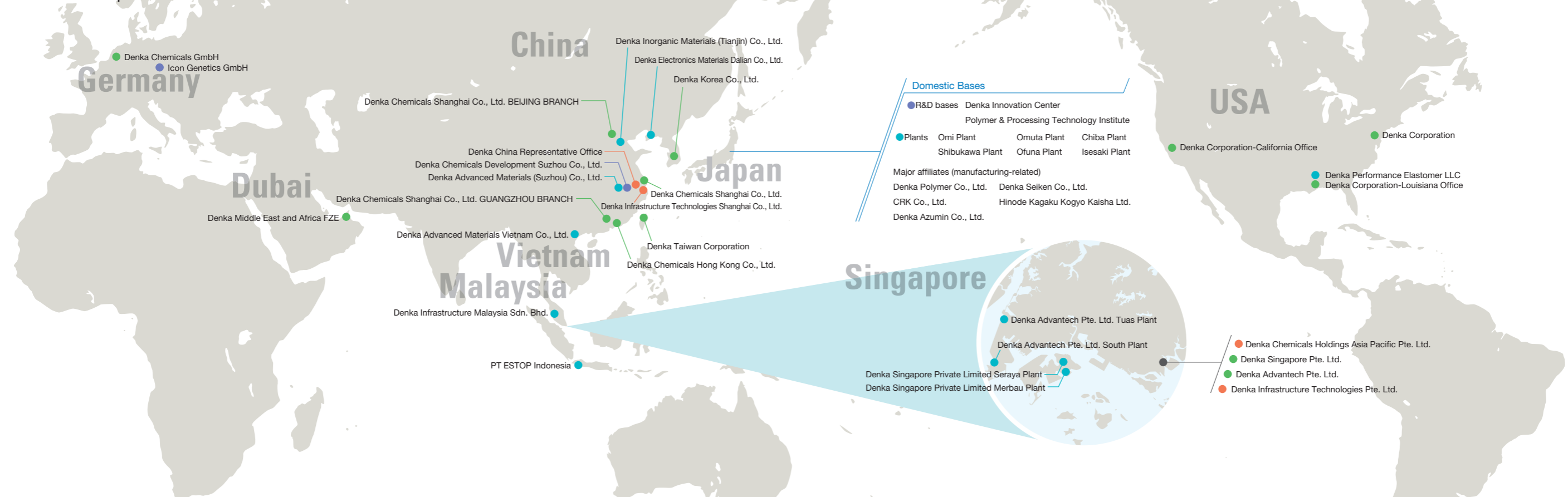
**Name** Denka Company Limited  
**Established** May 1, 1915  
**Business Sites** **Head Office**  
 Nihonbashi Mitsui Tower, 1-1, Nihonbashi-Muromachi 2-chome, Chuo-ku, Tokyo 103-8338, Japan  
 Tel: +81-3-5290-5055  
**Branches**  
 Osaka, Nagoya, Fukuoka, Niigata, Hokuriku (Toyama), Sapporo, Tohoku (Sendai)  
**Sales Offices**  
 Nagano, Gunma (Takasaki), Akita, Hiroshima, Shikoku (Takamatsu)  
**Research Institutes**  
 Denka Innovation Center [Advanced Technologies Research Institute, Life Innovation Research Institute, Infrastructure & Solutions Development Research Institute] (Machida, Tokyo)  
 Polymer & Processing Technology Institute (Ichihara, Chiba)

**Paid-in Capital** ¥ 36,998,436,962 (as of March 31, 2016)  
**Employees** Consolidated: 5,788 Non-consolidated: 2,974 (As of March 31, 2016)  
**Plants**  
 Omi (Itoigawa, Niigata), Omuta, Chiba (Ichihara, Chiba and Bibai, Hokkaido), Shibukawa, Ofuna (Kamakura, Kanagawa), Isesaki (Isesaki and Ota, Gunma)  
**Overseas Subsidiaries & Offices**  
 New York, California, Louisiana, Düsseldorf, Halle (Germany), Singapore, Malaysia, Indonesia, Vietnam, Shanghai, Beijing, Guangzhou, Suzhou, Hong Kong, Tianjin, Taiwan, Seoul and Dubai  
**Major Affiliates**  
 Denka Polymer Co., Ltd. (Koto-ku, Tokyo)  
 Denka Seiken Co., Ltd. (Chuo-ku, Tokyo)  
 CRK Co., Ltd. (Takasaki, Gunma)  
 Hinode Kagaku Kogyo (Maizuru, Kyoto)  
 Denka Azumin Co., Ltd. (Hanamaki, Iwate)



Denka's Overseas Expansion

Regional headquarters Manufacturing bases Sales bases R&D bases



Denka's Business Operations

Elastomers & Performance Plastics

- Main products**
- Chloroprene rubber
  - Styrene monomer
  - SBC resin
  - Acetylene black
  - ABS resin
  - Polyvinyl alcohol



DENKA BLACK Li

DENKA BLACK Li is acetylene black used as conductive aid for lithium-ion secondary batteries (LiBs). Aiming to meet growing market demand associated with these and similar products, Denka is striving to boost its capacity to supply safe and highly functional conductive materials. To this end, the Chiba Plant launched a dedicated acetylene black production facility capable of eradicating foreign matter content to the greatest possible extent. Denka is thus contributing to the advance of LiB performance.

Topic

Infrastructure & Social Solutions

- Main products**
- Calcium cyanamide fertilizer
  - Fire resistant materials
  - Water piping for agricultural and civil engineering use
  - Calcium carbide
  - Cement
  - Special cement additives



Film Farming

"Film Farming" is the world's first plant cultivation technology to utilize hydrogel membrane. In the face of growing public concerns over food safety, water shortages and soil contamination, Denka has initiated the marketing of a cutting-edge plant cultivation system based on this technology. Fully leveraging its long experience in the fertilizer business and accumulated product development know-how, Denka will strengthen its agriculture-related operations while pushing forward with new business development.

Topic

Electronics & Innovative Products

- Main products**
- Electronic circuit substrates
  - Fine ceramics
  - Functional adhesives
  - Fused silica
  - Electronic packaging materials



DENKA Thermo Film

All around the world, DENKA Thermo Film is widely used as a carrier tape for electronic components. Supplying a variety of product grades for various applications, Denka is striving to capture growing demand in China, Southeast Asia and other countries overseas. Specifically, having established a new plant in Vietnam, Denka is promoting local production and thereby creating an optimal production system.

Topic

Life Science & Environmental Products

- Main products**
- Food packaging materials
  - Industrial materials
  - Housing materials
  - Pharmaceutical products



An example of products made of TOYOKALON

TOYOKALON

Denka became the first in the world to commercialize polyvinyl chloride (PVC) synthetic fiber. Having branded it TOYOKALON, Denka has been supplying this product as a material for wigs and hairpieces, thereby garnering worldwide reputation for its superior quality, with the African continent and the United States constituting primary markets. Employing a manufacturing system supported by facilities in two locations, namely, Japan and Singapore, Denka will step up the supply of high quality products targeting the African market, where demand is expected to grow further.

Topic

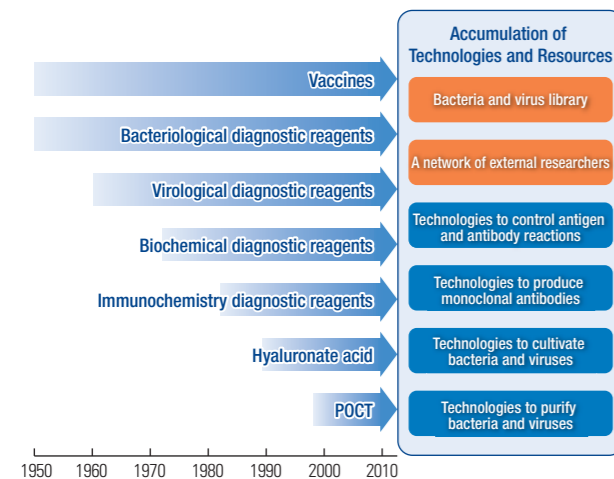
# Contributing to the Advance of Medical Technologies as an Innovator in the Shift toward Prevention through Early Diagnosis

## 1. Denka's Core Competencies in the Healthcare Field

As the core Group company in the field of healthcare, Denka Seiken Co., Ltd. has been manufacturing a variety of vaccines and diagnostic reagents since the 1950s. Denka itself has long been producing a macromolecular sodium hyaluronate preparation through fermentation. Having thus accumulated strengths in biotechnologies as well as extensive experience and a strong track record over its more than 65 years in the healthcare field, the Denka Group is positioned to offer comprehensive assistance to medical specialists on a number of fronts ranging from illness prevention, health examination and disease diagnosis to treatment.

In particular, products utilizing antigen, antibody and enzyme reactions account for more than 90% of Denka Seiken's net sales. This is thanks to the subsidiary's unique technological strength in the handling of proteins and an extensive library of infectious bacteria and viruses, which together place it in an advantageous position over domestic and overseas competitors with regard to the vaccine and diagnostic reagent business. In addition, Denka possesses a unique fermentation technology for producing hyaluronate acid for such medical applications as the improvement of joint function.

Denka's Core Competencies in the Healthcare Field



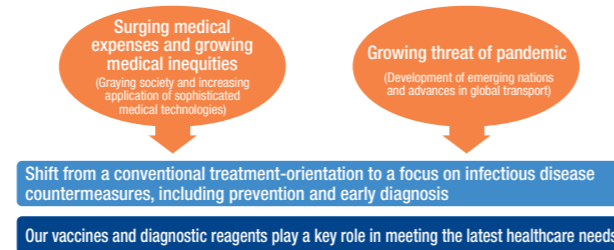
## 2. Fulfilling Our Mission to Help Resolve Challenges Confronting the Medical Industry

Reflecting the graying of Japan's society and advances in medical technologies, national medical expenses have been steadily growing, amounting to approximately ¥41 trillion in 2015. Given this trend, the healthcare industry is expected to shift its priorities toward earlier diagnosis and disease prevention and away from the more conventional treatment-centric approach. At the same time, burgeoning growth in emerging countries along with advances in global transport have greatly increased the threat of widespread epidemics. Because of this, the prevention of infection and the earlier diagnosis of diseases have become ever more important.

It can therefore be said that our Group operations related to various vaccines and diagnostic reagents, which provide solutions for disease prevention, early diagnosis and health

promotion, have a central role to play in answering the needs of the healthcare industry around the globe. We have thus positioned providing these solutions as our mission.

Shift in Healthcare Needs around the World from Treatment to Prevention and Early Diagnosis



## 3. Strengthening Our Operating Foundation

Our healthcare-related operations employ wide-ranging technologies. Due to the rapid nature of technological advancement in this field, these operations must be highly responsive; therefore, we proactively utilize an open innovation approach to R&D.

- 2014 Established the Life Innovation Research Institute ①
- 2016 Signed a comprehensive partnership agreement with Niigata University pertaining to R&D in the healthcare field ②
- 2017 Plans call for establishing Denka Life Innovation Research Private Limited at Nucleos in Biopolis, Singapore's premier research hub for biomedical industry, as a base for collaborative R&D with Singapore's Agency for Science, Technology and Research ③



## 4. Expanding into New Business Fields

In addition to a focus on disease prevention and early diagnosis, we are striving to acquire new technologies and launch new businesses in the fields of cancer treatment and gene-based remedies, both of which are characterized by rapid spurts of technological advancement.

### ① Meeting New Medical Needs by Applying Existing Technologies

- A) Expanding into the health checkup field  
Promote lipid panel examinations (sd LDL-C, etc.) aimed at countering lifestyle diseases and facilitating health awareness and cancer examinations based on pylorus reagents
- B) Developing cancer remedies  
Develop a mass-production method for G47Δ through the application of vaccine and reagent technologies while serving as a manufacturer of this cutting-edge anticancer drug

## ② Introducing New Technologies in Our Areas of Strength

- A) Create a new business based on the utilization of protein in vaccine and reagent development, with the acquisition of Icon Genetics GmbH providing us with gene-based antigen and antibody production technologies

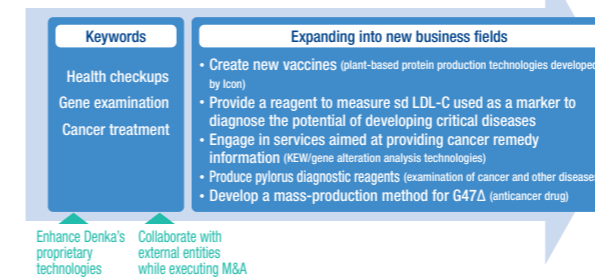


Icon Genetics GmbH

- B) Combine our know-how in the examination field and gene analysis technologies; collaborate with the U.S.-based KEW Group in the clinical sequence\* business

\*A service aimed at providing physicians with information to help select optimal remedies for each patient (mainly molecular target drugs). Clinical sequencing utilizes a gene analysis device called "sequencer" to analyze alterations in the patient's cancer cell genes while collating the results with a cancer treatment database.

### Expanding into New Business Fields

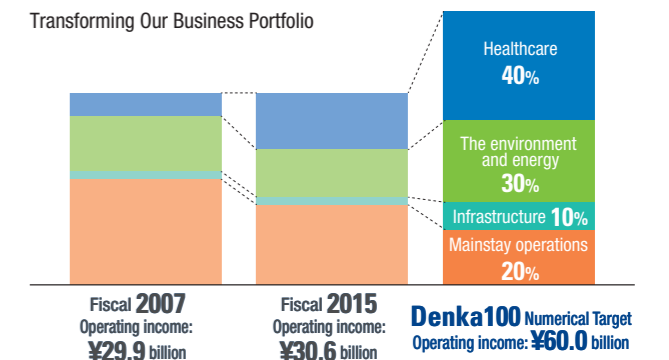


## 5. Nurturing Our Healthcare-Related Operations into a Key Business Pillar

In line with the Denka100 management plan numerical targets, we are striving to achieve operating income of ¥60 billion or greater. With this in mind, we have positioned the healthcare field as a future business pillar, nurturing our core operations in this field to transform our business portfolio.

- 10% of fiscal 2007 consolidated operating income (¥29.9 billion) was attributable to the healthcare-related business
- In fiscal 2015, the proportion of consolidated operating income (¥30.6 billion) attributable to this business grew to approximately 30%
- In the final year of the management plan, we are aiming for more robust operating income in this field (40% of consolidated operating income)

### Transforming Our Business Portfolio



## An Interview with the President of Denka Seiken Co., Ltd.

### Q. What are your key themes as you pursue market development?

Let me introduce three key themes. First, we are focusing on health examination. We have what we call "metabolic syndrome examination," a set of solutions for diagnosing lifestyle-related diseases. For instance, our reagents to measure lipoprotein subclasses, such as sd LDL-C—a useful marker for diagnosing the potential of developing critical diseases—are based on our own proprietary technologies. Also, other products enable "ABC examination" aimed at classifying and assessing the risk of stomach cancer through pylorus antibody examination. Our solutions also include the "expectant mother's examination" for detecting rubella virus and thus addressing a concern many pregnant women have. Having positioned these three areas as key priority items, we are striving to promote health examination-related solutions to help ensure disease prevention and facilitate early diagnosis.

Secondly, we are enhancing the lineup of our diagnostic test kits for Point of Care Testing, or POCT, for such infectious diseases as influenza. Not only are we stepping up the domestic marketing of these products, we are striving to popularize them in countries abroad. Although we often face constraints in overseas markets due to regulatory differences, we believe that our POCT kits will garner a solid reputation as they enable a user to perform a quick diagnosis using a simple procedure that does not require any other examination equipment.

Thirdly, we are developing a mass-production method for the G47Δ anticancer virus while building a manufacturing system for this cancer drug. G47Δ was developed by Dr. Tomoki Todo, a professor at the Institute of Medical Science of the University of Tokyo, and Denka Seiken was commissioned to establish a manufacturing method for this virus on the basis of the company's significant reputation as a vaccine maker equipped with superior cultivation technologies. This anticancer virus is expected to be effective in treating types of cancer that previously had been hard to address. Plans call for the completion of the first production facility in our Niigata Plant in September 2017. We will strive to commercialize this cancer treatment at the earliest possible date.

Among these three themes, the commercialization of G47Δ in particular will position us to make a big step forward in the field of disease treatment. In addition to the provision of disease prevention and early diagnosis solutions, the manufacture of such drugs will be another key field where Denka Seiken can fully leverage its core competencies in protein utilization technology. I expect this business to grow into a substantial earnings pillar for the Denka Group. I'm sure that Denka will have evolved drastically 30 to 50 years from now.



Tetsuro Maeda  
President, Denka Seiken Co., Ltd.



A diagnostic reagent for measuring sd LDL-C



Denka Seiken Kagamid Plant

# Denka Group's CSR



**Manabu Yamamoto**  
 Director, Senior Managing Executive Officer,  
 General Manager of Corporate Planning Dept.,  
 in charge of CSR & Corporate Communications Dept.

## Promoting CSR Activities to Realize "The Denka Value," Our Corporate Philosophy

In May 2016, the Denka Group established "The Denka Value," a new corporate philosophy that serves as a cornerstone of its corporate activities. By doing so, we renewed our commitment to living up to the expectations and trust of society. This philosophy consists of the Denka Mission, which represents our uppermost mission statement, namely, "Taking on the challenge of expanding the possibilities of chemistry to create new value and contribute to sound social development," as well as the Denka Principles, a set of precepts that all Group employees should refer to in all they do.

Fulfilling our social responsibilities is a linchpin of our corporate activities aimed at achieving the goals of the Denka100 management plan. Therefore, CSR is as essential as the plan's new growth strategies to the realization of "The Denka Value." We believe that a clear awareness of the social responsibilities that each employee should bear is essential to the achievement of sustainable future growth. With this in mind, we will strive to enhance our structure for promoting Groupwide CSR activities.

## Major CSR Initiatives Undertaken from Fiscal 2015 to the Present

### (1) Establishment of "The Denka Value" (May 2016)

With the establishment of "The Denka Value," we have identified "Taking on the challenge of expanding the possibilities of chemistry to create new value and contribute to sound social development" as the Denka Mission. The Denka Principles provide a set of precepts guiding the actions of all employees to realize this mission.



### (2) Establishment of the Denka Corporate Governance Guidelines (November 2015)

We established the Denka Corporate Governance Guidelines to achieve sustainable growth and enhance our corporate value over the medium to long term.

### (3) Establishment of the Safety Promotion Meeting and activities to ensure "safety first" (September 2015)

To ensure that every worksite places the utmost priority on safety and embraces the Basic Policy for Workplace Safety, Health, Security and Disaster Prevention, we renamed our "safety review meetings," aimed at voluntary safety inspection activities, the Safety Promotion Meetings and strengthened their functions.

### (4) Revisions to personnel systems to promote employee happiness and development

To promote diversity and help employees strike a healthy work-life balance, we have been actively developing systems to support those engaged in child rearing and the nursing care of their families. The revisions executed in April 2016 include extending the period of nursing care leave granted to eligible employees; initiating a subsidy program to defray childcare facility fees for employees whose spouses also work full-time; and letting eligible employees work at home on a trial basis.

### (5) Strengthening of information disclosure with regard to our global warming prevention initiatives (CDP initiatives)

In fiscal 2015, we began disclosing information on our climate change counterstrategies and greenhouse gas (GHG) emissions employing the Carbon Disclosure Project (CDP), a scheme operated by a U.K.-based NPO. Moreover, in fiscal 2016 we expanded the scope of operations for which we calculate Scope 3 indirect emissions.

### (6) Activities to support areas affected by the Kumamoto Earthquake and the Great East Japan Earthquake

Staff at the Omuta Plant has been engaged in volunteer and other activities to help people in areas near the plant that were impacted by the Kumamoto Earthquake. In addition, ongoing volunteer activities are under way to respond to requests for assistance from agriculture and fishery industries in areas devastated by the Great East Japan Earthquake in 2011, with the aim of helping local people get back to their previous ways of living.

## CSR Promotion Structure

To promote its CSR activities, Denka has established a CSR promotion structure consisting of the CSR & Corporate Communications Department and other specialized bodies. The CSR & Corporate Communications Department has been systematically developing an in-house structure to promote CSR, facilitating the understanding of all Group employees to ensure their wholehearted engagement in CSR activities and publishing these activities' results in the CSR report.

For fiscal 2016, we plan to establish a CSR Committee (tentative) that will comprehensively discuss matters

pertaining to and approve Groupwide CSR activities. Furthermore, in order to prioritize our overall corporate activities based on their materiality, we began utilizing a materiality matrix. This approach enables us to effectively focus our tangible and intangible resources on vital management activities while helping us communicate our initiatives to stakeholders in an easily understood manner. We will strive to step up our CSR activities by enhancing our action plans with a PDCA cycle.

## Value Creation Process

### The New Growth Strategies: The Denka100 Management Plan

Create the most optimal production system, scrutinize every cost element and focus management resources on new growth drivers, and develop next-generation products

Division	Products	Source of value	Expected socially beneficial effects	Sustainable Development Goals (SDGs)*
Elastomers & Performance Plastics	Synthetic rubber, synthetic resins, acetyl chemicals and styrene monomer	<ul style="list-style-type: none"> <li>● Polymer structure design and polymer control and composite technologies</li> <li>● Particle control and granulizing technologies</li> </ul>	<ul style="list-style-type: none"> <li>● Enhancing traffic safety</li> <li>● Contributing to the stable supply of food and safe water</li> <li>● Developing energy storage and transport technologies</li> <li>● Contributing to the advance of ICT</li> <li>● Curbing waste generation</li> </ul>	11. SUSTAINABLE CITIES AND COMMUNITIES 2. ZERO HUNGER 6. CLEAN WATER AND SANITATION 7. AFFORDABLE AND CLEAN ENERGY 9. INDUSTRY, INNOVATION AND INFRASTRUCTURE 12. RESPONSIBLE CONSUMPTION AND PRODUCTION
Infrastructure & Social Solutions	Fertilizers, cement additives, inorganic materials and corrugated pipes	<ul style="list-style-type: none"> <li>● In-house power generation facilities and limestone mines</li> <li>● Technologies to control the hardening, expansion and shrinkage of concrete</li> <li>● Fertilizer technologies to increase crop yields</li> <li>● Polymer processing technologies</li> </ul>	<ul style="list-style-type: none"> <li>● Contributing to the stable supply of food and safe water</li> <li>● Facilitating sustainable farming</li> <li>● Enhancing urban areas' disaster resilience</li> <li>● Assisting developing countries with infrastructure development</li> <li>● Facilitating the recycling and reuse of waste</li> <li>● Reducing automobile exhaust emissions</li> </ul>	2. ZERO HUNGER 6. CLEAN WATER AND SANITATION 2. ZERO HUNGER 11. SUSTAINABLE CITIES AND COMMUNITIES 9. INDUSTRY, INNOVATION AND INFRASTRUCTURE 12. RESPONSIBLE CONSUMPTION AND PRODUCTION 12. RESPONSIBLE CONSUMPTION AND PRODUCTION
Electronics & Innovative Products	Functional ceramics, thermally conductive substrates for electronic circuits, heat dissipating products, electronic packaging, dicing tapes, adhesives and emitters for electron microscopes	<ul style="list-style-type: none"> <li>● Combination of organic and inorganic chemistry</li> <li>● High-temperature control and calcining technologies and particle control technologies</li> <li>● Resin compounding and film processing technologies</li> <li>● Database of adhered materials</li> </ul>	<ul style="list-style-type: none"> <li>● Enhancing traffic safety</li> <li>● Contributing to the advance of ICT</li> <li>● Advancing energy-saving technologies</li> <li>● Popularizing clean energy</li> </ul>	11. SUSTAINABLE CITIES AND COMMUNITIES 9. INDUSTRY, INNOVATION AND INFRASTRUCTURE 9. INDUSTRY, INNOVATION AND INFRASTRUCTURE 7. AFFORDABLE AND CLEAN ENERGY
Life Science & Environment Products	Pharmaceutical products, synthetic fibers, functional films and food packaging	<ul style="list-style-type: none"> <li>● Vaccine and diagnostic reagent technologies (e.g., bacterial and virus library and monoclonal antibody technologies)</li> <li>● Polymer processing technologies</li> </ul>	<ul style="list-style-type: none"> <li>● Improving disease prevention and early diagnosis</li> <li>● Contributing to the stable supply of food and safe water</li> <li>● Helping women achieve career success</li> <li>● Contributing to the advance of ICT</li> <li>● Enhancing traffic safety</li> <li>● Popularizing clean energy</li> <li>● Reducing food waste</li> </ul>	3. GOOD HEALTH AND WELL-BEING 6. CLEAN WATER AND SANITATION 5. GENDER EQUALITY 9. INDUSTRY, INNOVATION AND INFRASTRUCTURE 11. SUSTAINABLE CITIES AND COMMUNITIES 7. AFFORDABLE AND CLEAN ENERGY 12. RESPONSIBLE CONSUMPTION AND PRODUCTION

\* United Nations SDGs that relate to "Expected socially beneficial effects" listed on the left

CSR Promotion Challenges, Targets and Performance

A: Achieved significant results B: Observed some results C: No results were observed D: The level of activity deteriorated

Disclosure items	Challenges	Fiscal 2015				Major challenges and goals in fiscal 2016 and beyond	
		Targets	Results	Pages	Rating		
Customers	<ul style="list-style-type: none"> <li>Supply of safe and high-quality products and development of economical products</li> </ul>	<ul style="list-style-type: none"> <li>Supply safe and high-quality products</li> <li>Develop and market products that benefit the environment and society</li> </ul>	<ul style="list-style-type: none"> <li>Focused management resources on such growth drivers as healthcare-related operations <b>Photo 1</b></li> <li>Developed products capable of helping reduce energy consumption and environmental burdens (electronic circuit substrates, phosphor, etc.)</li> <li>Strengthened overseas operations related to special cement additives that contribute to social infrastructure development (operations in Southeast Asia, etc.)</li> </ul>	p. 34-49 (printed report)	B	<ul style="list-style-type: none"> <li>Create new technologies and products that contribute to the sustainable development of society</li> <li>Promote open innovation via in-house and external collaboration</li> </ul>	
Corporate Governance	<ul style="list-style-type: none"> <li>Raising CSR awareness and promoting CSR activities</li> <li>Strengthening corporate governance structure and promoting compliance education</li> </ul>	<ul style="list-style-type: none"> <li>Strengthen corporate governance</li> <li>Provide training on corporate ethics and legal matters</li> <li>Nurture a CSR mindset</li> </ul>	<ul style="list-style-type: none"> <li>Established "The Denka Value," which lays out our corporate philosophy, principles and strategies</li> <li>Established the Denka Corporate Governance Guidelines</li> <li>Increased the number of outside directors (from two to three) and decreased the number of in-house directors (from seven to five) to enhance management transparency and soundness</li> <li>Appointed a Chief Compliance Officer</li> <li>Implemented training on corporate ethics, legal matters and CSR activities for employees at each Denka Group company <b>Photo 2</b></li> </ul>	p. 30-33 (printed report)/ p. 4 (web-based CSR Report references)	B	<ul style="list-style-type: none"> <li>Strengthen corporate governance</li> <li>Identify materiality in each business activity; establish a CSR Committee (tentative name) to handle a CSR activity PDCA cycle under the direct oversight of management and thereby nurture a CSR mindset</li> </ul>	
Safety Activities	<ul style="list-style-type: none"> <li>Ensuring facility security and disaster prevention while building and maintaining relationships of trust with local community members</li> <li>Maintaining occupational safety and health while creating a vibrant and comfortable working environment</li> </ul>	<ul style="list-style-type: none"> <li>Promote the Basic Policy for Workplace Safety, Health, Security and Disaster Prevention, which declares "We put the utmost priority on worksite safety and health, facility security and disaster prevention in all aspects of our business activities."</li> <li>Bring the number of major accidents and disasters to zero</li> <li>Continuously improve the number of occupational accidents</li> </ul>	<ul style="list-style-type: none"> <li>Established the Basic Policy for Workplace Safety, Health, Security and Disaster Prevention on April 1, 2015</li> <li>Renamed safety review meetings, which conduct voluntary inspections of safety activities, as the Safety Promotion Meetings</li> <li>Formulated the safety slogan "Placing the utmost priority on safety, let us strictly comply with rules and decisively make necessary changes."</li> <li>Held a kickoff ceremony for Safety Promotion Meetings with representatives from all plants and R&amp;D bases attending <b>Photo 3</b></li> <li>Worksite safety record (non-consolidated basis): 15 occupational accidents (down seven incidents year on year); two accidents involving absence from work (down one incident year on year)</li> <li>We will identify risk factors to implement countermeasures related to facilities and operational management</li> <li>Worksite safety record (domestic and overseas affiliates): 13 occupational accidents (up six incidents year on year); five accidents involving absence from work (up one incident year on year)</li> <li>Facilitating human exchange between Denka and affiliates, we will step up safety activities on a Groupwide basis</li> <li>Facility-related incidents included two fires and one leak</li> <li>We will swiftly correct current practices related to the handling of combustible materials and forklift management while taking steps to prevent recurrences</li> </ul>	p. 18-19 (printed report)	C	<ul style="list-style-type: none"> <li>Fiscal 2016 Companywide targets (announced at the Safety Promotion Meeting kickoff ceremony)                             <ol style="list-style-type: none"> <li>Reduce the number of major accidents and disasters to zero</li> <li>Continually improve the occupational safety record</li> </ol> </li> <li>Priority initiatives in the fiscal 2016 occupational safety management plan                             <ol style="list-style-type: none"> <li>Step up hazard prediction systems to prevent major accidents and facility-related incidents (leverage case studies of accidents at Denka and other companies and utilize assistance systems developed by industrial associations, etc.)</li> <li>Create a lively and sound workplace (facilitate worksite communication to ensure the ongoing reduction of potential dangers and eliminate accidents attributable to operator action)</li> <li>Step up the planning and management of facility improvement projects related to safety countermeasures (conduct facility reviews to re-identify those in need of safety countermeasures, formulate a three-year action plan, set aside budget and steadily execute said plan)</li> </ol> </li> </ul>	
Environmental Activities	<ul style="list-style-type: none"> <li>Prevention of global warming (CO<sub>2</sub> emissions reduction), curbing chemical substance emissions, waste reduction, technological innovation for energy conservation</li> </ul>	<ul style="list-style-type: none"> <li>Implement the Fifth Medium-Term Environmental Plan</li> <li>Promote RC activities</li> </ul>	<ul style="list-style-type: none"> <li>Implemented the Fifth Medium-Term Environmental Plan (with fiscal 2015 as the final year)                             <ol style="list-style-type: none"> <li>Achieved the target for energy consumption intensity: 0.95 compared with fiscal 2012 level (target: 0.96) Succeeded thanks to the energy-saving effect of improved processes introduced at each plant</li> <li>Achieved the target for CO<sub>2</sub> emissions intensity: 0.94 compared with fiscal 2012 level (target: 0.97) Succeeded thanks to the effect of improved processes introduced at each plant</li> <li>Achieved the target for emissions of PRTR substances: 76t (target: 88t) Made progress in the switchover to aqueous solvents for industrial tape adhesives at the Chiba Plant</li> <li>Achieved the target for the volume of final waste disposal: 153t (target: 176t) Succeeded thanks to a decrease in overall waste generation and effective utilization through recycling</li> </ol> </li> <li>Promoted the construction of the New Omigawa Power Plant (hydroelectric power generation) and carried out preparatory surveys for the construction of the New Himekawa Power Plant No. 6 (Kurobegawa Electric Power Company)</li> </ul>	p. 20-23 (printed report)/ p. 7-21 (web-based CSR Report references)	A	<ul style="list-style-type: none"> <li>Achieve the goals of the Sixth Medium-Term Environmental Plan (priority items: global warming countermeasures and the continuous reduction of industrial waste)</li> <li>Reduce emissions of chlorofluorocarbons (comply with the Act for Rationalized Use and Proper Management of Fluorocarbons; step up management and renewal of air conditioning, refrigeration and freezing equipment)</li> <li>Operate wastewater treatment facilities in a more systematic manner and step up the assessment of water usage status</li> <li>Strengthen environmental management encompassing Group companies, including overseas subsidiaries</li> </ul>	
Stakeholders	Employees	<ul style="list-style-type: none"> <li>Inclusive and rewarding workplaces</li> </ul>	<ul style="list-style-type: none"> <li>Implement initiatives under the Action Plan for General Business Operators (ensure that each employee takes at least 12 days of annual paid leave, streamline operations and reduce overtime work)</li> <li>Step up health promotion initiatives, including a program to address mental health problems</li> </ul>	<ul style="list-style-type: none"> <li>Revisions to the personnel system aimed at reducing burdens on employees who engage in such family duties as child rearing and nursing care while working</li> <li>April 2015: Lengthened the eligibility period for shortened working hours to support those engaged in child rearing; made it possible for employees to apply to change work locations when their spouses are transferred; began granting subsidies for those living separately from their spouses (without children) to defray their commuting expenses; and implemented the "Career Returner Plan" allowing for the reinstatement of employees who have resigned due to family duties, including nursing care and child rearing</li> <li>Implemented the Action Plan for General Business Operators (fiscal 2014 to 2016)</li> <li>Annual average utilization of paid leave: 9.56 days per individual; reduction in total working hours: 1,931 hours (same as the previous fiscal year)</li> <li>Increased "No Overtime Days" while sending messages via public address to raise employee awareness</li> <li>Number of employees who suffer mental health problems remained virtually unchanged</li> <li>Hired four foreign nationals to enhance our responsiveness to globalization (at the beginning of fiscal 2016; including those recruited from external companies)</li> <li>Provided employees hired in Singapore with long-term training in Japan while having those hired in China engage in job assignments at the Head Office in Tokyo</li> </ul>	p. 26-27 (printed report)	B	<ul style="list-style-type: none"> <li>Revisions to the personnel system</li> <li>April 2016: Lengthen the eligibility period for shortened working hours to support those engaged in nursing care; provide subsidies for those engaged in child rearing whose spouses also work full-time, as well as for single parents, to defray their childcare facility expenses; create region-specific job positions for those who need to stay in a particular region due to marriage, childbirth or nursing care; let eligible employees who are pregnant, raising a small child or engaged in nursing care work at home on a trial basis</li> <li>Promote the Action Plan for General Business Operators: Reduce total working hours and facilitate the use of annual paid leave</li> <li>Assess and improve the status of worksite environments by implementing the Mental Health Promotion Plan and stress checks</li> <li>Secure more foreign student recruits and step up long-term training programs in Japan</li> <li>Help women achieve career success (target for the proportion of women among newly hired specialists: 20% or more in fiscal 2017; target for the proportion of female managers across all managerial positions: 5% by fiscal 2025)</li> </ul>
	Supply Chains	<ul style="list-style-type: none"> <li>Promotion of CSR in tandem with supply chains</li> </ul>	<ul style="list-style-type: none"> <li>Communicate such information as the CSR Procurement Policies and Guidelines to supply chains</li> </ul>	<ul style="list-style-type: none"> <li>Sent out questionnaires to the key suppliers who represent 70% of Denka's raw material supply chain and obtained responses from the half of these, with all respondents approving Denka's CSR Procurement Policies</li> </ul>	p. 28 (printed report)/ p. 22 (web-based CSR Report references)	B	<ul style="list-style-type: none"> <li>Engage in more robust dialogue to promote CSR procurement, mainly with suppliers who failed to respond the questionnaires</li> </ul>
	General Public and Local Communities	<ul style="list-style-type: none"> <li>Initiatives as a good corporate citizen, such as robust communication with local communities and social contribution activities</li> </ul>	<ul style="list-style-type: none"> <li>Promote interaction with community members and social contribution activities</li> <li>Continue volunteer activities to support disaster-stricken areas</li> </ul>	<ul style="list-style-type: none"> <li>Engaged in interaction and dialogue with local communities by hosting plant tours and participating in community events <b>Photo 4</b></li> <li>Provided educational support by hosting experimental science classes; engaged in interaction with local communities; and raised employee awareness with regard to social contributions</li> <li>Helped revitalize local communities through events at DENKA BIG SWAN STADIUM and support for the NIGATA Albirex BB Rabbits <b>Photo 5</b></li> <li>Promoted the recycling of industrial waste for use in cement production</li> <li>Dispatched employee volunteers to Minami Sanriku-cho through the Disaster Area Volunteer Support Program</li> <li>Assisted students who grew up in the vicinity of Denka business sites in their pursuit of higher education through a scholarship program</li> <li>Contributed to youth education and social welfare by sponsoring and assisting the Fureai Trio concerts</li> </ul>	p. 14-17, 50-54 (printed report)	A	<ul style="list-style-type: none"> <li>Maintain robust communications with communities around business sites while contributing to the revitalization of local society</li> <li>Continuously implement volunteer activities to meet the needs of disaster-stricken areas (Minami Sanriku-cho)</li> <li>Support the restoration and reconstruction of areas hit by the Kumamoto Earthquake with the Omuta Plant serving as a main contributor</li> </ul>
	Governmental/ External Institutions	<ul style="list-style-type: none"> <li>Proactive engagement in public policies and activities aimed at resolving social issues</li> </ul>	<ul style="list-style-type: none"> <li>Utilize subsidy schemes to pursue R&amp;D projects and advance energy-saving and other environment-friendly technologies</li> </ul>	<ul style="list-style-type: none"> <li>Drew on public subsidy schemes to execute production facility upgrades aimed at reducing environmental burdens and conserving energy</li> <li>Main examples:                             <ul style="list-style-type: none"> <li>Energy-saving technologies: Reduced steam and fuel consumption (the Chiba Plant) while curbing energy used by cement production facilities</li> <li>Environmental burden reduction technologies: Promoted the use of CO<sub>2</sub>-SUICOM</li> <li>Cutting-edge technologies: Developed SiC power modules and constructed an ultra-pure acetylene black production facility</li> </ul> </li> </ul>	p. 23 (web-based CSR Report references)	A	<ul style="list-style-type: none"> <li>Utilize subsidy schemes to develop and commercialize eco-friendly technologies, including those aimed at reducing environmental burdens and conserving energy</li> </ul>
	Shareholders and Investors	<ul style="list-style-type: none"> <li>Enhancing corporate information disclosure and ensuring its reliability</li> </ul>	<ul style="list-style-type: none"> <li>Ensure timely and appropriate information disclosure to strengthen relationships of trust</li> <li>Execute the business plan and return profits to shareholders</li> </ul>	<ul style="list-style-type: none"> <li>Implemented new growth strategies for achieving the goals set forth in the Denka100 management plan</li> <li>Systematically implemented steps to enhance shareholder returns through the payment of dividends, purchase of treasury stock and execution of growth investments</li> <li>Consolidated information on environmental management and proactively disclosed it via such outlets as CDP</li> </ul>	p. 20-21, 29 (printed report)	B	<ul style="list-style-type: none"> <li>Promote new growth strategies to achieve the goals set forth in the business plan (final year set at fiscal 2017)</li> <li>Step up the disclosure of such non-financial information as environmental activity data and consider measures to secure its reliability (e.g., receive a third-party audit to earn accreditation)</li> </ul>



Photo 1 Mr. Tetsuro Maeda, the president of Denka Seiken, delivering a greeting at the facility completion ceremony (the Kagamida Plant)



Photo 2 A legal affairs training session (the Omi Plant)



Photo 3 The Safety Promotion Meeting kickoff ceremony



Photo 4 Participating in a summer festival with the Fujimicho Town Association (the Ofuna Plant)



Photo 5 Supporting the NIGATA Albirex BB Rabbits

# Engaging with Society

## Our Social Contribution Activities

In line with Article 9 of the Denka Group Guidelines stating "We will contribute to society as a good corporate citizen," Denka recognizes that implementing local contribution and cultural activities in collaboration with other community members is essential to fulfilling its social responsibilities.

Based on this recognition, our key social contribution initiatives include taking part in festive, sporting and other local events (community revitalization); undertaking beautification, cleanup and greenery maintenance activities in neighboring areas (environmental conservation); hosting experimental chemical classes and plant tours and providing internship and scholarship programs (educational support); and dispatching volunteers to aid in reconstruction efforts in disaster-stricken areas (humanitarian aid).

Not only do we aim to contribute to society through these activities, we also consider them key to facilitating the understanding of our operations among the general public and enhancing our relationships of trust with community members. Moreover, these activities help nurture our employees' awareness of social contribution. We are thus building a strong human resource base. This base is essential to our efforts to achieve sustainable growth in tandem with the development of society.

### Key Activities

Category	Key Activities
Community revitalization	Supporting events at DENKA BIG SWAN STADIUM (to which Denka holds the naming rights); supporting the NIIGATA Albirex BB Rabbits; taking part in local festivals (Itoigawa Omanta Festival, Omuta Daijaya Festival, Goi Rinkai Festival, Shibukawa Heso Festival, Ofuna Fujimicho Summer Festival (photo 1)); and participating in industrial product exhibitions
Environmental conservation	Undertaking cleanup activities in areas near business bases, including streets, beaches, river banks, irrigation channels and side ditches (photo 2); maintaining hydrangea beds; and co-sponsoring J-WAVE Green Casting Day
Educational support	Hosting plant tours and experimental chemical classes; participating in the Summer Holiday Chemical Experiment Show for Children (photo 3); providing internship programs; giving lectures to support job seekers; operating a scholarship system (to cover the housing fees of students from rural areas); donating books to the National University of Singapore; and holding Denka football clinics (Singapore; for elementary and junior high school students)
Culture and art	Supporting Mitsui Bunko archives; and hosting concerts featuring the Fureai Trio (photo 4)
Humanitarian aid	Engaging in volunteer activities to support the reconstruction of Minami Sanriku-cho as well as areas hit by the Kumamoto Earthquake; and supporting the Mitsui Volunteer Network Center



1 The Fujimicho Town Association Summer Festival (Ofuna Plant)  
 2 Cleaning the Nakamura water channel (Shibukawa Plant)  
 3 Summer Holiday Chemical Experiment Show for Children  
 4 Teaching a person with disabilities how to play the violin as part of the Fureai Trio concert

## Supporting People Affected by the 2016 Kumamoto Earthquake

We extend our deepest condolences for those who lost their loved ones in the Kumamoto Earthquake as well as our sincere sympathy to all those affected by the disaster.

As we have a base of operations near areas affected by the earthquake, we began supporting victims of this disaster and facilitating the reconstruction of communities immediately after the earthquake struck in April 2016. With staff at the Omuta Plant spearheading these humanitarian aid activities, we distributed drinking water and emergency rations to such areas as Kumamoto, Aso and Uki cities as well as Mashiki-cho while operating soup kitchens at Takumabaru and Hiroyasu elementary schools, which served as evacuation shelters. Furthermore, we assisted our business partners with their efforts to restore factory operations. In addition, Denka made a monetary donation to the Kumamoto prefectural government, while many of its officers and employees made individual contributions.

In Kumamoto City and Mashiki-cho, both of which suffered particularly grave damage, our employees help operate a local disaster volunteer center, sorting and transporting aid supplies, cleaning damaged housing and separating debris at collection sites. As of the end of June 2016, a total of more than 130 employees had taken part in these activities. We will continue these efforts.

Looking ahead, we will do our utmost to continuously meet the needs of those affected by the disaster. We sincerely hope for the earliest possible recovery of communities in these areas.



Denka staff who ran the soup kitchen at Takumabaru elementary school  
 Cooking rice  
 Setting up tables  
 Meals are ready



Soup kitchen run by Denka staff (Hiroyasu elementary school)

## Reconstruction Support Initiatives for Areas Hit by the Great East Japan Earthquake: Marking the Sixth Year

More than five years have passed since the Great East Japan Earthquake. Since the launch of the Disaster Area Volunteer Support Program in July 2011, Denka, with the eager participation of many of its employees, has striven to help reconstruct areas hit by this unprecedented disaster. Our activities were initially centered on cleaning damaged housing areas, getting rid of debris from farmland and sorting out articles left by deceased persons in such heavily-devastated areas as Minami Sanriku-cho, Miyagi Prefecture.

After seeing progress in the disposal of debris, we shifted our focus to reconstructing local industry by, for example, helping oyster farms resume operations through the provision of sandbags used for aquafarming rafts and re-developing farmland damaged by tsunami flooding. Before the disaster, Minami Sanriku-cho was home to thriving fishery and agricultural industries, but the earthquake forced many locals to leave the area. As a result, these labor-intensive industries are now facing a severe human resource shortage, to the point that a portion of crop yields and fish catches are being thrown away since there is not the necessary workforce to process them. Given this situation, Denka's volunteers are striving to help collect and process edible brown seaweed while also harvesting crops.

In May 2016, the MINAMISANRIKU CHEERING SQUAD, run by a local sightseeing association, took over the volunteer reception of the Minami Sanriku-cho volunteer center. This organization aims to foster ties between people in areas affected by the disaster and those who want to support them, in line with its belief that such wholehearted collaboration will speed reconstruction efforts, which will, in turn, bring the area back to self-reliance. Supporting this organization, we often hear comments from locals, saying things like "We're so happy that you're here again to help us!" This kind of experience allows us to truly appreciate the importance of ties between people, encouraging us to do our best for their sake. Going forward, we will help reconstruct this and other disaster-stricken communities so that they can thrive as they once did.



Supporting local farms (May 2016)



Supporting the local fishery industry (June 2016)

## Topic Social Contributions through the Ekomira Koto Recycling Project—Denka Polymer Co., Ltd.

Established in 1966, Denka Polymer Co., Ltd. manufactures and markets plastic food packaging. In doing so, Denka Polymer actively promotes lightweight packaging with the aim of helping reduce household waste and curbing environmental burden, including greenhouse gas emissions.

As a molded plastic food packaging maker headquartered in Koto Ward, Tokyo, Denka Polymer is a participant in a local formed styrol recycling project titled the "Ekomira Koto," launched in April 2010. Under this project, formed styrol packaging is collected from households and supermarkets in Koto Ward, processed into pellets at a facility run by environmental NPO Chikyusen Club, and shipped to manufacturers as a raw material for plastic products. Denka Polymer supports the operation of this NPO on various fronts.

In addition to being a collaborative resource recycling initiative that involves the local government, an NPO and businesses, the distinguishing feature of this project lies in the fact that it creates employment for people with disabilities while providing educational programs regarding environmental and social welfare issues for youths. More specifically, intellectually challenged persons are hired at the aforementioned processing facility to enable them to serve as independent members of society. This facility is located within the premises of Ekokkuru Koto, a public-run building for providing environmental education that periodically invites elementary and junior high school students for facility tours and educational sessions involving hands-on programs.

In these ways, Denka Polymer fosters a recycling-oriented society while contributing to social welfare and local communities.



Ekomira Koto processing facility



Used food packaging collected from households and supermarkets in Koto Ward



Processing collected items into pellets



# Revitalizing Local Communities by Promoting Sports Activities



From left: Shunya Nagasaki, Chikako Umeki and Noriyuki Shimizu

Since 2012, Denka has been a supplier of uniforms for the NIIGATA Albirex BB Rabbits, a women's basketball team based in Niigata. Moreover, in January 2014, Denka acquired naming rights for Niigata Stadium, which has served as a major arena for local sports events and the home stadium for the professional football team ALBIREX NIIGATA.

For nearly three years since the acquisition of naming rights and subsequent rebranding as the DENKA BIG SWAN STADIUM, this arena has been a venue for numerous events, including football games in which the J. League team ALBIREX NIIGATA plays. Looking ahead, we will promote sports activities to foster ties with local people and create a more vibrant community.



## We Value Chances to Meet and Interact with People in Niigata

**Noriyuki Shimizu**  
General Manager, CSR & Corporate Communications Dept.

Our mainstay Omi Plant, established 96 years ago, is located in Itoigawa City, Niigata Prefecture. In addition, Denka Seiken Co., Ltd., a producer of influenza vaccines and diagnostic reagents, operates in Gosen City, while other Group companies, such as those engaged in the manufacture of raw concrete, situate their facilities around Niigata City. As such, the Denka Group has deep roots in Niigata as a manufacturer. Against this background, we became a uniform supplier for the NIIGATA Albirex BB Rabbits in 2012. This move was driven by our wish to contribute to and help revitalize communities surrounding our bases of operations.

Since the beginning of engagement with this team, we have come to see its supporters' love for the region. There

has been a lot to learn from human interaction through sports. This experience moved us and prompted us to consider stepping up our local contribution activities. We then received an offer pertaining to the acquisition of the naming rights of Niigata Stadium.

Although the cost of the naming rights was not insignificant, we decided to take the offer. As we were approaching the centennial of our founding in 2015, we aspired to become a company that is more familiar to the people of Niigata. We were determined to continue corporate activities that value opportunities to meet and interact with members of local communities.

Having made a new start under the new name in January 2014, the DENKA BIG SWAN STADIUM has helped athletes and supporters experience inspiring moments and new encounters. It is our great honor to support and witness sports events in which history is made. We will continue to play a role in the revitalization of communities and the promotion of sports activities as best we can.



## Taking Deep Root in Local Communities to Become a Beloved Team

**Shunya Nagasaki**  
Director in Charge of Women's Basketball Club  
NIIGATA Albirex, a general incorporated association

In April 2011, the NIIGATA Albirex BB Rabbits was established, carrying on the legacy of its precursor, the JAL Rabbits, a team that has been a top domestic women's basketball team for the past 43 years. Having freed ourselves from operating under the auspices of a major corporation like JAL, we became the first team to be run solely with the support of local businesses and supporters and are members of the top league of the Women's Japan Basketball League Organization.

We believe that, going forward, relationships between local communities and professional sports teams will become ever more important. As the support of communities is essential for our activities, we would like to become their essential partner, a team that helps them grow and develop and is loved by many people.

However, we are aware that our team is not yet widely known. Therefore, first and foremost, we are striving to draw the general public's attention to basketball. We focus on encouraging people to come to the arena, feel the excitement of an intense basketball game, and become a basketball fan. This will require long, ongoing work, but we know that in order to create more basketball fans, our efforts to publicize the sport's appeal must be unceasing. And, fortunately, the Denka Group, a major corporate group based in Niigata Prefecture, is here to help us push forward. To return the favor of our supporters, Denka included, we will do our utmost to create an even stronger team that the people of Niigata can be proud of.

## I Hope the BB Rabbits Will Create Opportunities for People to Interact

**Chikako Umeki**  
Captain, the NIIGATA Albirex BB Rabbits  
General Affairs Department, Denka Seiken Co., Ltd.

It's been one year since I joined Denka Seiken. My duties in the General Affairs Department often overwhelmed me at first, as they involved relations with various other departments and a great number of colleagues, but I gradually got accustomed to handling my tasks. At the same time, I became aware of the important role Denka Seiken products play in society. The sense of responsibility I feel toward my work is growing stronger day by day.



Meanwhile, I was nominated as the captain of the BB Rabbits in 2016. The burden that the captain bears is heavy, but my teammates, the team staff and my family as well as the people of local communities have been helping me so that I can concentrate on playing basketball. I am so grateful for their support. Moreover, when we are practicing in one of the gymnasiums in Gosen City, which lies near Denka Seiken and where from this year forward most of our training is taking place, local residents frequently come to cheer, which we all find heartwarming. Before and after our practice, we also have opportunities to communicate with kids who play in local junior teams. These interactions with local people give me joy. For the people of Niigata, I will strive to lead my team to win as many games as we can. At the same time, I want to become a model for children who love basketball and dream of one day playing in Japan's top league or joining the national team. Finally, although I have yet to come up with a specific idea of how to do it, I'd like to help facilitate exchange between Denka Seiken—a big supporter of the BB Rabbits along with other Denka Group members—and the people of Niigata.

# Our Initiatives to Maintain Safe Operations

► For more details of occupational safety and health initiatives, please see the web-based *CSR Report 2016* references (p. 18).



**Mitsukuni Ayabe**  
Representative Director, Chief Operating Officer,  
Assistant to CEO, RC Committee Chair

**Remaining true to our motto “Safety first,” we will eliminate accidents and disasters by strictly complying with rules and decisively making necessary changes.**

The maintenance of safe operations is essential for Denka's future operations. We are therefore determined to foster a safety-oriented corporate culture that faithfully adheres to the lessons we have learned in the past and passes them on to the future. At the same time, we will remain quick to change what needs to be changed for the sake of safety. Moreover, we will ensure that everyone is encouraged to freely share his/her thoughts and insights on safety operations and take action. In this way, we will decisively endeavor to create a vibrant and lively workplace in which all will benefit from this collective effort to improve.

## Basic Policy for Workplace Safety, Health, Security and Disaster Prevention

**We put the utmost priority on worksite safety and health, facility security and disaster prevention in all aspects of our business activities.**

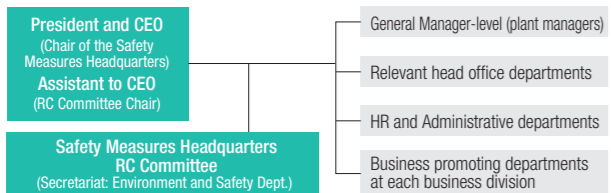
To fulfill our social responsibilities as a chemical company, we put the utmost priority on safety as our basic stance for operations, thereby working together to create a lively and sound workplace and becoming a company capable of eliminating accidents and disasters and worthy of society's trust.

April 1, 2015

Chair of the Safety Measures Headquarters (President & CEO)

## Safety Management Structure

**Safety Management Overview (Safety Measures Headquarters, etc.)**



### 1 Safety Promotion Meetings

- With a dedicated inspection team established under the direct supervision of the chair of the Safety Measures Headquarters, we carry out annual safety inspections encompassing every production and R&D base in Japan and overseas.
- In fiscal 2015, we renamed our annual safety review meetings Safety Promotion Meetings to strengthen their functions regarding objective inspections of activities undertaken at each business base and discussions about important measures.

### 2 Safety management conferences

- These conferences are convened for each manufacturing process, reviewing technological standards for facility security and disaster prevention and inspecting the status of facility maintenance, the processes for managing facility changes and countermeasures against facility accidents and failures.
- Departments in charge of manufacturing, facility maintenance and security at each business base hold safety management conferences as necessary. In addition, representatives from the Head Office's Technology and Audit divisions attend regular annual meetings.

### 3 Safety networking meetings and other gatherings by theme

- Frontline leaders from each plant and affiliate gather to exchange ideas about preventing accidents attributable to operator actions. They also conduct mutual on-site inspections. These gatherings help them inspire one another by sharing best practices while identifying potential danger spots.

## Fiscal 2015 Accident Record and Safety Assurance

In fiscal 2015, the number of occupational accidents recorded at Denka and its subcontractors totaled 15 (down seven incidents year on year), with two accidents involving absence from work (down one incident year on year). Thus, we saw a second consecutive annual improvement in the accident record. However, some of these incidents may have been made more serious due to workers' failing to comply with the basics of safety by, for example, getting caught in a machine after reaching a hand toward it while it was moving.

Meanwhile, our affiliates in Japan and overseas recorded 13 accidents (up six incidents year on year), with five accidents involving absence from work (up one incident year on year). A turnaround from the previously favorable record, the fiscal 2015 accident record shows overall growth in the number of incidents. Moreover, the ratio of accidents involving absence from work is higher than that for Denka and its subcontractors.

In fiscal 2015, facility-related incidents included two fires: The driver's seat of a backhoe used at the Omi Plant burned out, and construction equipment suffered fire damage at the Omuta Plant. There was also a water leak at an electrical furnace work section of the Omi Plant. None of these three incidents caused human injury or had any environmental impact.

The two fires were attributable to the presence of combustible materials in a building that houses calcium carbide production lines, from which hot substances may occasionally fly. We quickly removed such materials from the site. The leakage incident was due to the breakage of coolant water piping, which was damaged by contact with a forklift operating in a zone where water was prohibited. To prevent recurrences, we have installed safeguard walls and altered piping routes. Furthermore, we inspected other production sites that are similar to the locations of these incidents.

### Building a More Robust Foundation for Safety Assurance Operations and Fostering a Safety-Oriented Corporate Culture

Since the 2013 heat blast accident at the Omi Plant, which was due to the failure of an electrical furnace, we have steadily implemented action plans aimed at preventing the recurrence of similar accidents. On December 15, 2015, we invited Dr. Masayoshi Nakamura, a professor at Tokyo Institute of Technology (Tokyo Tech), to inspect our accident countermeasures undertaken at cement and special cement additive production facilities and asked him to examine our recurrence prevention measures for electrical furnaces in the Omi Plant. Following on the guidance he gave in fiscal 2013 and 2014, Dr. Nakamura

provided valuable recommendations regarding these countermeasures. In addition, in fiscal 2015 we invited examiners from the Japan Society for Safety Engineering (JSSE) to perform a safety-level diagnosis of the Omi Plant. This diagnosis, executed from November 30 to December 1, 2015, helped us obtain a number of insights from an external perspective.

We will draw on all of this objective input and advice to build a more robust foundation for safety assurance operations and foster a safety-oriented corporate culture.



Safety inspection conducted by Dr. Masayoshi Nakamura from Tokyo Tech

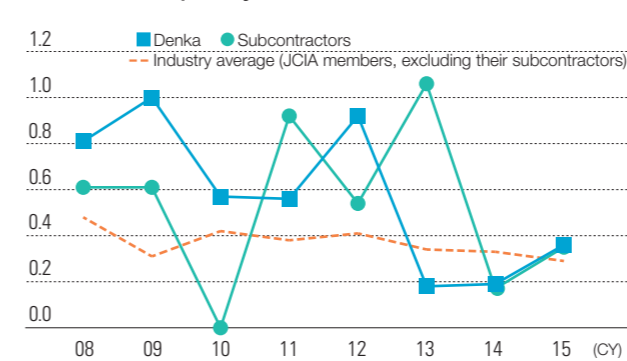
## Fiscal 2016 Occupational Safety Management Plan and New Initiatives to Realize Continuous Improvement

For fiscal 2016, we have set aside a dedicated budget for facility improvements related to safety countermeasures. This move is expected to ensure the steady execution of hazard prediction activities aimed at preventing major accidents and facility-related incidents as well as initiatives to address potential dangers identified by employees through worksite communication. We also stepped up the management of each improvement project.

### Number of Occupational Accidents<sup>1</sup>

	Denka							Affiliates					
	Directly managed sites		Subcontractors		Total			Japan			Overseas		
	Absence	No absence	Absence	No absence	Absence	No absence	Total	Absence	No absence	Total	Absence	No absence	Total
Fiscal 2014	2	12	1	7	3	19	22	4	2	6	0	1	1
Fiscal 2015	1	7	1	6	2	13	15	4	5	9	1	3	4

### Accident Frequency Rates<sup>2</sup>



<sup>1</sup> Number is calculated on a fiscal year basis.

<sup>2</sup> Rates are calculated on a calendar year basis in accordance with the instruction of the Labour Standards Inspection Office and JCIA guidelines.

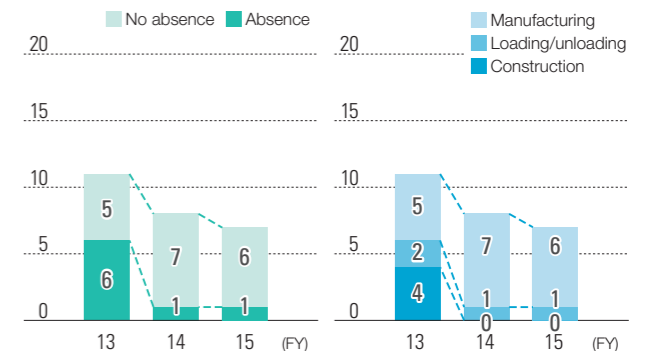
### Fiscal 2016 Occupational Safety Management Plan Companywide Targets

- 1 Reduce the number of major accidents and disasters to zero
- 2 Continually improve the occupational safety record

### Priority initiatives

- 1 Step up hazard prediction systems aimed at preventing major accidents and facility-related incidents
  - Leverage case studies of accidents at Denka and other companies
  - Utilize systems developed by industrial associations to assist with safety assurance operations
- 2 Create a lively and sound workplace
  - Facilitate worksite communication to ensure the ongoing reduction of potential dangers and eliminate accidents attributable to operator action
  - Promote safety assurance activities in which each worker is able to grasp the worth of their efforts
- 3 Step up the planning and management of facility improvement projects related to safety countermeasures
  - Conduct facility reviews to re-identify those in need of safety countermeasures and formulate a three-year action plan
  - Set aside a budget and steadily execute the action plan

### Reference: Number of Occupational Accidents at Subcontractors<sup>1</sup>



## Topic Safety Promotion Meeting Kickoff Ceremony

On July 11, 2016, a total of 800 employees took part in the Safety Promotion Meeting via a teleconference system connecting the Denka Head Office and Group business bases in Japan and overseas. As a kickoff event for Safety Promotion Meetings that will be convened annually at each domestic and overseas business base, this general meeting entailed an address by Denka President Shinsuke Yoshitaka (concurrently serving as chair of the Safety Measures Headquarters), who communicated his strong commitment to enforcing the motto of “safety first” and executing new safety-related priority measures to all Group employees. Moreover, representatives from each business base shared their determination to achieve the Companywide targets.



# Caring for the Global Environment

► For details of environmental conservation activities and environment data, please see the web-based *CSR Report 2016* references (p. 8-11, etc.).



**Tetsuya Shinmura**  
Executive Officer, Technology Div.,  
Leader of CDP Task Force

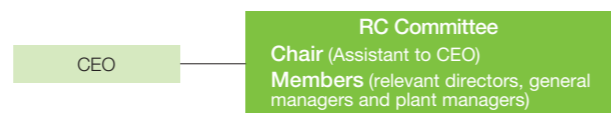
## Promoting Environmental Management Aimed at Ensuring the Sustainable Use of Resources and Energy

We have positioned “taking on the challenge of expanding the possibilities of chemistry to create new value and contribute to sound social development” as our mission. Our foundation for fulfilling this mission is the pursuit of CSR activities from economic, social and environmental perspectives. As part of such activities, we actively disclose information on environmental impacts attributable to our business activities—including those undertaken throughout our value chain—that may affect climate change by utilizing the CDP (Carbon Disclosure Project) scheme. In this way, we promote environmental management aimed at ensuring the sustainable use of resources and energy and thereby enhance our corporate value.

Furthermore, we will systematically implement countermeasures against global warming in line with the concept of “Decarbonization Pathways” suggested at the COP21.

### Fiscal 2016 Responsible Care (RC) Activity Policies

- Global warming countermeasures**  
Promote global warming countermeasures by achieving technological advancement in such areas as energy saving while exploring new development themes
- Continuously reducing industrial waste**  
Promote initiatives to improve yield ratios, sell recycling waste and utilize such waste in ways that complement the exhaustive scrutiny of each business base's cost elements
- Key themes**  
Promote resource recycling in cement production (the Omi Plant); step up measures aimed at reducing BOD and odor from wastewater treatment facilities and systematically renew freezers (the Omi Plant); and systematically reduce VOC emissions (the Chiba Plant)



The RC Committee engages in the review of the entire life cycles of our chemical products to assess their safety and potential impact on the environment and human health and thereby make systematic improvements.

### Life Cycle of Our Chemical Products



### RC Implementation Themes

Environmental conservation; security and disaster prevention; occupational safety and health; logistics safety; chemical and product safety; and worksite communication

In particular, the RC Committee formulates countermeasures against such critical issues as climate change that have the potential to alter the course of our overall operations. After the Board of Directors deliberates and gives approval to these countermeasures, we incorporate them into our business plans.

### Structure for Promoting Environmental Activities

To promote its environmental activities, Denka formulates annual plans through its Responsible Care (RC) Committee. After being discussed and approved by the Board of Directors, these plans are translated into Companywide policies and reflected in business plans. The RC Committee, which operates directly under the CEO, is attended by directors in charge of relevant matters, general managers of the relevant head office departments and plant managers, with the assistant to the CEO serving as the chair.

### Sixth Medium-Term Environmental Plan

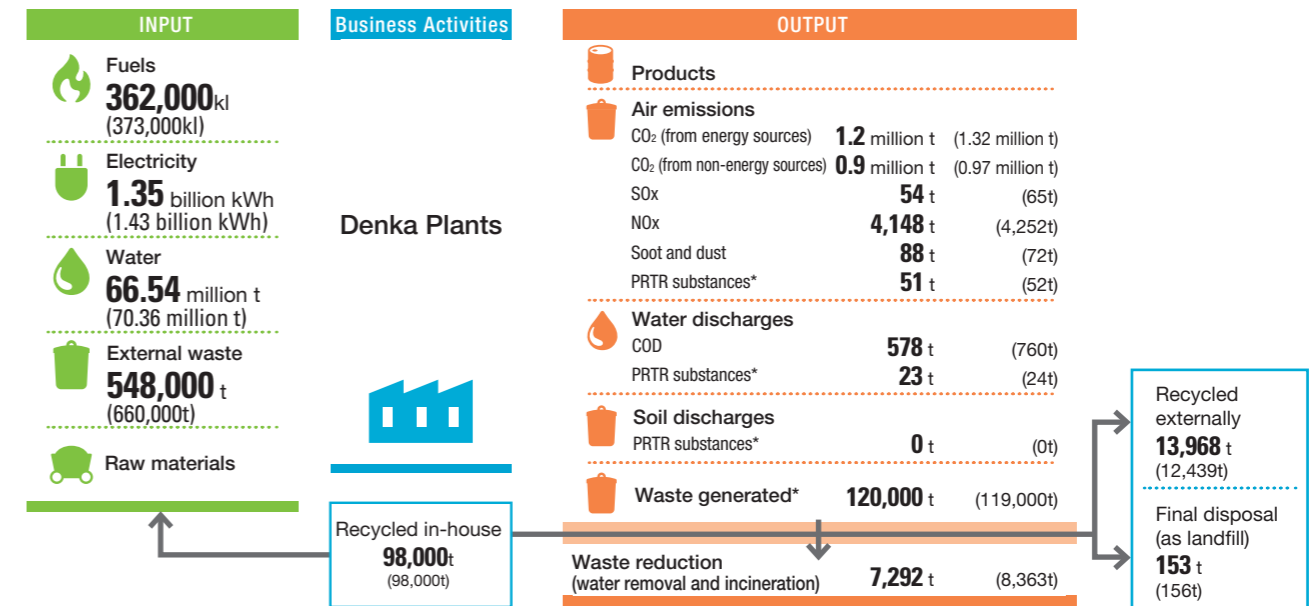
Fifth Medium-Term Environmental Plan (the final year)			Sixth Medium-Term Environmental Plan			
Items	Fiscal2015		Items	Fiscal2016	Fiscal2017	Fiscal2018
	Targets	Results		Targets	Targets	Targets
Energy consumption intensity (fiscal 2012 base)	0.96	0.91	Energy consumption intensity (fiscal 2015 base)	0.97	0.95	0.94
CO <sub>2</sub> emissions intensity* (from energy sources: fiscal 2012 base)	1.20 (0.97)	1.17 (0.93)	CO <sub>2</sub> emissions intensity (from energy sources: fiscal 2015 base)	1.18 (1.01)	1.14 (0.97)	1.13 (0.97)
Emissions of PRTR substances (tons)	88	74	Emissions of PRTR substances (tons)	73	73	71
Final landfill waste (tons)	176	153	Final landfill waste (tons)	151	123	111

\* Calculated based on the converted production volume of benchmark products

We were able to achieve the targets set forth in our Fifth Medium-Term Environmental Plan (fiscal 2013 to 2015). Specifically, initiatives to improve the production processes of the Omi, Chiba and Omuta plants, all of which are energy-intensive compared with other facilities, yielded greater energy savings than expected. In the Sixth Medium-Term Environmental Plan (fiscal 2016 to 2018), we will continue to strive to reduce energy consumption intensity by 1% every year. To this end, we will endeavor to produce concrete results from our key energy-saving initiatives as quickly as possible.

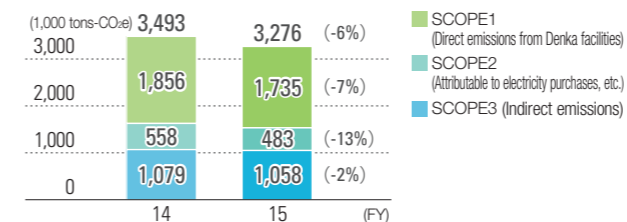
### Overview of Environmental Impacts (totals for all production sites in fiscal 2015; fiscal 2014 figures are provided in parentheses for comparison)

Denka is striving to assess and reduce the environmental impact of its business activities. We especially focus on improving the efficiency of our energy-intensive plants while curbing waste emissions from our facilities by enhancing yield ratios and promoting resource recycling. Moreover, we proactively accept waste from in-house and external sources, effectively utilizing it as fuel and raw material for cement production.



\* PRTR substances calculation excludes TOYO STYRENE Co., Ltd. and Taiyo Vinyl Corp. inside the Chiba Plant. Waste emissions calculation excludes TOYO STYRENE Co., Ltd.  
This environmental impact data encompasses Denka's domestic plants and main affiliates within those facilities.  
Domestic plants: Omi, Omuta, Chiba, Shibukawa, Ofuna, Iseaki. Major affiliates: Omi Plant, Denka Silane Co., Ltd., Denka Co., Ltd., Chiba Plant, TOYO STYRENE Co., Ltd., Taiyo Vinyl Corp.  
Explanation of Inputs: Fuels are the sum of all fuels used at each production site, converted into calorific crude oil equivalents. They include fuels for in-house power plants.  
Explanation of Outputs: The figures for CO<sub>2</sub> emissions from energy sources represent emissions from in-house fuel consumption and from electricity purchases. Those for CO<sub>2</sub> emissions from non-energy sources cover mainly the portion that is derived from raw materials. COD is the BOD discharge into rivers converted into COD values. External waste recycling covers materials converted externally into resources or fuel. Final disposal refers to material buried on Company premises or at external landfill sites.

### Greenhouse Gas Emissions



Unit: 1,000 tons-CO<sub>2</sub>e (each GHG item is converted to CO<sub>2</sub> emissions equivalent to its estimated greenhouse gas effect)  
Scope of calculation: All Denka business sites and main affiliates in Japan and overseas production bases in Singapore, China and Vietnam  
Scope 3: Seven categories (excluding processing, use and disposal by customers) for fiscal 2014; all categories are calculated for fiscal 2015  
Figures in parentheses are year-on-year changes

### Our Response to the Revised Act for Rationalized Use and Proper Management of Fluorocarbons

In accordance with the Act for Rationalized Use and Proper Management of Fluorocarbons (put into force in April 2015), we are stepping up the management of our equipment that uses fluorocarbons as refrigerants. With the revision of this act, business operators are obliged to submit a report to relevant authorities whenever their annual emissions volume exceeds a specified statutory limit. In fiscal 2015, our fluorocarbon emissions were below this limit. Looking ahead, we will keep emissions below the limit by steadily implementing facility inspection and maintenance.  
In addition, we are promoting the systematic renewal of such equipment, replacing it with alternatives that use refrigerants with a smaller GWP (global warming potential). In this way, we are working to make fundamental improvements.

### Utilization of the CDP Scheme

In 2015, we began disclosing information on our business activities, including those undertaken by the entire value chain,

that may affect climate change, utilizing the CDP (Carbon Disclosure Project)\* scheme. As such, we are stepping up our Groupwide initiatives to counter global warming while consolidating data about such initiatives.

**Denka's Score and Rating under CDP2015 Disclosure: 94; Performance: B**

\* A London-based NPO run by an association of institutional investors from around the world with the aim of encouraging businesses to reduce GHG emissions and mitigate the risk of climate change. Once a year, CDP compiles and publishes a report on participating companies' strategies to counter climate change as well as the volume of their GHG emissions.

### Establishing Our Target for Total GHG Emissions for 2020

Giving due consideration to the conclusions of the COP21 (November to December 2015, Paris), which included an agreement to promote international initiatives to achieve “Decarbonization,” we established an entirely new target for our total GHG emissions. In addition to pursuing ongoing initiatives to achieve our CO<sub>2</sub> emissions intensity targets, we will strive to curb total GHG emissions over the medium term, with end targets set for 2020.

### GHG Reduction Targets

Total GHG Emissions: Achieve a 12 % reduction by 2020 from the 2013 level  
CO<sub>2</sub> emissions intensity from energy sources: Achieve a 10% reduction by 2020 from the 2013 level

# Initiatives to Secure Our Electricity Supply

## Initiatives to Utilize Clean Energy

Since its founding, Denka has been stepping up its use of hydroelectric power and constructing new hydroelectric power plants. Today, the network of our hydroelectric power plants includes one location in the Omi river system, five locations in the Himekawa river system and four locations in the Umikawa river system. Meanwhile, Kurobegawa Electric Power Company, a joint venture owned half by Denka and half by Hokuriku Electric Power Company, has facilities in five locations. Together, the maximum output of these plants totals approximately 120,000kW.

We also have thermal power plants, which are being converted to run on natural gas instead of heavy oil with the aim of reducing CO<sub>2</sub> emissions. In addition, the Omi Plant has a biomass power generation facility fed by scrap wood and utilizes waste heat from cement production for power generation.

In response to the enactment of the feed-in-tariff (FIT) law for renewable energy, the Shibukawa and Isesaki plants have established mega solar power generation facilities, commencing sales of electricity to Tokyo Electric Power Company in July 2013. In November 2014, the Isesaki Plant increased the capacity of its mega solar facility by 200kW. The combined maximum output of the solar power generation facilities at these two locations now amounts to 3,400kW, with estimated annual power generation totaling approximately 3,800,000kWh.

Looking toward the next 100 years of our operations, we are striving to develop new hydroelectric power plants. Construction of the New Omi Power Plant (maximum output: approximately 8,000 kW; operational kickoff: 2018) upstream of the Omi Power Plant has been steadily advancing since fiscal 2014. Also, Kurobegawa Electric Power Company is undertaking surveys to assess the potential environmental impact of the planned construction of its New Himekawa Power Plant No. 6 (maximum output: approximately 27,500kW; operational kickoff: 2022). Denka is comprehensively cooperating on this construction project as part of its ongoing effort to promote the effective utilization of clean energy.

The output from these two new facilities will be sold through the FIT scheme for 20 years after their completion. Once this period expires, plans call for utilizing the facilities as in-house electricity sources, thereby increasing the ratio of clean energy in our overall electricity use by around four percentage points.



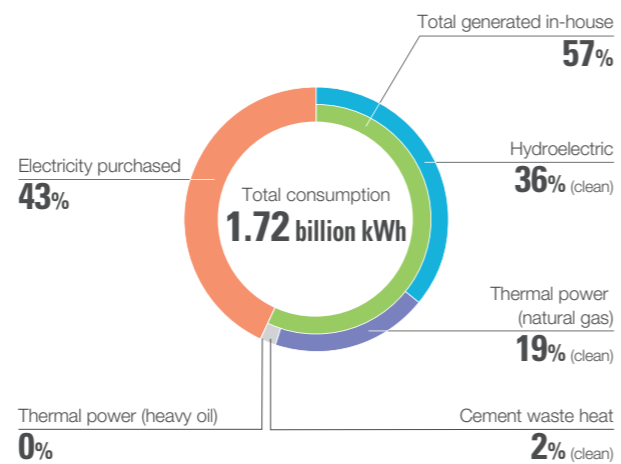
Hydroelectric			
1 Omi	3,300kW	9 Umikawa No. 3	2,600kW
2 Kotakigawa	5,200kW	10 Umikawa No. 4	900kW
3 Oami	28,400kW	11 Himekawa No. 6*	26,000kW
4 Otokorogawa	9,800kW	12 Takigami*	15,000kW
5 Yokokawa No. 1	10,000kW	13 Nagatoga*	5,000kW
6 Yokokawa No. 2	16,000kW	14 Sasakura No. 2*	10,200kW
7 Umikawa No. 1	3,800kW	15 Kita-otari*	10,700kW
8 Umikawa No. 2	4,700kW		

16 New Omi	8,000kW	The total maximum output of hydroelectric power generation: <b>118,150kW</b>	
(Completion scheduled for 2018)		Note: Figures represent the amount of electricity that Denka is entitled to based on its proportion of facility ownership.	
17 New Himekawa No. 6 <sup>1,2</sup>	27,500kW		
(Completion scheduled for 2022)			

Solar <sup>1</sup>		Gas turbine (cogeneration)	
Shibukawa <sup>3</sup>	2,200kW	Tomi	17,760kW
Isesaki	1,200kW	Chiba	12,720kW
Thermal		Ofuna	680kW
Omi	17,000kW	Shibukawa	1,000kW
Omi cement	11,100kW	Total maximum output of thermal power generation: <b>94,260kW</b>	
Tomi	25,000kW	Total maximum output of Denka's in-house power generation: <b>212,410kW</b>	
Chiba	9,000kW		

<sup>1</sup> Output from the New Omi Power Plant, New Himekawa Power Plant No. 6 and solar power generation facilities are not included as these facilities' sole purpose is supplying electricity to external companies.  
<sup>2</sup> Jointly owned with Hokuriku Electric Power Company  
<sup>3</sup> Denka Solar Power Shibukawa

### Power Sources in Fiscal 2015



Omi Power Plant concurrently serves as Denka's hydroelectric power generation plant management center

# Resource Recycling through Cement Production

## Recycling Business in Cement Production

The cement production operations at Denka's Omi Plant accept and recycle a large amount of waste and byproducts as fuels and raw materials.

The process utilizes coal ash from thermal power stations and contaminated waste soil from construction sites as well as sludge from water supply and sewage systems—all of which are result from processes that are integral to people's daily lives—as raw materials. Our cement also utilizes foundry sand that has been used for casting molds by automakers and machine parts makers as well as other waste from a variety of industries. As for fuels, we accept waste plastic separated from general waste as well as automobile shredder residue, tires recovered after automobile disassembly and waste oil.

The Omi Plant has a biomass thermal power facility fed by scrap wood, thereby reusing wooden materials collected from demolished houses. This facility also accepts byproducts from chemical production facilities within the plant, aiming to minimize external emissions. In fiscal 2015, Denka used 541 kilograms of waste and byproducts for every metric ton of cement produced.

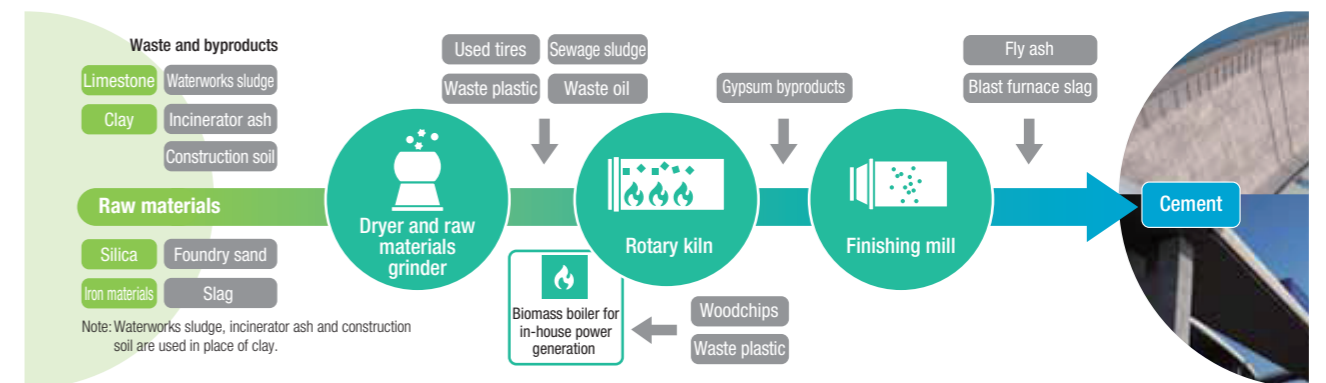
In sum, Denka's cement production utilizes recycled fuels and raw materials and thereby prevents various types of waste and byproducts emitted by businesses and households from

being disposed of in landfills or incinerated. Not only does this initiative reduce environmental burdens attributable to such waste disposal methods, our cement production helps curb the use of such mineral resources as coal.

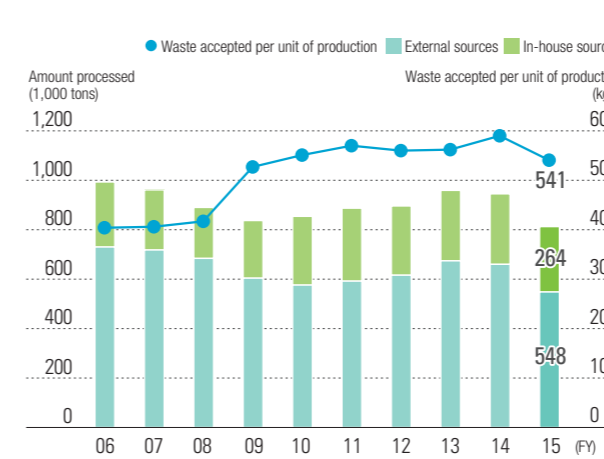


Rotary kiln

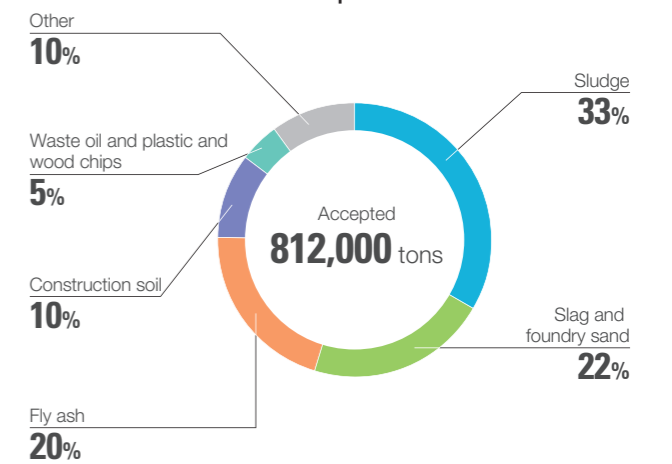
### Recycling Process Flowchart



### Volume of Waste Accepted (total and per unit of production)



### Breakdown of Waste Accepted in Fiscal 2015



# Human Resource Development

## Basic Policy

Denka has positioned human resource development as a key activity for strengthening its business foundation and facilitating corporate growth. With this in mind, we have established a program to nurture human resources capable of flexibly adapting to changes and taking action with a strong sense of commitment. Implementing this program, we are striving to ensure that all Denka employees can realize their maximum potential.

Guided by these concepts, we annually review and enhance the content of employee education programs. In these ways, we help each employee, department and division embody our corporate slogan "Possibility of chemistry." and better play their roles in achieving the goals of the Denka100 management plan.

## Fiscal 2015 Human Resource Development Initiatives and Results

### 1. Mandatory Job Level-Based Training

- We implemented training programs aimed at imparting essential competencies for employees at all levels (basic business skills as well as communication, management and leadership skills) while raising employees' awareness of level-specific job requirements.
- For younger employees who are in their first to third years with Denka, we provided programs to enhance their calculation, presentation and document preparation skills so that they are fully equipped with the skills they will need as businesspeople.
- In the face of an increasingly globalized business environment, we implemented overseas training programs to instill in our human resources superior communication skills and the ability to accurately assess diverse customer needs. More specifically, administrative specialists in their second year underwent such training to enhance their language skills and acquire intercultural experience, while technological specialists in their fifth year took part in a program aimed at broadening their perspectives as engineers working abroad.

### 2. Special-Purpose Training

- To deliver products that our customers really want, we provided our salespeople, who strive to closely accommodate market needs, with a specialized training program to enhance their marketing skills.
- In response to the enforcement of the revised law pertaining to the employment of the elderly, we held a Career and Life Planning Seminar, targeting specialists who had reached the age of 55 in fiscal 2015. This program was intended to provide these employees with options regarding career development up to the age of 65 and ways to ensure satisfactory lives post retirement.

### Content of Human Resource Development Programs (Fiscal 2016)

Mandatory job level-based training programs			Special-purpose training		Specialist courses	In-house academic meetings
Specialists	Engineers	General staff	Administrative skills	Technological skills		
New general managers (Class-9)	New Class-9		External training sessions (open seminars) Marketing training Career and Life Planning Seminar Mental health training sessions (group- and self-care)		<b>All job categories:</b> Internal control, CSR, legal affairs, accounting, information technology, quality management, logistics, intellectual property, trade administration, English language and various correspondence courses	<ul style="list-style-type: none"> <li>Denka100 presentation meetings</li> <li>Results presentation meetings</li> <li>Technological symposia</li> <li>Analytical research presentation meetings</li> <li>Quality symposia</li> <li>Process symposia</li> </ul>
New managers (Class-8)	New Class-8					
New assistant managers (Class-7)	New Class-7					
5th-year employees	Business unit training		Overseas training program (Overseas study program at Beijing Language and Culture University)	SQC and process technology training Overseas training program (technological specialists)	<b>Technological job categories:</b> Compliance with chemical-related regulations Engineering and analysis techniques	
3rd-year employees						
2nd-year employees						
6-month employees						
New employees						

## Participant's Perspective

### Overseas Training for Technological Specialists

My recent overseas training allowed me to take a close look at such overseas production sites as the Seraya Plant. I was able to see that collaboration between the "mother plant" in Japan, with its wealth of technological strengths in manufacturing built up over time, and these overseas sites, which endeavor to enhance productivity and labor efficiency, is providing our overseas production network with advantages over other companies even in the increasingly competitive market environment. On the other hand, this training made me more aware of the fact that communication with locals and differences in customs and diets can be a challenge during overseas assignments.

My experience in overseas training was quite stimulating and exposed me to diverse concepts and perspectives.

Hiroyuki Shiotsuki  
Ceramic Research Dept., Omuta Plant



Commemorative picture of technological specialists who participated in overseas training

## Our Structure for Promoting GCP Activities

Under the leadership of managers, our Good Company Program (GCP) activities aim to identify issues and challenges confronting each worksite, with specific activity themes established to reach solutions through teamwork. The DENKA100 Promoting Department supervises these activities while DENKA100 Promoting Committee members are assigned to individual sections and business sites to provide support. In fiscal 2015, a total of 152 departments and teams implemented their own GCP activities.

## Fiscal 2015 GCP Activities and Results

To review overall GCP activities, we hold the biannual Denka100 presentation meetings, in which selected departments and teams share the results of their initiatives. Marking the 22nd such occasion, the latest meeting was held on December 9, 2015 at the Head Office, with ten departments and teams giving presentations under the theme "applying a new point of view." Each presenter highlighted their creative, worksite-driven efforts to step up the creation of a better company applying a new point of view.

At the meeting, six departments and teams were chosen to receive prizes for their activities. Among these prize-winning participants were the Accounting & Business Administration Dept. of the Omi Plant, which made a notable improvement in its equipment purchasing activities; the Administrative Department of the Omuta Plant, which raised the capabilities of the overall production sites; and the Performance Plastics Dept. of the Head Office, the staff of which contributed their ideas about next-generation products; as well as Denka Electronic Materials Dalian Co., Ltd., Denka Singapore Pte. Ltd. (Seraya Plant), and Denka Corporation (U.S.A.), all of which demonstrated outstanding team strength in global expansion through collaboration between Japanese and local staff.

## Our GCP Activities Overseas

On April 15, 2015, the "Denka100 presentation meeting in China," the first overseas meeting of its kind, was held at the premises of Denka Chemicals Development Suzhou Co., Ltd, with the Denka China Representative Office serving as the main organizer.

Among Denka Group members, human exchange between our subsidiaries in China is particularly active. With this in mind, we focus on nurturing a greater sense of unity among staff at these organizations through the pursuit of GCP activities.

At the event, representatives from each participating subsidiary gave briefings on their safety assurance activities and presented employee education and other initiatives aimed at raising awareness and improving each company. Moreover, they shared their best practices related to R&D, production technologies and sales activities. Teams and individuals that implemented outstanding activities were commended at a social gathering held after the presentations.

GCP Grand Prize "Improving equipment purchasing activities"



Accounting & Business Administration Dept. of the Omi Plant

GCP Excellent Prize "Taking on the challenge of driving Denka's operations for the next 100 years"



Denka Electronics Materials Dalian Co., Ltd.

GCP Excellent Prize "Redefining administrative affairs from a new point of view"



Administrative Department of the Omuta Plant

GCP Special Prize "Incorporating everyone's ideas to create a next-generation product"



Performance Plastics Dept. of the Head Office

GCP Special Prize "Overcoming cultural differences between Japan and the United States"



Denka Corporation (U.S.A.)

GCP Special Prize "Improving logistics operations at the Seraya Plant"



Denka Singapore Pte. Ltd.



Denka Inorganic Materials (Tianjin) Co., Ltd.

Individual Prize (Right) Mr. Jinyi Min



General Manager, Denka Infrastructure Technologies Shanghai Co., Ltd.

Individual Prize (Right) Mr. Cui Dong



Manufacturing Manager, Denka Inorganic Materials (Tianjin) Co., Ltd.

# Developing Comfortable Workplaces

## Underlying Policy

Denka strives toward the creation of a better society through its business activities. In doing so, we have placed a fundamental emphasis on ensuring that all employees can take pride in being a part of a company deserving of society's trust while enjoying fulfilling lives. As we believe that these concepts are key to achieving the goals of our Denka 100 management plan, we consider the creation of a vibrant and lively environment in which everyone can realize their potential, to be essential.

## Work-Life Balance

We constantly strive to realize a comfortable workplace where all employees feel rewarded and professionally fulfilled. Simultaneously, we endeavor to ensure that employees enjoy sufficient time with their families and are able to engage in community activities and self-motivated learning or to commit themselves to such family duties as child rearing and nursing care. Our ongoing initiatives to achieve these two aims include reducing excessive overtime and encouraging the full use of annual paid leave. In fiscal 2016, we increased our designated "No Overtime Days," which had been Wednesdays only, to include Fridays as well. This move has prompted many employees to reconsider their weekly work schedules. To make sure that they need not put in overtime on either day, efforts are now under way to streamline individual work schedules as well as to encourage employees to set aside more time for recreation.

Other initiatives include upgrading childcare and nursing care leave plans and facilitating the use of such plans, as we recognize that employers' assistance to those who struggle with child rearing or nursing care issues ultimately helps to resolve the challenges confronting society.

### Status of Work-Life Balance (non-consolidated basis)

	Fiscal 2013	Fiscal 2014	Fiscal 2015
Total working hours	1,925	1,931	1,931
Overtime hours	91	100	104
Average number of days of paid leave utilized	9.2	9.05	9.56
Ratio of annual paid leave utilized	49%	48%	50%
Number of employees who took childcare leave (Of which, male employees)	4 (0)	6 (0)	11 (0)
Number of employees who took nursing care leave	1	1	0
Number of employees who took volunteer activity leave	0	0	0

### Denka's Three-Year Action Plans

Three-Year Action Plans in line with national legislation to support raising children (non-consolidated basis; launched in April 1, 2014)

- 1 Raise the average number of days of annual paid leave utilized per employee to 12 or greater
- 2 Reduce overall working hours by improving the efficiency of operations
- 3 Help young people enhance their understanding of working life and seek stable employment through the provision of hands-on vocational experience via internship programs and plant tours; assist college or university students who have grown up in the vicinity of the Company's domestic plants in their pursuit of higher education through the provision of scholarships
- 4 Provide educational support by hosting plant tours and experimental science classes

## Helping Women Succeed

In response to Japan's Act for Facilitation of Women's Career Development, enforced on April 1, 2016, Denka carried out an assessment and analysis of its workforce status and as part of its action plans set the target for the proportion of women hired for specialist positions in fiscal 2017 at 20%. Moreover, we are drawing on input from women representing a broad range of age groups to improve recruitment activities while proactively welcoming female workers and managers from external sources.

Our initiatives to help women succeed are publicized in-house and externally via such media as our corporate website.

For details, please visit the "Sustainability" section on the page entitled "Our Employees."  
<http://www.denka.co.jp/eng/sustainability/approach/employee/index.html>

## Initiatives to Promote Diversity

To secure sustainable corporate growth over the next 100 years, Denka is actively promoting human resource diversity. Following on our fiscal 2014 initiatives, we continued to enhance personnel systems relevant to those engaged in child rearing and nursing care. For example, we lengthened the period of nursing care leave from 93 days to one year. We also made it possible for employees to work shorter hours for a period of up to one year when they need to provide nursing care. This arrangement is handled separately from nursing care leave.

Moreover, our new programs included defraying a part of childcare-facility fees for those with children under elementary-school age and whose spouses also work full-time; creating region-specific positions for those who need to stay in a particular region for a certain period of time due to child rearing or nursing care demands; and letting eligible employees work at home on a trial basis with an eye to facilitating a healthier work-life balance for employees engaging child rearing and nursing care. All of these programs came into effect in April 2016.

### Status of Employees (non-consolidated basis) and Diversity

Data \* Including people with disabilities

		Fiscal 2013	Fiscal 2014	Fiscal 2015
Number of employees		2,873	2,934	2,974
Gender	Male	2,660	2,718	2,743
	Female	213	216	231
Employment status	Permanent	2,032	2,152	2,317
	Temporary	841	782	657
Average age		39.8	39.7	39.9
Average years of service		18	18	18
New recruits		103	100	75
Specialists (hired from new graduates)	Male	34	36	32
	Female	11	9	7
Female managers		1	1	2
Retiree reemployment rate		88	89	93
Ratio of people with disabilities		2.24	2.14	2.06
Resignees		30	40	39
Ratio of resignees		3.5	4.3	6.6
Number of people who resigned within three years of recruitment		4	3	3

## Securing Our Preparedness for Globalization

In line with the Denka100 management plan targets, we aim to raise our overseas sales ratio to 50% or greater in fiscal 2017. To achieve this aim, we are continuously striving to secure and nurture human resources with diverse values and competencies. Among new recruits in fiscal 2016, there were two foreign nationals (one Chinese and one Malaysian). Moreover, we recruited one Indian national and one U.S. national from external companies. The latter was introduced to Denka at a job-hunting fair in the United States, where the Company participated in events of this kind for the first time.

We have also stepped up human resource exchanges between Group members. New recruits hired by Denka Chemicals Holdings Asia Pacific Pte. Ltd. (Singapore) are participating in a training program in Japan as manager candidates. Meanwhile, national staff hired by our Chinese subsidiaries have been seconded to the Head Office in Japan and are playing a key role in sales activities targeting overseas customers. As such, we are implementing Groupwide initiatives to secure our preparedness for globalization.

## Mental Health Promotion Plan

Given the recent rise in the number of people who suffer mental illness, Denka has made addressing mental health issues a critical management task. In fiscal 2013, we established the Mental Health Promotion Plan to launch comprehensive countermeasures, including training focused on "self-care" and "group-care." In line with this plan, we have launched a support structure run by in-house staff while setting up a 24-hour helpline run by a third party. Furthermore, we formulated a reinstatement program for those who are on long-term leave due to mental health problems. The number of employees who suffer mental health problems as of April 2015 decreased 4% compared with April 2013. However, as of April 2016, the number slightly increased, getting back to the April 2013 level.

With the enforcement of new regulations regarding employee stress checks in fiscal 2016, we implemented mandatory stress checks in July 2016. We will assess and improve the status of our workplace environment by swiftly analyzing feedback.

### Number of Employees Participating in Mental Health Training in Fiscal 2013 through 2015

Business site	Number		
	Fiscal 2013	Fiscal 2014	Fiscal 2015
Head Office (specialists)	316	132	90
Head Office (general staff)	94	-	-
Branches (five locations)	21	131	20
Innovation Center	35	133	-
Total	466	396	110

▶ For details of occupational safety and health initiatives, please see the web-based CSR Report 2016 references.

## Our Initiatives to Protect Human Rights

The Denka Group Ethics Policy declares "we will respect individual's human rights while helping employees maintain

favorable human relationships at workplaces." Guided by this policy, the Denka Group is striving to ensure that all employees are well-versed in the significance of human resource protection by, for example, providing corporate ethics education.

## Facilitating a Corporate Culture That Encourages the Free Exchange of Ideas

In conjunction with the change of company name in October 2015, we abolished the previous in-house practice of addressing individuals by their job title, replacing this with the practice of addressing people by name and the honorific "san." We also began hosting a weekly "Wednesday Bar," a social gathering that takes place after the close of the workday at the Head Office and Innovation Center.

The adoption of the less formal form of address is intended to enhance worksite communication and help lay a psychological foundation for transforming our corporate culture into one that encourages diverse individuals to achieve success in global operations regardless of age, gender or nationality. The "Wednesday Bar" is a venue for mingling with colleagues without the restrictions of departmental boundaries and age differences and allows for the exchange of ideas in a more open atmosphere.



Wednesday Bar

## Businesses' Action for Promoting Cancer Control Measures

In December 2014, Denka was registered as a partner company for Businesses' Action for Promoting Cancer Control Measures, a national project sponsored by Japan's Ministry of Health, Labour and Welfare. A loss of human resources, which constitute a corporations' greatest asset, is a critical issue that may undermine its entire business foundation. Since the best way to counter cancer is early detection and treatment, we encourage all employees to submit to testing for cancer and distribute a booklet to raise their cancer awareness.

## Initiatives with Labor Unions

Denka holds periodic conferences, negotiations and other gatherings with the Denka Labor Union and Denka Employees' Union, maintaining favorable and mutual relationships of trust. In particular, we hold quarterly meetings to resolve ongoing issues and discuss potential future challenges with regard to working conditions, actively exchanging various views on this matter.

## Quality Management: Working with Our Supply Chain

### Our Policies on Quality Management

In fiscal 2015, we implemented ongoing quality improvement activities in line with the following Companywide Quality Policies.

- 1 Improve quality assurance levels Companywide
- 2 Strengthen compliance with laws and regulations and enhance customer satisfaction
- 3 Raise awareness of employees engaged in manufacturing
- 4 Enhance technologies to ensure built-in quality
- 5 Facilitate the adoption and utilization of quality control technologies and methods at each production site

•We experienced no major quality problems, with the number of complaints decreasing from 496 in fiscal 2014 to 359 in fiscal 2015, thanks to such exhaustive recurrence prevention measures as facility improvements.

•In the face of a global trend toward the tightening of regulations on chemical substances, we strengthened our management structure for such substances. In addition, we are developing a more solid production assurance system by adopting the upgraded version of ISO standards.

•One document failure was found with regard to the reporting of chemicals obtained from exporters. Following the instruction of relevant authorities, we strove to make improvements. We also carried out thorough product-by-product checks to ascertain whether there were similar shortcomings in documentation.

▶ For details on our quality management, please see the web-based *CSR Report 2016* references.

### CSR Procurement

The Denka Group recognizes that all of its suppliers are essential partners in its pursuit of initiatives aimed at fulfilling its social responsibilities. In line with this recognition, the Group works hand in hand with its supply chain to promote CSR procurement while clarifying its approach and standards through the CSR Procurement Policies and CSR Procurement Guidelines that it formulated based on the Denka Group Guidelines. In fiscal 2014, we began sending out questionnaires with regard to our CSR Procurement Guidelines to key suppliers.

For fiscal 2016, plans call for expanding the scope of recipients of these questionnaires, with the aim of facilitating communication with a greater number of suppliers and encouraging them to embrace CSR Procurement.

### Life Cycle Assessment (LCA) Initiative

With an eye to promoting sustainability through its corporate activities, Denka is implementing LCA initiatives aimed at saving energy and reducing CO<sub>2</sub> emissions. These initiatives also help us identify risk and business opportunities pertaining to the entire supply chain.



LCA environmental education (the Isesaki Plant)

### Green Procurement

To decrease environmental burdens attributable to the raw materials it purchases, Denka implements chemical substance management based on the Negative List that takes into consideration environmental regulations in Japan and overseas. Moreover, in addition to acquiring such documents as SDS, MSDSplus and AIS pertaining to procured materials, we issue purchasing specifications to clarify materials' compliance with Japanese and international environmental management regulations as well as relevant industrial guidelines. We also visit suppliers of some key raw materials, performing on-site inspections of their manufacturing facilities.

### Response to the Conflict Minerals Issue

In the United States, listed companies are obliged to report on the status of the use of conflict minerals to the Securities and Exchange Commission (SEC) in accordance with the Dodd-Frank Wall Street Reform and Consumer Protection Act enacted in July 2010 and rules issued by the SEC in August 2012. Although Denka is not subject to this legislation, the Company considers it a social responsibility to follow suit. With this in mind, we undertake tracking surveys when requested by customers to affirm that our products are conflict mineral free.

#### Message from the General Manager

We have transactions with more than 2,000 suppliers and are aware of the fact that their cooperation is essential to our corporate activities. Therefore, we aim to fulfill our social responsibilities in tandem with suppliers. Looking ahead, we will strive to enhance communication with each supplier through CSR activities while working with them to resolve challenges and build favorable partnerships. I sincerely ask for their continued support of and cooperation with our operations.

Masataka Yoshitomi  
General Manager, Purchasing Dept.

#### Major Initiatives

- 1 Completed LCA for 47 mainstay products (resin-based and inorganic products, electronic materials, etc.)
- 2 Identifying environment-friendly products and assessing reduction in environmental burdens via the use of such products
- 3 Participating in the carbon-Life Cycle Analysis (c-LCA) Committee hosted by the Japan Chemical Industry Association
- 4 Providing LCA-related information in response to customers' requests
- 5 Conducting relevant environmental education for employees (global warming, the latest LCA trends, etc.)

## Engaging with Shareholders

### Denka's Policies on Shareholder Returns

In November 2014, Denka established its Policy on Shareholder Returns and Budget for Growth Investments. Guided by the principles set out in these documents, Denka aims to return profits yielded by initiatives executed under the Denka100 management plan to its shareholders while implementing such strategic investments as M&A for further growth.

#### Policy on Shareholder Returns and Budget for Growth Investments

##### 1. Policies on Shareholder Returns

Total payout ratio target : 50%

\* (Dividends paid + treasury stock purchased) / consolidated net income

##### 2. Methods for Shareholder Returns

- 1 Cash dividends: Maintain steady cash dividends, with a minimum payout ratio set at 30%
- 2 Purchase of treasury stock: Flexibly purchase treasury stock in step with trends in stock prices and the market environment

##### 3. Budget for Forward-Looking Strategic Investments

After paying out shareholder returns, Denka will appropriate funds from retained earnings as well as cash inflows to finance such investments. The total amount budgeted for is approximately ¥50 billion. (Over the four years from fiscal 2014 to 2017)

##### 4. Term

Four years ending with fiscal 2017, the target year of the Denka100 management plan

### Results Briefings

Denka holds periodic results briefings for analysts and institutional investors, believing that maintaining a proactive approach to disclosing the latest corporate information to shareholders and investors can enhance their understanding of our business operations and growth strategies.

One such briefing held on May 11, 2016, included a presentation on operating results and forecasts as well as an overview of our business expansion initiatives in the healthcare field—the most prominent priority field under the Denka100 management plan growth strategy that aims to “focus management resources on new growth drivers and develop next-generation products.” In particular, we explained an initiative entitled “Global Strategy for ‘sd-LDL-C’ and Other Diagnostic Reagents That Measure Lipoprotein Subclasses” being executed by Denka Seiken Co., Ltd.

### Corporate Briefing for Individual Investors

On August 19, 2015, Denka held a corporate briefing for individual investors at Niigata Convention Center “TOKI MESSE” in Niigata City. The 13th of its kind, this briefing welcomed more than 100 attendees and provided them with

a report of progress under the Denka100 management plan and the content of the plan's strategies to create an optimal production system in Japan and overseas. Furthermore, we detailed initiatives undertaken by Denka Seiken, such as those aimed at expanding operations related to rapid diagnostic test kits and promoting the development and application of new technologies. As such, it was an opportunity to elaborate on key healthcare-related operations that bolster the aforementioned strategy to focus management resources on growth drivers and develop next-generation products.

At the venue, panels were exhibited to display Denka's history from its founding to the centennial celebration as well as its Policy on Shareholder Returns and Budget for Growth Investments, drawing investors' attention.

### General Meeting of Shareholders

Denka's annual General Meeting of Shareholders provides a valuable opportunity for engaging in direct communication with shareholders. Accordingly, we work to give shareholders enough time to confirm and examine the reports and items up for vote. To this end, we send the notice of convocation for the General Meeting of Shareholders three weeks prior to the date of the meeting. For the fiscal 2015 meeting, we posted such notice along with its English translation one week prior to sending it out in print, via the Company's and the Tokyo Stock Exchange's websites. As for the print version, we print this notice on large B5-sized (182 x 257 mm) paper, with the aim of enhancing readability.

Moreover, we try to schedule the meeting at the earliest possible date to avoid overlaps with similar meetings held by other companies, thereby making it easier for shareholders to attend (June 19 in 2015 and June 22 in 2016).

At each meeting, we use narrated videos to supplement our explanations of reported items while maintaining exhibition booths to showcase our initiatives and products and gain greater recognition of our operations.

We have adopted a voting system that allows shareholders to use on-line voting via personal computers and cellular phones in addition to regular post. Denka also joined the Electronic Voting Platform for institutional investors run by the Tokyo Stock Exchange. As such, we are striving to improve shareholders' convenience with regard to the exercise of voting rights.



The 157th ordinary General Meeting of Shareholders

# Corporate Governance

Website: The Denka Corporate Governance Guidelines and the Corporate Governance Report.  
<http://www.denka.co.jp/eng/sustainability/management/governance/pdf/cgreport.pdf>



**Kenji Nakano**

Director, Managing Executive Officer, Chief Compliance Officer (CCO), Representative in China, Secretary Dept., Administrative Dept., Legal Dept., HR Dept., DENKA100 Promoting Dept.

Striving to live up to the expectations and trust of its shareholders and other stakeholders, including customers, suppliers and local communities as well as its employees, Denka believes that in addition to building a stronger business foundation through profit increase and business growth, the Company must remain worthy of society's respect and support.

Guided by this belief, we constantly endeavor to realize robust corporate governance as we consider it key to ensuring a corporation's management transparency and soundness, factors that, in turn, support stable business activities over the long term.

Moreover, compliance with laws, regulations, internal rules and moral and ethical norms is essential to maintaining the trust of stakeholders and society as a whole. We have therefore established and strictly enforce the Denka Group Ethics Policy, which clarifies our commitment to refraining from violating any of these principles.

## Corporate Governance Structure

We have adopted an Audit & Supervisory Board System as the basis of our Corporate Governance System. Said board includes two outside members to assess operations and management, thereby ensuring that our business properly serves stakeholders.

Similarly, the Board of Directors has three independent outside members. Moreover, there are no hierarchical relationships between directors, so each is free to oversee and supervise business execution.

Moreover, we have in place a Management Committee, composed of directors, members of the Audit & Supervisory Board and selected executive officers, to streamline and accelerate deliberation on important managerial matters. For individual items entailing budget planning and capital investment, we set up special committees or deliberative councils by function.

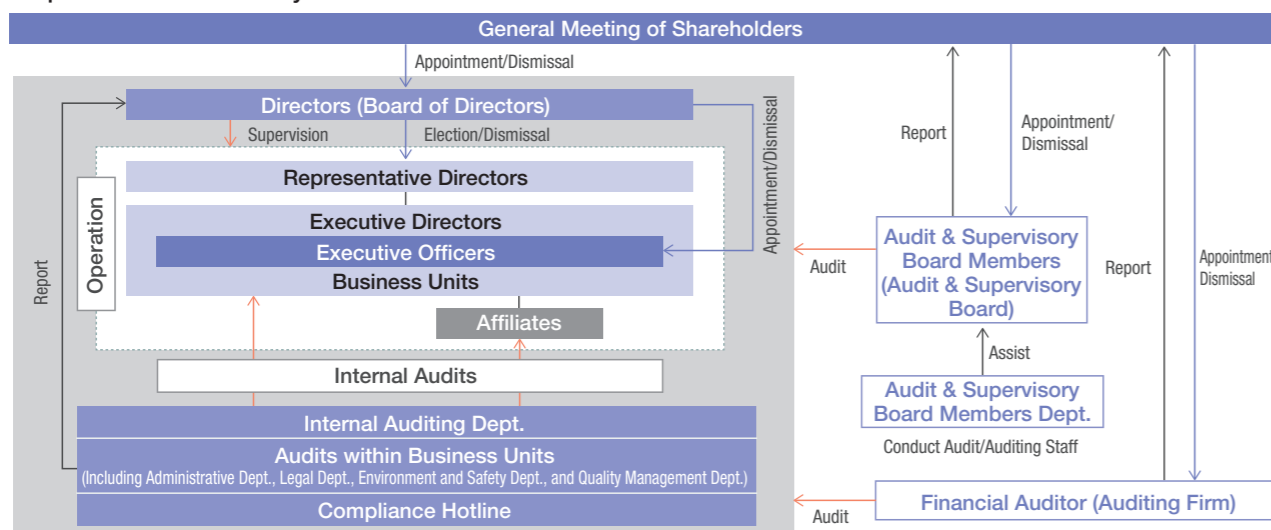
### Board of Directors and Executive Officers

With the aim of enhancing its corporate governance, Denka has clarified the separation of executive officers' business execution and the Board of Directors' supervisory functions. To further enhance management transparency and soundness, we increased the number of outside directors (from two to three) while reducing the total number of Board members (from 12 to 10) based on a resolution passed at the annual General Meeting of Shareholders held on June 19, 2015.

The three outside directors and two outside Audit & Supervisory Board members are all registered as independent directors/auditors under the rules of Tokyo Stock Exchange Inc. Sufficiently independent from management, they leverage extensive knowledge in their areas of specialty to ensure the stringent supervision of the Company's business operations.

The abovementioned management structure is designed to allow adaptability in the face of a globalizing operating environment and the advance of information communication technologies. Looking ahead, we will strengthen this structure to drive aggressive expansion while introducing robust preventive initiatives.

### Corporate Governance System



## Establishment of Denka Corporate Governance Guidelines

In November 2015, we established the Denka Corporate Governance Guidelines. Giving due consideration to the spirit of Japan's Corporate Governance Code, formulated by the Tokyo Stock Exchange in June 2015, our guidelines stipulate principles governing the relationship between the Company and its shareholders, measures aimed at ensuring appropriate information disclosure and corporate transparency and the responsibilities of the Board of Directors. Under the new guidelines, we are endeavoring to realize the best possible corporate governance practices in order to maintain the trust of shareholders and other stakeholders and thereby achieve sustainable business expansion and medium- to long-term growth in corporate value.

## Internal Control Reporting System

Denka strives to secure the reliability of its financial statements and, to this end, has set up an internal control reporting system that complies with Japan's Financial Instruments and Exchange Act while conducting audits in line with the "Standards for Management Assessment and Audit concerning Internal Control Over Financial Reporting" formulated by the Business Accounting Council of the Financial Services Agency.

Based on the results of fiscal 2015 assessments and audits, our internal control report declared that the Denka Group's internal control was effective. Moreover, the attached certificate prepared by the independent accounting firm that audited the report (ERNST & YOUNG SHINNIHON LLC) concluded that all significant aspects of disclosure were proper.

## Risk Management

An essential part of corporate governance is understanding the diverse and numerous risks inherent in corporate activities and exerting proper risk control. In general, each business unit is responsible for identifying and managing its specific risks. For environmental, safety, product liability and export control issues that affect the entire Company, we have in place special sections and permanent committees to handle matters.

### Risk Management Overview



We have also appointed a team of specialists to audit our Group subsidiaries for their risk management. We formulated our Risk Management Guidelines to comprehensively tackle incidents that may have major impact on corporate activities. In addition to the permanent Risk Management Committee, we set up the Crisis Measures Headquarters to act whenever contingencies arise.

## Compliance

Compliance is essential for sustainable growth. We accordingly adhere to internal rules and government legislation and refrain from acts that violate moral and ethical norms. The Denka Group Ethics Policy was established to codify Groupwide standards of conduct, while the Ethics Committee, chaired by the president, oversees the overall compliance structure and reports to management, thereby ensuring adherence to this policy. Moreover, the Legal, Environment and Safety, Intellectual Property and other departments ensure thorough compliance in their respective areas of specialty. In July 2015, we newly appointed a Chief Compliance Officer (CCO) to step up collaboration between relevant departments. We also focus on providing employees with compliance education under an initiative promoted by the Human Resource Development Center.

► For details of compliance initiatives, please see the web-based CSR Report 2016 references (p. 4).

## Compliance Hotline System

We have set up and operate the Compliance Hotline in keeping with the Denka Group Ethics Policy. This system is intended to address circumstances that may not be spotted by our internal control and compliance systems and to facilitate the self-correction of any organizational problems. The hotline accepts calls on actions that may or do violate the ethics policy and through relevant education programs, employees are aware of its availability and purpose. Once a report is submitted, the Ethics Committee, chaired by the president, quickly takes appropriate steps to resolve the situation.

The hotline's mandate is to be fair and swift and designated contacts are in place at the Audit & Supervisory Board Members Department and the labor union, which maintain neutral stances, as well as at the Ethics Committee Administrative Office and general affairs sections within all offices. People can also send reports to an external law firm functioning as a totally independent reporting channel.

Moreover, overseas subsidiaries have set up their own hotlines, reflecting our policy of providing various reporting channels. We also maintain specified multiple dedicated e-mail addresses within and outside the Group, so that reporters can freely make contact without facing burdens. In addition, with the aim of securing the effectiveness of the system, this policy specifically safeguards whistleblowers from discrimination and mistreatment. During fiscal 2015, we registered three reports, which were handled appropriately.



## Dialogue between Outside Directors

To obtain their insights on the Denka Group's initiatives aimed at achieving sustainable business expansion and medium- to long-term growth in corporate value, we talked to three outside directors, asking questions about a variety of subjects.

**What are your beliefs with regard to the role of outside directors in the Group's pursuit of sustainable business expansion and long-term growth in corporate value?**

**Yamamoto:** I think our most important role is to check whether the Company has put in place the appropriate key management systems and functions and that its management activities are consistent with intended strategies and plans. Not only do we oversee these aspects and advise top management thereto, we sometimes may have to challenge management decisions, especially when failing to do so could undermine sound corporate growth.

With regard to the agenda submitted to the Board of Directors, I am striving to leverage my long experience in corporate management, which helped me acquire a global perspective, as well as my historical expertise regarding the industry while maintaining a fair and impartial standpoint. In doing so, I present my opinions based on my conception of what corporate management really should be.

The ultimate success or failure of management decisions can be judged only in hindsight. Therefore, I try to remain humble and pay close attention to the latest industrial trends and what is happening on the frontlines, where workers tackle their day-to-day tasks.

**Sato:** Denka aims to raise its overseas sales ratio to 50% or greater as a management plan target. Accordingly, I see my role as one of providing opinions and advice, employing an external perspective based on my management knowledge and experience accumulated in foreign-capital corporations as well as in the pharmaceutical industry, where I have served as an executive. Recently, the Company established "The Denka Value," a corporate philosophy serving as the cornerstone of its business activities and determining its future direction. Constantly keeping this philosophy at the forefront of my mind, I will contribute to the Board's discussions from an objective standpoint, giving due consideration to the perspectives of shareholders and all other stakeholders.

**Fujihara:** If outside directors are to effectively contribute to stable growth in corporate value and sustainable business expansion, it is important that they share the same purposes and directions and maintain cooperative relationships with other directors and employees. However, outside directors are also expected to bring to bear the perspective of various



Yasuo Sato

external stakeholders into discussions. This is our most crucial duty and can only be achieved when we avoid being content with cozy relationships with top management and act as its equal in discussions, providing harsh criticism when called for.

**Please tell us about future challenges that Denka should address to enhance its corporate governance.**

**Yamamoto:** Recently, governance systems modeled after those of U.S. corporations are becoming mainstream in Japan. However, Japan's business sector has a different culture, history and context. Accordingly, I believe that we should develop Japan-specific governance styles while incorporating strengths of a U.S.-based approach.

Just like an individual citizen, a corporation plays an important role as part of sound civil society. Corporate managers are therefore being asked to embrace an even stronger awareness of the public good. Moreover, striking a balance between the interests of various stakeholders, ranging from shareholders and suppliers to employees and local communities, will become ever more important.

**Sato:** Although some aspects of Japan's traditional Audit & Supervisory Board system may have to be reviewed, it has been working very well in general. In addition to ensuring stringent and structural management oversight, I would suggest creating more opportunities and new methodologies for communicating the Company's transparency to shareholders and other stakeholders. It goes without mentioning, of course, that external information disclosure should be enhanced, as should transparency within our organizations.

**Fujihara:** The principal purpose of developing a corporate governance structure is to secure systems and functions to ensure robust internal control. When such corporate governance is in place, it enables the self-correction of organizational problems unforced by external pressures. I would even dare to say that the ideal company needs no outside directors. However, corporations are composed of people. And cozy relationships and outdated conventions that may emerge over the course of time can lead to a failure of ethics or a biased corporate culture. In other words, an organization run by an unchanging group of people can, over time, become deficient with regard to transparency, fairness and soundness. This is why outside directors are there; we provide a constant monitoring of such factors as the function of internal control systems.

**For Denka to grow sustainably into the future, securing our preparedness for globalization will be of importance. Please share your insights on necessary measures to be taken to become a truly competitive global player.**

**Sato:** Denka's current management plan has positioned transforming into an organization that embraces a more



Website: NOTICE OF CONVOCATION OF THE 157TH ORDINARY GENERAL MEETING OF SHAREHOLDERS

► For the backgrounds of Denka's outside directors, please see the web-based CSR Report 2016 references (p. 25) and the notice of convocation.

aggressive and speed-oriented business approach and encourages employees' ambitions as key to achieving its management goals. I totally agree with the idea that such a corporate culture is essential to success on the global stage.

Factors shaping corporate culture include people, customs and rules. That being said, customs and rules are human concepts. Therefore, promoting diversity, that is, accepting people of different nationalities and race, as well as values and concepts, will be a crucial part of future corporate growth strategy. Of course, listening to the voices of women and younger generations must be included in this pursuit. Although Denka has been working hard on this matter, it should be noted that there is much to be done to promote diversity from the directorial levels to frontline business units. Today, a number of Denka employees directly engage in business with locals in countries around the world. Given this, we should steadily foster a corporate culture that accepts diversity, whether it be about values, concepts or types of people. I believe such effort will help us grow into a truly competitive global company.

**Fujihara:** Global expansion entails greater risk than do domestic operations. It is therefore important to establish a robust governance system capable of addressing such risk. At the same time, we need to actively address how we are going to create a diversity-oriented corporate culture. Organizing our approach to this issue, let us work on challenges attributable to differences in cultures, business customs and various other factors with constant awareness of embracing diversity. This will eventually enhance our risk management and enable us to take a significant step toward our transformation into a stronger global player.

**Yamamoto:** It is often said that the key to success abroad is "When in Rome, do as the Romans do." But I would also stress the significance of having a clear perception of "What we value most." At the core of operations at the Omi and Omuta plants lies a longstanding drive to contribute to local society and ensure mutual development. Moreover, "The Denka Value" emphasizes being sincere in one's dealings, willing to take on challenges, adopting an uncompromising approach to manufacturing and maintaining a strong awareness of occupational safety and facility security. These values are exactly what Denka has always treasured for more than a century.

The more Denka expands globally, the more it faces challenges attributable to differences in cultures or religions. The course of industrial development might also be totally different in countries other than Japan. Nevertheless, I'm convinced that Denka can succeed by communicating the aforementioned values to local communities, employees and business partners and by embodying such values through its business conduct, products and services.



Akio Yamamoto



Tatsutsugu Fujihara

**Lastly, please share your views on Denka's role in society and your expectations regarding the Company's future growth.**

**Yamamoto:** I think Denka will be called upon to take on challenges and yield results in a variety of business fields that go beyond the bounds of a traditional commodity-producing petrochemical business. Among such new fields are highly functional materials, healthcare products and products with environment and energy saving applications, areas that all boast considerable growth potential. In the face of the drastic industrial transformation transpiring in countries around the world, Denka is steadily pushing forward with structural reforms and global expansion under the strong leadership of its president, Shinsuke Yoshitaka. The pain Denka might suffer over the course of its current initiatives aimed at reaching the next growth stage is similar to the "growing pains" of youth. As an outside director, I will commit myself to helping ensure that Denka's growth is sound, strong and sustainable.

**Fujihara:** Mr. Yoshitaka often stresses that "A fair and transparent management foundation is essential to growth in corporate value" and "Earning greater profit and fulfilling social responsibilities must be realized in tandem." In addition, he has positioned a "spirit of taking on challenges" as an essential qualification for Denka staff. These remarks correlate with the Company's recent shift to corporate governance aimed at driving aggressive expansion and corporate growth. As I believe that Denka has great potential on its own, the key is translating this potential into performance. Against this backdrop, I'm determined to take on the increasingly important duties that outside directors must fulfill.

**Sato:** I feel that Denka's top management is eager to make the most of the experience and knowledge of its outside directors. In contrast to this forward-leaning mindset, however, the majority of companies seem to be content with conventional ways of doing business, thinking and so forth. This is also an issue Japan's chemical industry as a whole must tackle. Society is changing at an ever faster pace. I think therefore, that while re-identifying its unchangeable core values, Denka should decisively move forward as a business innovator. I expect Denka to make a smooth shift from its conventional role to a more creative organization as it is capable of playing a significant role in society to create a better future for the world.

# Denka100 New Growth Strategies

We Actively Promote Initiatives under New Growth Strategies in Line with the Denka100 Management Plan.

## Fiscal 2015 Overview

In 2013, we established the three new growth strategies under the Denka100 management plan, with the target year set at fiscal 2017. In line with these strategies, we have taken an aggressive business approach involving concrete initiatives.

### Outline of the Denka100 Management Plan

#### New Growth Strategies

- 1 Create the most optimal production network
- 2 Scrutinize every cost element
- 3 Focus management resources on new growth drivers and develop next-generation products

#### Numerical Targets (fiscal 2017)

Consolidated operating income: ¥60 billion or more  
 Operating income ratio: 10% or greater  
 Overseas sales to net sales ratio: 50% or greater

Immediately after the milestone celebration of our centennial in 2015, we changed our company name to Denka Company Limited. This move was intended to renew our commitment to achieving further growth as a global company, marking our fresh start as we move forward and embark on the next 100 years of operations. In addition, our fiscal 2015 initiatives included the steady execution of a number of concrete measures in line with three new growth strategies stipulated in the Denka100 management plan.

To create the most optimal production system, we established production facilities for VINI-TAPE and cover tapes in Vietnam while launching a new ALSINK production facility in Dalian, China. We have also made a Malaysian construction material maker our subsidiary, with the aim of accelerating our operations related to special cement additives in the Southeast Asian region. Moreover, we acquired operations related to chloroprene rubber from the U.S.-based DuPont and thus secured a robust production network supported by facilities in two locations sited in Japan and the United States. Using this acquisition as a springboard, we expect the

Group to gain greater market presence in the latter country especially.

Our efforts to scrutinize every cost element, have yielded steady results, with successful ongoing cost reduction initiatives under way at each business base. In particular, the Chiba Plant has succeeded in optimizing its steam and power supply structures with regard to other facilities within the industrial complex in which it is located, improving its competitiveness considerably.

Focusing our management resources on new growth drivers and the development of next-generation products, the acquisition of Icon Genetics GmbH enabled us to tap its novel vaccine manufacturing technologies and apply its antibody production technologies in our diagnostic reagent development. Furthermore, we have initiated the development of a mass-production method for an anticancer virus that will enable the commercialization of oncolytic virotherapy. In addition, efforts are now under way to promote surveys to launch a cancer remedy information service employing a system for analyzing gene alteration.

Denka Seiken Co., Ltd., one of our core Group subsidiaries, has commenced clinical trials aimed at commercializing an intradermal influenza vaccine in an effort to strengthen and expand its vaccine-related operations. At the same time, we completed a new production facility at Denka Seiken's Kagamida Plant, located in Gosen City, Niigata Prefecture. As a result, Denka Seiken's Niigata and Kagamida plants are now equipped with integrated production systems for vaccines and diagnostic reagents, respectively. Looking ahead, we will pursue aggressive expansion in the field of healthcare, where we expect significant future market growth.

Lastly, we established "The Denka Value" in May 2015. Announced in conjunction with the 101st anniversary of the Company's founding, "The Denka Value" represents a new corporate philosophy that will serve as the cornerstone for all Group activities. With this philosophy guiding our efforts as we embark on our next 100 years of operations, we will contribute to society's sound development and strive to live up to the expectations and trust our stakeholders place in us by taking on the challenge of expanding the possibility of chemistry and creating new value.

## Fiscal 2015 Main Initiatives under the Denka100 New Growth Strategy

Growth strategy	Field	Time	Product or business	Details
Create the most optimal production network	Elastomers & Performance Plastics	May 2015	Functional resins	Downsized ABS and specialty resin production lines at the Chiba Plant
	Life Science & Environmental Products	July 2015	VINI-TAPE	Completed a new production base in Vietnam (Denka Advanced Materials Vietnam Co., Ltd.) <a href="#">Photo 1</a>
	Electronics & Innovative Products	August 2015	ALSINK	Completed a new production base in China to manufacture ALSINK thermal conductive plate for power modules of high-speed rolling stock (Denka Electronics Materials Dalian Co., Ltd.) <a href="#">Photo 2</a>
	Electronics & Innovative Products	September 2015	Electronic packaging sheets	Completed a new electronic packaging sheet plant at Denka Advanced Materials Vietnam Co., Ltd.
	Elastomers & Performance Plastics	November 2015	Chloroprene rubber	Acquired DuPont's the chloroprene rubber business and thereby established Denka Performance Elastomer LLC <a href="#">Photo 3</a>
Focus management resources on new growth drivers and develop next-generation products	Elastomers & Performance Plastics	February 2016	Chiba Plant	The Chiba Plant entered an agreement with Maruzen Petrochemical Co., Ltd. pertaining to the receipt of steam supply from the latter's ethylene production facility in an effort to optimize the utility network within the industrial complex (the agreement came into effect in June 2016)
	The environment and energy	April 2015	Acetylene black	Completed an ultra-pure acetylene black production facility at the Chiba Plant <a href="#">Photo 4</a>
	Infrastructure	April 2015	Special cement additives	Made POSCO (Malaysia) a subsidiary of Denka Chemicals Holdings Asia Pacific Pte. Ltd. (DCHA), renaming it Denka Infrastructure Malaysia Sdn Bhd.
	Healthcare	May 2015	Oncolytic virotherapy	Denka Seiken initiated the development of large-scale production methods for the "G47Δ" oncolytic virus as a project commissioned by Dr. Tomoki Todo, a professor at the Institute of Medical Science of the University of Tokyo
	Healthcare	June 2015	Rapid diagnostic test kits for infectious diseases	Denka Seiken signed an agency contract with Sinopharm Group Beijing Huahong Co., Ltd. (China) for marketing the QuickNavi™-Flu influenza antigen detection test kit
	The environment and infrastructure	June 2015	Ultrahigh-strength fiber-reinforced concrete	Received the Japan Prestressed Concrete Institute 2014 Award for Outstanding Engineering Innovations for the development of SUQCEM ultrahigh-strength fiber-reinforced concrete
	Healthcare	August 2015	R&D of bio pharmaceutical products	Acquired Icon Genetics GmbH, a Germany-based bio-pharmaceutical R&D venture
	Healthcare	October 2015	Cancer remedy information service	Announced the launch of a cancer remedy information service in Japan through collaboration with KEW Group Inc., a U.S.-based company specializing in genetic tests for cancer diagnosis
	Healthcare	November 2015	Cutting-edge farming technology	Initiated the marketing of plant cultivation systems employing cutting-edge farming technologies
	Healthcare	March 2016	Kagamida Plant (Denka Seiken)	Denka Seiken completed a new production facility at its Kagamida Plant <a href="#">Photo 5</a>
	Healthcare	March 2016	Reagent for measuring sd LDL-C	BEIJING STRONG BIOTECHNOLOGIES, INC. obtained Beijing FDA approval regarding the marketing of Denka Seiken's reagent for measuring "sd LDL-C" (a marker for heart diseases)
	Infrastructure	May 2016	Special cement additives	Made PT ESTOP Indonesia, an Indonesia-based construction material maker, a subsidiary of DCHA
	The environment and energy	July 2016	Automobile-related operations	Established the Automotive Materials & Solutions Dept.
	Overall (healthcare)	July 2016	R&D based on an industry-academia partnership	Signed a comprehensive partnership agreement with Niigata University to promote industry-academia joint R&D <a href="#">Photo 6</a>
	Healthcare	July 2016	Oncolytic virotherapy	Denka Seiken decided to construct a production facility for "G47Δ" oncolytic virus at its Niigata Plant (completion scheduled for September 2017)
Healthcare	July 2016	R&D of pharmaceutical products	Decided to open Denka Life Innovation Research Private Limited at Biopolis in Singapore, with the aim of securing our first overseas R&D base in the healthcare and life science fields (launch scheduled for February 2017)	
Initiatives for the next 100 years		April 2015	Safe operations	Established the Basic Policy for Workplace Safety, Health, Security and Disaster Prevention, which declares "We put the utmost priority on worksite safety and health, facility security and disaster prevention in all aspects of our business activities."
		April 2015	Corporate identity	Renewed corporate logo while formulating new corporate slogan "Possibility of chemistry."
		May 2015	Limestone mining	Completed construction to develop a new working face in the eastern section of the Omi limestone mine (Itoigawa City, Niigata Prefecture)
		October 2015	Change of company name	Changed company name to Denka Co., Ltd. (Denka Company Limited)
		October 2015	Safe operations	Established the Safety Promotion Meeting to step up voluntary inspections of safety assurance activities
		November 2015	Corporate governance	Established the Denka Corporate Governance Guidelines
		May 2016	Corporate philosophy	Established "The Denka Value," a new corporate philosophy encompassing the Denka Mission and Denka Principles
The environment and energy	2018 (scheduled)	New Omigawa Power Plant	A new hydroelectric power plant is under construction (operational kickoff scheduled for 2018)	
The environment and energy	2022 (scheduled)	New Himekawa Power Plant No. 6	Kurobegawa Electric Power Company, a joint venture of Hokuriku Electric Power Company and Denka, is conducting surveys in preparation for an upcoming hydroelectric power plant construction project (operational kickoff scheduled for 2022)	



Photo 1 Celebrating the first VINI-TAPE shipment at Denka Advanced Materials Vietnam Co., Ltd.



Photo 2 Celebrating the first ALSINK shipment at Denka Electronics Materials Dalian Co., Ltd.



Photo 3 Establishment ceremony of Denka Performance Elastomer LLC



Photo 4 An ultra-pure acetylene black production facility completed at the Chiba Plant



Photo 5 A facility completion ceremony at the Kagamida Plant, with Mr. Tetsuro Maeda, president of Denka Seiken, delivering the greeting



Photo 6 A signing ceremony for a comprehensive R&D partnership agreement between Denka and Niigata University

# Elastomers & Performance Plastics

## Denka Aims to Develop Distinctive Products and Sustainable Solutions to Meet Emerging Global Demands

The Elastomers & Performance Plastic Division deals with products such as chloroprene rubber, which enjoys the largest market share globally, and other specialty products, including styrenic resins, SBR resin, MS resin, acetylene black and acetyl chemicals. The overseas sales ratio in fiscal 2015 exceeded 60%. While accommodating ever-growing demand for these products in markets around the world, the division is striving to improve its operating structure and efficiency and thereby reinforce the Company's business foundation. Moreover, the division has developed products with superior functionalities tailored to customer needs, including an ultra-pure acetylene black for next-generation LiBs. Going forward, its manufacturing, R&D and sales sections will work as one to maximize overall organizational strengths, thereby creating innovative products capable of helping to resolve issues confronting society.



**Toshio Imai**  
Executive Officer,  
Elastomers & Performance Plastics

## Business Overview

This division handles products in three key categories: acetylene derivatives, including chloroprene rubber and acetylene black; styrene-based functional resins; and acetyl chemicals. Revenues from these products represent 40% of the overall Group sales. Leveraging a broad range of techniques and experience in synthesizing, compounding and molding polymers, we are bolstering technological innovation in such manufacturing fields as automobiles, home appliances and food packaging.



## Business Models (Value Creation Flows)

Business	Product	Source of value	Value created
Elastomers	DENKA Chloroprene DENKA ER	<ul style="list-style-type: none"> <li>Polymer structure design technologies tailored to specific applications</li> <li>Polymer composite technologies to achieve targeted functionalities</li> </ul>	<ul style="list-style-type: none"> <li>Provide products with superior performance, including high-heat resistance and high durability and longer product lives</li> </ul>
Special Conductive Materials	DENKA BLACK DENKA BLACK Li	<ul style="list-style-type: none"> <li>Technologies to precisely control the diameter and maintain the high purity and crystalline properties of particles</li> <li>Technologies to produce uniformly granulated particles that boast high bulk density and can be easily dispersed into such materials as resins</li> <li>Activation technologies that form pores on particle surfaces, significantly increasing specific surface area</li> </ul>	<ul style="list-style-type: none"> <li>Provide conductive materials for LiBs to increase their reliability, capacity and output</li> <li>Provide a conductive material for use in high-voltage power transmission cables to help extend its useful life and reduce transmission loss</li> </ul>
Performance Plastics	DENKA ABS Transparent resins Heat resistant resins CLEAREN	<ul style="list-style-type: none"> <li>Technologies to control polymer structures combining various polymerization methods</li> <li>Sophisticated manufacturing and quality management technologies capable of curbing the formation of and removing insoluble polymer</li> </ul>	<ul style="list-style-type: none"> <li>Supply products with superior transparency, heat resistance and hinge performance</li> <li>Realize superior amenability to molding, printability and shrink property</li> </ul>
Acetyl Chemicals	DENKA POVAL	<ul style="list-style-type: none"> <li>Polymer structure design technologies based on compositing tailored to specific applications</li> <li>Powder control technologies to produce resin particles</li> </ul>	<ul style="list-style-type: none"> <li>Provide a dispersant for the polymerization of vinyl chloride and a vinyl acetate emulsifier with stable dispersibility</li> <li>Provide raw materials for glass interlayer films with thermal stability and excellent transparency</li> </ul>

## Topic Enhancing the Competitiveness of the Chiba Plant through the Optimization of Utilities

In line with two of the Denka100 management plan growth strategies, namely, "Create the most optimal production system" and "Scrutinize every cost element," the Chiba Plant decided to receive steam supplied by a neighboring ethylene production facility run by Maruzen Petrochemical Co., Ltd. This will allow the plant to suspend the operation of one of its two boilers. Having thus optimized its utilities usage, the plant is expected to see a considerable reduction in costs thanks to lower expenses related to steam production as well as boiler maintenance and renewal. Looking ahead, we will collaborate with other companies operating within the same industrial complex to enhance the overall competitiveness of facilities at the site. Moreover, such moves will reduce total CO<sub>2</sub> emissions.

### 1 The Market Environment

- A shift to overseas production in electronics, automotive and other related markets on the back of demand growth in emerging economies
- Increasing market presence of commodity manufacturers based in emerging economies
- Burgeoning demand for performance plastics and the shortening of product life cycles

### 2 Strategies

- 1. Create the most optimal production system**
  - Develop a more robust global supply structure for our flagship products to solidify their top global market shares
- 2. Improve business structure**
  - Enhance our resilience against risks attributable to changes in foreign exchange rates, raw material and fuel prices and other factors in the trade environment by scrutinizing every cost element and optimizing all processes from production to sales
- 3. Develop new businesses**
  - Focus further management resources on growth drivers and promote external collaboration to develop new businesses for the next generation

### 3 Main Achievements in Fiscal 2015

- 1. Created the most optimal production system**
  - Began operating the chloroprene rubber business acquired from DuPont (the United States)
  - Brought a new ultra-pure acetylene black production facility on line (Chiba Plant)
- 2. Improved business structure**
  - Downsized ABS production lines by consolidating deposition processes following the integration of finishing processes in 2014
- 3. Developed new businesses**
  - Explored R&D themes employing open innovation
  - Commenced the construction of a new facility for the semi-commercial production of "DENKA SE POLYMER" styrene based-elastomer

### 4 Challenges

- Step up initiatives to develop new businesses targeting growth fields
- Create greater synergies with a two-location production system (Japan and the United States) for chloroprene rubber
- Establish an ultra-pure acetylene black supply structure supported by three locations (Omuta, Chiba and Singapore) to serve broader markets around the world
- Continue scrutinizing every cost element to enhance competitiveness of domestic production bases
- Better respond to changes in the trade environment, such as the appreciation of the yen and rising crude oil prices

## Creating Shared Value (CSV); Helping Resolve Social Issues DENKA BLACK Li

### Social Issues

Urgent need for the reduction of emissions of hazardous particles and greenhouse gases from automobiles through the popularization of EVs, HVs and other eco-friendly vehicles

### Society's Technological Expectations

Development of safer automotive secondary batteries with superior functions

### The Denka Group's Technological Solutions

DENKA BLACK Li is carbon black manufactured through the thermal decomposition of acetylene gas. Boasting a unique structure, the product is used as a conductive material in lithium ion secondary batteries (LiBs).

The most prominent features of DENKA BLACK Li are its chain-like structure and extreme purity. Consisting of fine carbon particles connected in a series like a chain, even a tiny amount of DENKA BLACK Li confers high electric conductivity. Moreover, this product boasts extreme purity as we have eradicated the metallic foreign matter content that commonly compromises battery safety, making it optimal for producing reliable cells.

To ensure the supply of safe and highly functional conductive materials for LiB

applications, we launched a dedicated production facility at the Chiba Plant that aims to ensure the most thorough possible eradication of foreign matter content from our output. DENKA BLACK Li is now contributing to the popularization of eco-friendly vehicles.



DENKA BLACK Li (right above: Magnified view)

# Infrastructure & Social Solutions

## Pursuing a Needs-Oriented Approach and Developing a Local Network to Provide Optimal Solutions

The Infrastructure & Social Solutions Division handles cement and special cement additives, both of which are essential for infrastructure development; corrugated pipes for water catchment and discharge systems used to manage ground- and river water; chemical fertilizers that help improve crop yields; fire resistant materials; desulfurizing agents; and other materials for use at such facilities as steelworks. Moreover, an array of special cement additives support the division's capability to offer optimal solutions, including novel materials and innovative construction methods. Working together, the division's manufacturing, sales and R&D sections serve markets in China and Southeast Asia, where rapid infrastructure development is under way. Paying close attention to the latest customer needs, we are promoting these and other solutions to help advance energy and resource saving as well as global warming countermeasures.



**Toyoki Yokoyama**  
Executive Officer,  
Infrastructure & Social Solutions Div.;  
Deputy General Manager,  
Disaster Reconstruction Support Div.

## Business Overview

In addition to the calcium carbide and calcium cyanamide fertilizers that Denka has been manufacturing for a century, this division handles cement, special cement additives and other products made by applying inorganic chemistry as well as corrugated pipes. Leveraging the competitive advantages provided by in-house power generation capabilities and ownership of limestone mines, we provide unique products and solutions that support agricultural development and social infrastructure.



## Business Models (Value Creation Flows)

Business	Product	Source of value	Value created
Special Cement Additives	Cement Special cement additives	<ul style="list-style-type: none"> <li>Competitive advantages backed by in-house power generation facilities and ownership of limestone mines</li> <li>Unique solution technologies capable of controlling various characteristics of concrete, such as hardening, expansion and shrinkage rates</li> <li>Robust R&amp;D structure backed by diverse collaboration involving partnerships between industry, academia and the government</li> </ul>	<ul style="list-style-type: none"> <li>Develop social infrastructure while strengthening national land</li> <li>Assist infrastructure development in emerging nations (roads, railways and concrete buildings)</li> <li>Provide technologies for repairing aged concrete structures and facilitating reconstruction following disasters</li> </ul>
Agri-Products	Fertilizers	<ul style="list-style-type: none"> <li>Fertilizer technologies accumulated over 100 years of experience in providing solutions tailored to varying climates and soil qualities in regions throughout Japan</li> </ul>	<ul style="list-style-type: none"> <li>Provide fertilizers and fertilizer application technologies best suited to specific regions and types of crop while enhancing our products' responsiveness to growing requirements for climate change countermeasures</li> <li>Supply safe and ecological products that minimize soil and atmospheric pollution</li> <li>Contribute to the restoration of farmland damaged by such natural disasters as high winds and flooding</li> </ul>
Inorganic Materials	ALUMINA CEMENT SULFEX FIRELEN	<ul style="list-style-type: none"> <li>An array of inorganic material manufacturing technologies that enable the production of high-quality fire-resistant materials and desulfurizing agents with superior functionalities</li> </ul>	<ul style="list-style-type: none"> <li>Contribute to the reduction of environmental burdens as well as improvements in product quality and cost competitiveness by supplying inorganic materials to steelworks in Japan, already the world leader in terms of quality and production efficiency</li> </ul>
Environmental materials	Corrugated pipes	<ul style="list-style-type: none"> <li>Polymer processing technologies accumulated over years</li> </ul>	<ul style="list-style-type: none"> <li>Provide drainage solutions for land development, tunnel construction and roads while supplying water management systems for farmland</li> </ul>

## Topic Expanding into Markets Overseas with Special Cement Additives

Toward the goal of achieving annual overseas sales of special cement additives amounting to ¥15 billion, we are striving to develop a more robust local business network. In Southeast Asia, we made Denka Infrastructure Malaysia Sdn. Bhd. (DISB) a subsidiary in April 2015, stepping up collaboration with this company through human exchanges and mutually utilizing one another's sales channels. In July 2016, we signed an agreement with PT ESTOP Indonesia, an affiliate of DISB, with regard to the additional acquisition of its equity stake, making it a subsidiary as well. In this way, we will solidify our foothold and further penetrate the Indonesian market.

Moreover, efforts are now under way to step up collaboration with major cement makers in China, with Denka Infrastructure Technologies Shanghai Co., Ltd. serving as regional headquarters. In particular, some key local construction material manufacturers have been cooperating with our sales channel development initiative, thanks to the solid reputation we have earned for our technological strengths.

## 1 The Market Environment

- Trend toward demand growth reflecting an increase in construction and infrastructure projects associated with the recovery from the Great East Japan Earthquake and an upturn in public-sector investment
- Ongoing firm market demand for infrastructure development in China and Southeast Asia
- A shift toward automated and large-scale farming aimed at strengthening the agricultural industry's foundation
- Growing need for ecological solutions

## 2 Strategies

- Maximize profitability by optimizing our production system
- Facilitate the prudent use of resources and thereby help develop a recycling-oriented society
- Step up overseas expansion with a focus on augmenting local production in Asia
- Promote our solution business through the development of farming materials
- Help create energy-saving steel and industrial furnaces employing our fire resistant products

## 3 Main Achievements in Fiscal 2015

- The cement business**  
Steadily operated a process that recycles various waste and byproducts
- The special cement additive business**  
Expanded into the Southeast Asian market by stepping up collaboration with Denka Infrastructure Malaysia Sdn. Bhd. and utilizing its sales channels
- The agri-products business**  
Developed a humic acid liquid fertilizer tailored for use in plant cultivation facilities that employ nutriculture systems to accommodate recent growth in demand; Developed a weed-preventing soil solidifier by applying rapid hardening technologies for special cement additives
- The inorganic products business**  
Developed high-value-added products with superior thermal insulation properties
- The environmental materials business**  
Contributed to underground drainage construction in areas affected by the Great East Japan Earthquake in Miyagi Prefecture in an effort to help restore farmland

## 4 Challenges

- The cement business**  
Develop new recycling technologies
- The special cement additive business**  
Achieve our annual overseas sales target (¥15 billion) as early as possible
- The agri-products business**  
In addition to developing humic acid liquid fertilizers, a weed-preventing soil solidifier and cutting-edge farming methods, pursue new businesses that support agricultural infrastructure, such as the marketing of appliances for horticulture facilities
- The inorganic products business**  
Make proposals for fire-resistant materials and thermal insulation products to meet customer needs
- The environmental materials business**  
Create a farmland development model that fully leverages Denka's unique strengths

## Creating Shared Value (CSV); Helping Resolve Social Issues

## DENKA RENOTEC

### Social Issues

An aging social infrastructure due to concrete degradation and emerging as problems ranging from cracking and surface delamination and the development of internal defects to salt damage and neutralization, all of which now plague roads, bridges, tunnels and other structures built during Japan's high economic growth period, poses the risk of potential disaster

### Society's Technological Expectations

Safe and cost-effective repair technologies that require shorter periods to apply and that ensure long-lasting endurance by employing the diagnosis of structure degradation using non-destructive inspection methods (infrared light, supersonic, etc.) and broad-view inspections (such as those using drones, etc.)

### The Denka Group's Technological Solutions

- We provide solutions to repair aged concrete structures that have surface delamination due to cracking or internal damage. Our solutions include injecting resins with superior hardening properties and applying mortar with superior waterproof properties. Moreover, with an eye to enhancing the life cycle costs of structures, we develop and employ cutting-edge materials and technologies that ensure long-lasting repair effectiveness.
- Concrete durability can be compromised by such causes as salt damage and neutralization due to acid rain. We perform non-destructive inspections to assess and analyze the external and internal soundness of concrete,

detecting the causes of degradation and identifying optimal repair methods. One such method is the DENKA TECHNOCRETE System, which is capable of restoring the strength of aged structures through electrochemical technologies. In these ways, we are helping maintain the soundness of social infrastructure.



Desalination technology was applied to the Oyashirazu beach elevated bridge, which is part of the Hokuriku expressway

# Electronics & Innovative Products

## Developing New Businesses with an Emphasis on Adding and Creating New Value

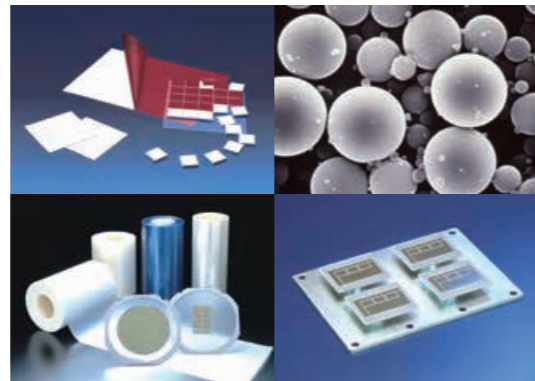
The Electronics & Innovative Products Division boasts an array of products that are essential to the field of electronics. Its offerings include electronic parts materials, packaging materials for transporting electronic components, thermal solution components, and structural adhesives. In July 2016, we established the Automotive Materials & Solutions Department to capture a wide ranging needs for automobile parts-related solutions. Also, in line with the Denka100 management plan, the division has implemented the "VALUE 50" business strategy aimed at achieving stable business growth. In the face of today's diversifying customer needs, it is important to adapt to drastically changing market conditions. To maximize the "Possibility of chemistry," we will pursue a speed-oriented, forward-looking business approach while fully leveraging our creativity in order to provide markets with cutting-edge products and technologies.



**Sanshiro Matsushita**  
Managing Executive Officer,  
Electronics & Innovative Products

## Business Overview

Supporting progress in electronics and technologies, the Electronics & Innovative Products Division provides functional fine particles and thermally conductive substrates, which achieve key thermal control for realizing miniaturization and greater reliability and performance. At the same time, our functional films and adhesives play essential roles in realizing labor-saving, cost-efficient and environment-friendly manufacturing processes. Providing a variety of products to meet customer needs, we will strive to help resolve social issues.



## Business Models (Value Creation Flows)

Business	Product	Source of value	Value created
Functional Fine Particles	Fused silica Spherical fused silica Spherical alumina	<ul style="list-style-type: none"> <li>Technologies that employ the flame spray pyrolysis method to shape spherical oxide ceramic particles and technologies to precisely control particle diameters</li> </ul>	<ul style="list-style-type: none"> <li>Enabled extremely close packing into semiconductor sealants, realized greater stability in sizes thanks to a reduced thermal expansion property and improved safety due to a cut in fire retardant content → Contributed to the miniaturization of semiconductors and electronic devices as well as the reliability of these products</li> </ul>
	Boron nitride Silicon nitride Aluminum nitride Phosphor	<ul style="list-style-type: none"> <li>High-temperature calcining technologies in a nitrogen atmosphere</li> </ul>	<ul style="list-style-type: none"> <li>Create ceramics with unique characteristics, including superior heat conductivity, strength, lubricity and color-rendering → Contributed to the realization of smaller, thinner and more energy-saving electronic devices as well as improved high-resolution displays</li> </ul>
Heat Dissipating Products	Highly heat-conducting substrates (DENKA AN PLATE and HITPLATE) Thermally conductive sheets and thermal grease-type dissipation materials	<ul style="list-style-type: none"> <li>Technologies for calcining highly heat-conducting fillers and those for designing electrical insulation and thermal dissipation materials</li> </ul>	<ul style="list-style-type: none"> <li>Create a variety of heat-dissipation and other solution technologies → Contributed to the miniaturization of rolling stock and automotive components, industrial instruments and home appliances as well as mobile devices while improving their energy efficiency</li> </ul>
Functional Films	Electronic packaging materials (DENKA ThermoSheet and DENKA Thermo Film)	<ul style="list-style-type: none"> <li>Technologies to produce resin compounds with such functionalities as electrical conductivity in addition to multilayered film technologies</li> </ul>	<ul style="list-style-type: none"> <li>Provide carrier tapes, cover tapes and other packaging materials with superior functionalities for transporting electronic components and thereby helped accelerate production process and miniaturization → Contributed to the creation of better-performing, more cost-competitive electronic components</li> </ul>
Adhesives	HARDLOC ELEGRIIP	<ul style="list-style-type: none"> <li>Adhesive compounding technologies and a wealth of data with regard to various adhesive and adherent materials</li> </ul>	<ul style="list-style-type: none"> <li>Realize adhesive products for various materials that have greater reliability with regard to both permanent and temporary applications → Helped enhance product design and quality while reducing semiconductor production processes and costs</li> </ul>

## Topics Establishing the Automotive Materials & Solutions Department

The automotive industry is undergoing a drastic change due to emerging demand for such environment-friendly technologies as HVs, EVs and FCVs as well as the upcoming commercialization of autonomous driving systems. Given the circumstances, in July 2016 we established this department to collectively take on R&D projects that address needs related to next-generation automobiles and automotive parts. By bringing to bear a range of materials and core Denka technologies, we will provide products and solutions capable of realizing unprecedented performance.

### Adopting New Global Strategies

- We are developing a HITPLATE (aluminum-based circuit substrate) production structure supported by subcontractors in the Philippines, in addition to those operating in China.
- We are building an overseas supply structure for our mainstay adhesive SGA (a two-component type second-generation acrylic adhesive). Since the commencement of sales in China, we have kicked off efforts to release our products in Southeast Asia, Europe and the United States. Once the marketing structure is established, we will be able to shorten delivery times and lengthen our products' durable life.

## 1 The Market Environment

- Quantitative shrinkage in market demand for electronic materials due to the miniaturization of devices
- Growing requirements for cost-competitive products due to rapid commoditization
- Formation of new markets due to growth in demand for EVs and HEVs

## 2 Strategies

- 1. Shift our focus to high-value-added products as we develop mainstay offerings**
  - Differentiate ourselves in terms of product performance and quality by continuously improving technologies
- 2. Build an optimal production system and thoroughly reduce costs**
  - Leverage our domestic and overseas production networks more efficiently (spherical fused silica and electronic packaging materials)
  - Launch new overseas production sites (ALSINK and electronic packaging materials)
- 3. Enter promising next-generation business areas early**
  - Nurture and expand operations related to phosphor and spherical alumina, both of which are on a growth track
  - Enter the OLED and peripheral fields, where demand growth is expected, by employing our adhesive technologies
- 4. Create new businesses**
  - Identify the latest needs for automotive materials and commercialize products to meet such needs
  - Participate in industrial-government-academia partnerships to create new businesses where we can leverage our technological strengths and thereby go beyond the production of electronic materials

## 3 Main Achievements in Fiscal 2015

- Initiated the production and sales of ALSINK at Denka Electronics Materials Dalian Co., Ltd. in China
- Initiated the production and sales of electronic packaging materials at Denka Advanced Materials Vietnam Co., Ltd. in Greater Hanoi City, Vietnam
- Denka's phosphor was chosen for smartphones, following success in 4K televisions

## 4 Challenges

- Promote the local production of adhesives to better serve local markets while developing new applications
- Step up marketing in the automotive field with thermal solution products based on our functional fine particle technologies
- Augment production facilities for nitride-type ceramics in preparation for future sales growth

## Creating Shared Value (CSV): Helping Resolve Social Issues

### Social Issues

- A need to popularize HEVs and EVs in order to curb vehicle emissions
- Demand for HEVs and EVs with greater energy efficiency

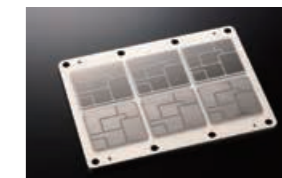
### Society's Technological Expectations

- Thermal solutions for facilitating the weight reduction and miniaturization of ECUs for motor control

## Silicon Nitride and SN Plate

### The Denka Group's Technological Solutions

DENKA SN PLATE, a silicon nitride-based substrate, boasts superior thermal conductivity as well as high strength and reliability. It is used as a thermal conductive substrate for the power modules used in inverters installed in HEV and EV motor control units, providing protection from heat degradation and ensuring that performance is maintained while prolonging durability.



DENKA SN PLATE



# Life Science & Environmental Products

## Helping Enhance the Quality of People's Lives while Tailoring Solutions in Step with Changing Lifestyles

The Life Science & Environmental Products Division is in charge of products closely related to people's lifestyles and living environments and serves such industries as healthcare, foodstuffs and housing. In recent years, maturing markets and a concomitant rise in demand for higher product quality have driven worldwide recognition of the technological strengths of Japanese manufacturers. Accordingly, we will strive to improve quality and productivity even further while developing our overseas business network. It is expected that changes in people's lifestyle needs will fuel the constant creation of new demand. Staying vigilant to market trends, we will continue to work to enhance the quality of people's lives through the provision of environment-friendly and safe products.



**Junichi Kimura**  
Executive Officer,  
Life Science & Environmental Products

## Business Overview

The division is engaged in wide-ranging businesses that directly affect people's lifestyles and living environments. For example, it handles materials for construction use, such as rain gutters, as well as industrial tapes, food packaging materials and pharmaceuticals. Moreover, the division produces TOYOKALON, a material for wigs and hairpieces that is expected to become popular globally, VINI-TAPE for such applications as electrical insulation and automotive wire harnesses, and multi-layer food packaging sheets. In addition, Denka Seiken Co., Ltd., a Group company serving as a key business driver in the healthcare field, boasts the QuickNavi™ series rapid diagnostic test kits. Commanding a considerable share of the domestic market for diagnostic reagents for influenza, norovirus and other infectious diseases, these test kits can provide diagnoses without using any special equipment or electric devices. Going forward, we will expand into Asian and African markets while developing diagnostic test kits for Ebola virus and other tropical infectious diseases.



### 1 The Market Environment

- The maturation of the domestic market and intensifying competition
- Growth in market potential reflecting the burgeoning purchasing power of emerging economies
- Growing interest in food safety
- Rapid aging of society
- Proliferation of multilateral trade agreements
- Growing interest in environmental protection
- Diversification of people's lifestyles and values

### 2 Strategies

- Enhance cost competitiveness through such steps as the creation of an optimal production system (rain gutters and food packaging)
- Promote a shift to local production for products targeting overseas markets (TOYOKALON, VINI-TAPE and food packaging materials)
- Explore promising domestic and overseas markets while nurturing next-generation products and technologies (technological development related to the creation of multi-layer, oil-resistant food packaging capable of enduring high heat; the stepped up marketing of fluorine-based film, synthetic fiber, rain gutters and influenza virus detection test kits; R&D of macromolecular sodium hyaluronate preparation; the development of an intradermal influenza vaccine; and the development of manufacturing technologies aimed at commercializing oncolytic virus)

### 3 Main Achievements in Fiscal 2015

- **Established overseas production network**  
Synthetic fiber: Launched a new facility (the South Plant of Denka Advantech Pte. Ltd.) in Singapore in June 2013  
VINI-TAPE: Launched a new facility (Denka Advanced Materials Vietnam Co., Ltd.) in Vietnam in May 2015  
Food packaging: Launched a new facility (Denka Advanced Materials (Suzhou) Co., Ltd.) in March 2015
- **Gained footholds in overseas markets**  
Established a local sales subsidiary in Dubai in January 2015; plans call for utilizing this subsidiary to penetrate emerging markets in the Middle East, CIS and Africa
- **Developed and released new products**
  - Developed and marketed a highly oil resistant sheet for use in food containers
  - Developed and released a variation of fluorine-based film (TEFKA) that boasts greater transparency and flame retardant property
  - Developed and released a new synthetic fiber for hairpieces specially designed for women of African origin
  - Developed and released rain gutter parts that enable labor-saving installation in response to the shortage of workers
  - Developed a rapid diagnostic test kit capable of detecting Ebola virus in just 15 minutes

### 4 Challenges

- Establish a more flexible production system capable of accommodating diversifying needs (synthetic fiber and food packaging materials)
- Build a supply structure to better serve emerging markets (synthetic fiber, VINI-TAPE and food packaging materials)
- Reduce waste through the development of strong but lightweight materials with smaller bulk (food packaging materials, VINI-TAPE and fluorine-based films)
- Establish a production structure capable of accommodating growing demand (fluorine-based films)

## Business Models (Value Creation Flows)

Business	Product	Source of value	Value created
Synthetic Fibers	TOYOKALON	<ul style="list-style-type: none"> <li>• Polymer processing technologies that enabled for the world's first commercialization of polyvinyl chloride fiber in 1952</li> <li>• Two production bases in Japan and Singapore as well as marketing and technical service bases in New York and Dubai, which together serve the global market</li> </ul>	<b>Functionality</b> <ul style="list-style-type: none"> <li>• Tangle resistant even after being worn for long periods</li> <li>• Soft lifelike feel, evocative of silk</li> <li>• Flame resistant</li> </ul> <b>Design</b> <ul style="list-style-type: none"> <li>• Unique glossiness and superior curling property</li> <li>• Versatility to fit various hairstyles</li> </ul> <b>Service capability</b> <ul style="list-style-type: none"> <li>• Service structure for painstakingly accommodating the needs of individual customers</li> </ul>
Functional Films	DENKA DX FILM	<ul style="list-style-type: none"> <li>• A comprehensive R&amp;D structure encompassing technologies for resin composite, multi-layer coextrusion and other film production techniques</li> </ul>	<ul style="list-style-type: none"> <li>• Superior weather- and chemical-resistant properties as well as anti-pollution properties</li> <li>• Superior adhesiveness to materials that previous conventional fluorine-based films found difficult to stick to</li> <li>• Flexible, abrasion resistant and electrical insulating properties</li> </ul>
Functional Films	TEFKA	<ul style="list-style-type: none"> <li>• Film production technologies (plant maintenance techniques and thin-film production, crystal-structure control technologies )</li> </ul>	<ul style="list-style-type: none"> <li>• High transparency</li> <li>• Fire resistance and flame retardant properties</li> <li>• Weather and chemical resistance properties</li> </ul>
Food Packaging	DENKA Thermosheet NB	<ul style="list-style-type: none"> <li>• Sheet production and multi-layer membrane production technologies (lamination technology)</li> </ul>	<ul style="list-style-type: none"> <li>• Realized a moisture-barrier property in addition to being easy to mold and strong like conventional products</li> <li>• Used as a material for creamer containers, it prevents evaporation, thereby stabilizing and ensuring the quality of the content over a longer period of time</li> </ul>

## Topic Establishing a New Business Base to Serve the Middle Eastern and African Markets

In January 2015, we established Denka Middle East and Africa FZE in Dubai, securing a local subsidiary in United Arab Emirates. In April of that year, we began marketing synthetic fibers for wig and hairpiece applications targeting Africa as well as polyvinyl chloride electrical insulation tapes targeting both the Middle East and Africa.

Not only does Dubai boast significant potential for economic growth, it provides us with easier access to elsewhere in the Middle East as well as Africa. Having acquired a strategically advantageous sales base, we will push forward with business expansion by employing unique Denka Group products and technologies to meet growing demand in infrastructure development and healthcare fields.

## Creating Shared Value (CSV); Helping Resolve Social Issues

## DENKA Thermosheet Special BOPS

### Social Issues

- Growing concerns over food safety
- A growing need for quick and easy cooking
- Aging of society and an increase in households in which families rarely eat together

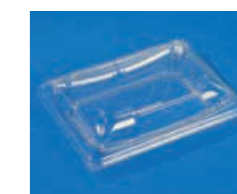
### Society's Technological Expectations

- Highly transparent containers that allow consumers to view content
- Heat-resistant containers with adaptability to microwave cooking as well as oil resistance
- High-strength, lightweight containers that facilitate resource saving and CO<sub>2</sub> reduction

### The Denka Group's Technological Solutions

On the back of a growing reliance on take-out food, which is usually microwaved before consumption, we are seeing increasing demand for highly functional plastic food containers with greater heat- and oil-resistant properties. In response, we developed a special BOPS, a food container sheet that incorporates a new polymer. Boasting superior resistance to heat and oil, this product is also highly transparent and lightweight, just like its conventional counterparts. Moreover, efforts are now under way to boost its heat- and oil-resistance even further.

These and other functional BOPS products will contribute to the convenience of consumers by broadening the range of foods that can be microwaved within the container.



# Denka's R&D Activities



**Norihiro Shimizu**  
 Managing Executive Officer,  
 Research and Development, Innovation Center,  
 New Business Planning Dept.,  
 R&D Promoting Dept., Intellectual Property Dept.

## Actively Promoting Open Innovation to Meet Diversifying Needs, We Will Lead Technological Advancement in a Globalized Business Environment.

To showcase current R&D activities that are providing powerful support to the aforementioned four business divisions, we spoke with Mr. Norihiro Shimizu, Managing Executive Officer of Research and Development, about the Denka Group's medium- and long-term R&D activities.

### 1. Denka's Manufacturing Strength

Denka boasts a wealth of technological assets, including expertise in both organic and inorganic chemistry, which together constitute its core manufacturing competencies.

Since its beginnings as a producer of calcium carbide, Denka has been accumulating high-temperature and calcining control technologies through the operation of electrical furnaces. This experience has, in turn, helped us create highly functional ceramic, fused silica, phosphor and other electronic materials as well as acetylene black, a next-generation material for battery cells.

Moreover, our organic polymer-related technologies, which encompass precise synthesis, polymerization and composite techniques, enhance the functionality of synthetic resins and elastomers. We are able to combine these technologies with those we have developed for resin design and processing, thereby contributing to the creation of new value in the fields of automotive parts and food packaging.

In addition, we have applied a combination of organic and inorganic technologies to electronic circuit substrates, thermally conductive materials and adhesives. This approach has also enabled us to provide cutting-edge construction and civil engineering solutions that employ such new materials as special cement additives.

Meanwhile, we have been active in the biotechnology field for 65 years. For example, we have leveraged our proprietary fermenting technologies to manufacture macromolecular sodium hyaluronate preparations. Furthermore, our subsidiary, Denka Seiken Co., Ltd., boasts an array of vaccines, diagnostic reagents and other innovative pharmaceutical products developed using antigen and antibody reaction technologies in its possession.



Denka Innovation Center

We will step up the development of these and other Denka technologies supporting our core competencies, thereby creating next-generation products while enhancing our key operations.

### 2. Transforming Our R&D Organizations

A key to a manufacturing innovation often lies in challenging the perceived "boundaries" separating different fields. With this in mind, we introduced a matrix-type R&D organizational structure two and a half years ago. This movement was intended to consolidate Groupwide research-related resources, which ranged from our in-house research institutes to R&D departments within plants, with the Denka Innovation Center serving as a core. Employing this structure, we have been tackling the creation of new R&D themes. These efforts have begun to yield results in the fields of life science and food packaging that, in turn, are leading to the commercialization of new products. We believe that going forward, this organizational transformation will bring even greater benefits.

Also, we launched a project team consisting of younger researchers working to devise new R&D themes, developing them from scratch through the free exchange of ideas. In addition to encouraging our young colleagues to apply their flexible ways of thinking in R&D, this project is expected to develop their potential and instill independent-mindedness, thereby nurturing key researchers who will lead the next generation. Moreover, our external partners, including business corporations and research organizations, have expressed their appreciation of this project's purpose, and we are expanding the scope of participants to welcome those from outside entities.



### 3. Innovation Comes from Dialogue

As an officer in charge of R&D management, I engage in face-to-face dialogue with customers and partners in Japan and overseas. Although asking our researchers to do the same may make them feel exposed and pressured with regard to the success or failure of particular development themes, I believe this type of dialogue can trigger deeper and more constructive explorations of themes as we reach across the barriers separating disciplines. We are committed to accurately understanding our customers' technologies and resolving challenges they are confronting, knowing that this is exactly how technological advancements in chemistry will be achieved.

In July 2016, we established the Automotive Materials & Solutions Department as a dedicated body for collectively handling new R&D themes in the automotive field and relevant technological input. The global automotive industry is now undergoing drastic change, with manufacturers facing high expectations for breakthroughs in EVs, FCVs, autonomous driving and other cutting-edge technologies.

Since the development of new materials and components may well provide the key technologies that help realize such breakthroughs, we have stepped up our ongoing dialogue with representatives from Automotive parts makers and are fielding a growing number of consultations from automobile makers. I am well aware of our customers growing expectations of us.

### 4. Driving Open Innovation Forward

Active technological exchange with corporations, academia and other external partners that boast strengths in basic and peripheral technologies helps raise the success ratio of development themes while significantly shortening the timespan of R&D projects. Well aware of this fact, Denka is actively driving open innovation forward in tandem with more than 200 business corporations and research institutions, including the NIMS-DENKA Center of Excellence for Next Generation Materials.

In July 2016, we signed a comprehensive partnership agreement with Niigata University. Having initiated industry-academia joint research in the life science field, where the Company has been operating for many years, Denka and Niigata University will go on to expand the scope of R&D to include fertilizers and food packaging.

Denka is also engaging in active exchange with venture companies—including "early stage ventures"—that boast unique cutting-edge technologies. One such company is the U.S.-based KEW Group specializing in genomic alteration



Icon Genetics GmbH

### R&D Policy

Having positioned "Open Innovation and Challenge" as our underlying R&D slogan, we have stepped up joint research with external partners in Japan and overseas while participating in industry-academia-government collaboration. At the same time, we are working in tandem with the four business divisions to carefully assess customer requirements for the next-generation products in an effort to deliver solutions for unmet needs as earlier as possible.

### Fiscal 2015 R&D Achievements

#### Proactively Utilized the Denka Innovation Center

During the year the Denka Innovation Center hosted a total of more than 1,000 visitors from external corporations, universities and research bodies, and it is continuing to serve as a hub for technological exchange and joint research in a variety of fields, including inorganic ceramics, organic polymers and biomaterials.

analysis for cancer treatment application. Partnering with this company, Denka will launch a cancer remedy information service in Japan. We are also developing a norovirus vaccine, to this end utilizing a platform for producing high molecular proteins that has been created by Icon Genetics GmbH, which became a Group subsidiary in 2015 and is based in Halle, Germany.

### 5. Diversity Is Key to the Future Success of R&D

I believe that diversity will be a key driver of our success in R&D. Global operations in particular require the understanding of different cultures, lifestyles and legal systems along with insights into local needs and concept-



DLIR will be in the Nucleus building in Singapore's Biopolis research park (photo courtesy of Ascendas-Singbridge)

building capabilities that give appropriate consideration to local circumstances. Accordingly, we will endeavor to develop our overseas R&D organizations while promoting diversity among our researchers in terms of nationality and race.

As part of such endeavors, we decided to establish Denka Life Innovation Research Private Limited (DLIR) in the Biopolis research park, with operational kickoff scheduled for February 2017. We will thus secure a second overseas R&D base after Denka Chemicals Development Suzhou Co., Ltd. (China). Since excellent researchers are attracted to Singapore from countries and regions all around the world, we expect that this facility will serve as a hub for international research projects.

All Denka Group researchers are strongly committed to contributing to society's sustainable development through their R&D activities. Looking ahead, we will strive to meet customers' expectations by reaping a stable stream of results from our day-to-day research operations.

### Results from Inter-Organizational R&D

R&D undertaken with the NIMS-DENKA Center of Excellence for Next Generation Materials is resulting in the creation of innovative products, including novel functional ceramics and a next-generation material for power devices. Denka and the center have also taken on the development of various materials and components for the next generation, ranging from organic polymers to biomaterials.

We maintain a comprehensive research partnership with Yamagata University. Pursuing joint research, we incorporate our basic accomplishments regarding polymer synthesis and molding processing into new R&D themes that have been aligned with the latest market needs to develop next-generation products. Going forward, we will step up multi-faceted collaboration, working to realize greater benefits from this and other collaborative R&D activities.



A lecture provided by NIMS researchers at the Denka Innovation Center

# Creating Shared Value (CSV): How Denka Products Help Resolve Social Issues



Electronics & Innovative Products Division				
Category	Department	Product Name	Application	Benefits
	Electronic Products Dept.	DENKA AN Plate DENKA SN Plate ALSINK	Rolling stock, industrial instruments, electric and hybrid vehicles	Ceramic-based electronic circuit substrates with superior heat dispersion capabilities that, when used in such components as inverters and drive transistors, facilitate downsizing while ensuring greater reliability and superior energy efficiency
	Advanced Specialty Materials Dept.	ALONBRIGHT	Phosphor for LEDs	A phosphor for white LEDs used in LCD TV backlights and various types of LED lighting that helps to significantly reduce energy consumption and greenhouse gas emissions
	Electronic Products Dept.	HITT PLATE	Electronic circuit substrates for air conditioners and automotive parts	An electronic circuit substrate used in invertors that effectively disperses the heat emitted by drive transistors to protect electronic circuits and facilitates their downsizing while enhancing energy efficiency
	Electronic Products Dept.		Electronic circuit substrates for LEDs	Electronic circuit substrates that help improve LED luminous efficiency by effectively dissipating the heat generated during use
	Electronic Products Dept.	Thermally Conductive Sheets	Automotive parts, smartphones and tablets	Silicon materials packed with ceramic filler that boast high thermal conductivity for use in hybrid and electric vehicles as power semiconductor heat dissipaters, facilitating the downsizing of automotive parts and enhancing their energy efficiency
	Advanced Specialty Materials Dept.	Silicon nitride	Bearings for wind power turbines, mold-release agents for manufacturing silicon ingots for solar cells	High-strength ceramic material used in the bearings of wind power turbines to enhance durability while significantly reducing facility maintenance workload. It is also used as a mold-release agent in the manufacture of silicon ingots being processed into solar cells.
	Advanced Specialty Materials Dept.	Molded BN products	LED manufacturing equipment	Used in LED chip manufacturing equipment as an excellent, easy to cast insulation material
	Advanced Specialty Materials Dept.	Spherical fused silica filler	Semiconductor encapsulant fillers	An incombustible filler with form- and size-modified particles that is mixed into the encapsulant used for semiconductors. Capable of protecting circuits from temperature fluctuations, it can be used to reduce the need for hazardous flame retardants.
	Advanced Specialty Materials Dept.	Spherical alumina	LEDs	Added to a resin matrix as a heat-conducting filler for the purpose of dissipating the heat generated by LED chips and thereby enhancing LED's luminous efficiency
	Adhesives & Solutions Dept.	HARDLOC (SGA)	Metal adhesive (substitute for welding)	A room-temperature hardening adhesive that can be substituted for conventional metal welding, reducing energy consumption significantly while eliminating the need to reshape heat-deformed metal
	Adhesives & Solutions Dept.	TEMPLOC	Temporary adhesives for the processing of glass in smartphones	A temporary UV-curing fixing adhesive that can be removed with hot water rather than solvents, thereby reducing environmental burdens attributable to wastewater treatment and heat processing while facilitating cost reductions by enabling "laminated-glass cutting"

Infrastructure & Social Solutions Division				
Category	Department	Product Name	Application	Benefits
	Special Cement Additives Dept.	EIEN/SUICOM	EIEN: Embedded concrete molds, radioactive waste containers SUICOM: Vegetation blocks, foundation blocks	Incorporating special cement additives, EIEN can densify the internal structure of concrete by reacting with carbonate ions. In addition to absorbing CO <sub>2</sub> during production, by helping prolong the lives of buildings it reduces the need for CO <sub>2</sub> -emitting demolition and construction processes. During production, SUICOM absorbs CO <sub>2</sub> , working to harden concrete through the carbonization of a special cement additive made using slaked lime, which generates no CO <sub>2</sub> even at the raw material stage. SUICOM thus contributes significantly to CO <sub>2</sub> reduction throughout its life cycle.
	Special Cement Additives Dept.	DENKA Σ 1000,2000, 80N	Concrete piles, propulsive pipes, box culverts, high-strength piles, pillars for buildings, concrete secondary products, cast-in-place concrete	<ul style="list-style-type: none"> <li>These products effectively utilize industrial byproducts emitted from steelworks and thermal power generation plants as raw materials.</li> <li>When supplemented with Σ1000 and 2000, high-strength concrete can be made through steam curing. These products also perform well with blast furnace cement made of recycled steel slag. Concrete made of blast furnace cement supplemented with Σ1000 realizes approximately 40% or lower CO<sub>2</sub> emissions intensity than autoclave cured cement.</li> <li>Σ80N reduces high-strength concrete's CO<sub>2</sub> emissions intensity by more than 30%. Moreover, the concrete produced boasts superior abrasion resistance and durability and can be recycled multiple times.</li> </ul>

Infrastructure & Social Solutions Division				
Category	Department	Product Name	Application	Benefits
	Special Cement Additives Dept.	F-DAC Fine CSA	Additive used for vibrating compaction	<ul style="list-style-type: none"> <li>F-DAC effectively utilizes the industrial byproducts of steelworks and thermal power generation plants as raw materials.</li> <li>F-DAC and Fine CSA shorten the time required for the pre-curing and steam curing processes, helping to reduce CO<sub>2</sub> emissions. These products also perform well when used in blast furnace cement made from recycled steel slag. Concrete produced using blast furnace cement and F-DAC has a CO<sub>2</sub> emissions intensity approximately 40% lower than that of steam-cured concrete.</li> </ul>
	Special Cement Additives Dept.	NATMIC	Shotcrete (high strength and low dust generation)	<ul style="list-style-type: none"> <li>This product effectively utilizes industrial byproducts emitted from steelworks and thermal power generation plants as raw materials.</li> <li>NATMIC hardens quickly and thus is used as a shotcrete for tunnel construction. It also performs well with blast furnace cement made with recycled steel slag. When this product is added into blast furnace cement, the resulting concrete's CO<sub>2</sub> emissions intensity is approximately 50% lower than that of other types of concrete supplemented with the product.</li> </ul>
	Special Cement Additives Dept.	DENKA slurry shot method (NATMIC US-50)	Shotcrete for tunnels	Shotcrete with low dust generation. This product produces less dust and concrete splash during the spraying process for a better workplace environment and decreased material loss.
	Special Cement Additives Dept.	Clear shot method (NATMIC LSA, USS, HSS)	Shotcrete for tunnels	Shotcrete with outstanding performance and low dust generation. Employing quick-hardening cement with a low alkaline content, the shotcrete method improves tunnel construction work conditions. By reducing dust and concrete splash, it also helps to cut spraying-related material loss.
	Special Cement Additives Dept.	Electrochemical repair	Countermeasure against concrete deterioration due to neutralization and salt damage, etc.	Desalination (electrochemical repair) is an environment-friendly repair method capable of reducing CO <sub>2</sub> emissions by approximately 30% compared with conventional surface repair methods. Moreover, a surface coating applied after a repair reduces the need for future repairs as well as CO <sub>2</sub> emissions over a structure's useful life.
	Cement Department	DENKA Cement	Utilization of industrial waste	With the aim of contributing to a recycling-oriented, low-carbon society, Denka makes cement that uses waste from a variety of fields, such as general waste from nearby municipalities, coal ash from thermal power plants and waste soil from construction sites as well as industrial byproducts from in-house and external sources, as raw materials and fuel. It also utilizes scrap wood in a biomass boiler that powers its production system.
	Special Cement Additives Dept.	Super Cement	Emergency repair of roads, railways and airports	This ultraquick-hardening concrete gains practical strength over a short time period, helping to restore the transportation infrastructure quickly at times of emergency.
	Special Cement Additives Dept.	F-DAC, B-FORM	Concrete secondary products	Facilitating the hardening and solidification of concrete, this cement additive shortens curing time while reducing fuel use, thereby enhancing production efficiency and cost effectiveness.
	Special Cement Additives Dept.	SUQCEM	Concrete precast products	An ultrahigh-strength fiber-reinforced concrete that significantly reduces construction expenses and life cycle costs by facilitating the construction of lighter, stronger structures
	Cement Department	DENKA SOIL PACK SP20, SP2000	Soil liquefaction countermeasures	Soil stabilization materials that strengthen soft ground by causing dehydration when mixed directly into the soil.
	Special Cement Additives Dept.	ES, ES-L	Terrestrial grouting work and soil liquefaction countermeasures	Boasting high durability, these cement-based quick-hardening materials accelerate the solidification and hardening of cement in terrestrial grouting work performed during construction.
	Special Cement Additives Dept.	DENKA Colloidal Super	Terrestrial grouting work and soil liquefaction countermeasures	Boasting high strength and durability as well as excellent permeability, this superfine powder cement additive is used in terrestrial grouting work.
	Special Cement Additives Dept.	DENKA S pack	Terrestrial grouting work and soil liquefaction countermeasures	A grout additive used as the primary injection material in the dual-tube double packer grouting method aimed at stabilizing ground, preventing water intrusion and countering soil liquefaction



# Creating Shared Value (CSV): How Denka Products Help Resolve Social Issues



Infrastructure & Social Solutions Division				
Category	Department	Product Name	Application	Benefits
	Special Cement Additives Dept.	CG1000, CG2000 SR-LG method	Backing injection material for tunnel construction	Hardening materials used as cavity sealants in soil improvement work and tunnel construction. Boasting superior plasticity, these materials can be injected into distant spots using a pressure feed.
	Agri-Products Dept.	AZUMIN (Magnesium humate soil fertilizer)	Fertilizer, soil improver	AZUMIN humic acid fertilizer provides a key solution for improving salt-damaged farmland after desalination. Mixed into the desalinated soil, AZUMIN enhances agricultural yields, helping restore farmland damaged by tsunami.
	Agri-Products Dept.	Calcium cyanamide	Fertilizer, agrochemical, soil improver	Calcium cyanamide was certified under the Japanese government's J-Credit Scheme for its ability to cut more than 39% off of emissions of N <sub>2</sub> O attributable to the use of nitrogen fertilizers when employed as a fertilizer supplement (24% or greater ratio). * A study conducted by the National Agriculture and Food Research Organization has estimated that the use of supplemented fertilizer in tea plantations countrywide would have a GHG reduction effect equivalent to the planting of 200 million cedar trees. (The global warming potential of N <sub>2</sub> O is approximately 300 times greater than that of CO <sub>2</sub> )
	Inorganic Products Dept.	Synthetic FLUX COMPOUND	Desulfurizing agent, deoxidizing agent	Product lineup includes Eco FLUX, which contains no fluorine.
	Inorganic Products Dept.	DENKA ALCEN	Automobile parts (catalyst holder), materials for heating furnaces and industrial furnaces	Automotive applications: This product is used to hold ceramic catalysts that purify automobile exhaust. It is also used in support mats that protect exhaust gas filters from high temperatures and vibration. In these ways it helps reduce the environmental burden attributable to exhaust gas. Applications as a fire resistant material: It is used as a thermal insulator for furnaces. Boasting lower density, lighter weight and lower thermal conductivity compared with such materials as firebricks, this product helps reduce the overall weight of furnaces while curbing energy consumption.
	Inorganic Products Dept.	Alumina cement	Steelmaking and refining of non-ferrous metals	Boasting superior heat resistance, this product is used in fire-resistant materials for such equipment as steel ladles, helping enhance their heat insulating properties.
	Environmental Materials Dept.	TOYODRAIN	Corrugated pipes for construction and agricultural use	Used in construction and farmland development, TOYODRAIN contributes to the effective utilization of water resources.

Elastomers & Performance Plastics Division				
Category	Department	Product Name	Application	Benefits
	Special Conductive Materials Dept.	DENKA BLACK	Lithium-ion secondary cells (conductive aid, activating agents for electrodes)	Ultra-pure electro-conductive carbon black used as a conductive aid for electrodes to enhance battery performance
	Special Conductive Materials Dept.	DENKA BLACK	Tire bladders	Incorporated into bladders* used in the manufacture (vulcanization) of tires to improve heat conductivity and thus shorten vulcanization time and contribute to energy savings * A balloon-like device that inflates and applies pressure to hold the rubber against the tire mold
	Elastomers Dept.	DENKA chloroprene	Gaskets for solar cells, vibration insulation rubber for wind power generation, charging cables for electric vehicles	Due to its flame resistance and ability to control vibrations, this product is used in gaskets for solar cells installed on housing rooftops and charging cables for electric vehicles in addition to as vibration insulation rubber for wind turbine nacelles (covers for power generation components).
	Elastomers Dept.	Chloroprene latex	Aqueous adhesives	This product facilitates a changeover in chloroprene-based adhesive solvents from volatile organic compounds (VOCs) to aqueous solutions, thereby helping reduce environmental burdens and improve the workplace environment.

Elastomers & Performance Plastics Division				
Category	Department	Product Name	Application	Benefits
	Performance Plastics Dept.	CLEAREN	Food packaging materials	CLEAREN can be processed at a temperature 50C° lower than that of its competitor PET-G, while also being 20% lighter than PET-G, thereby reducing energy use in processing and transportation.
	Performance Plastics Dept.	MS Polymer	Transparent molded resin products	Incorporating PS as an ingredient, MS Polymer is 6% lighter than resins used for the same applications that consist only of PMMA, and therefore requires less energy for transportation.

Life Science & Environment Products Division				
Category	Department	Product Name	Application	Benefits
	Household Packaging Materials Dept.	DENKA Thermosheet FB (oxygen barrier sheet)	Food packaging materials	Used in food containers, this sheet acts as an oxygen barrier to considerably prolong the shelf life of foodstuffs, thus helping to reduce food waste.
	Food Packaging Dept.	NB sheet	Food packaging materials	Used to make creamer containers, this sheet acts as a moisture barrier that prevents evaporation and thereby prolongs food expiration dates to enhance consumer convenience.
	Food Packaging Dept.	BOPS oil-resistant sheet	Food packaging materials	Used to make food containers, this sheet boasts superior oil resistance, transparency and fitting compatibility while helping enhance sanitation. Improving the ability of containers to hold high-oil-content food, this product enhances consumer convenience.
	Food Packaging Dept.	BOPS heat-resistant sheet	Food packaging materials	Used to make food containers, this sheet boasts superior heat resistance, transparency and fitting compatibility while helping enhance sanitation. Thanks to its greater heat resistance, it allows a wider range of foods to be microwaved without removing the packaging, thereby enhancing consumer convenience.
	Environmental Film Dept.	DENKA DX Film	Back sheets for solar panels	A fluorine-based film that boasts superior weather-resistance and thus helps enhance the durability of back sheets for solar panels
	Social Life Products Dept.	VINI-TAPE	Electrically insulating adhesive tape	Adopting a low VOC content adhesive, VINI-TAPE significantly reduces environmental burdens and hazardous substances affecting working environments.
	Social Life Products Dept.	TOYOKALON	Material for hairpieces	As a material for wigs and hairpieces, TOYOKALON meets a variety of fashion needs, thereby enhancing the quality of people's lives.
	Social Life Products Dept.	Calalyan Y	Food packaging and pharmaceutical packaging materials	Using their hands, consumers can easily open packaging made using this product by tearing it across, making it highly convenient.
	Social Life Products Dept.	Calalyan Tape (Packaging tapes for various purposes)	Packaging	Using a rubber-based hot melt adhesive free of organic solvents, this tape helps reduce the environmental burden while improving the working environment.
	Housing Materials Dept.	GUTTERS	Rain gutters for housing and other buildings	Protecting structures while contributing to the effective utilization of rainwater
	Medical Science Dept.	Macromolecular sodium hyaluronate preparation	Joint function improvement agent	Helping maintain quality of life by improving joint function

# Japan

▶ For a corporate overview as well as data on policies, activities and other items pertaining to overseas business sites, please see Site Reports (PDF format).



## Omi Plant

### Itoigawa Omanta Festival

Every year, a number of plant employees take part in the local summer festival held in Itoigawa City.



## Omuta Plant

### Chemistry Classes for Children

We hosted special one-day chemistry classes at community centers and local schools to provide a fun learning experience for elementary school students and their parents.



## Chiba Plant

### Comprehensive Emergency Drills

We perform emergency drills in tandem with the local municipal fire department as well as a joint fire brigade put together by companies based in the same industrial complex to ensure readiness to swiftly and appropriately respond in the event of a natural disaster or other emergency. The latest drill centered on handling a leak.



## Shibukawa Plant

### Plant Tours

We hosted plant tours for students from local high schools and nursing schools as well as members of neighboring community associations, with the aim of enhancing their understanding of our operations.



## Ofuna Plant

### Rice Cake Making

With the plant's labor union serving as the organizer, we hosted a rice cake making event at a town association facility, interacting with community residents and children.



## Isesaki Plant

### Participating in the "Made in Isesaki" Exhibition

We participate in Isesaki City's initiatives to enhance the recognition of the region's handicrafts and industrial products by, for example, participating in manufacturer exhibitions.



## Denka Innovation Center

### Summer Holiday Chemical Experiment Show for Children

We took part in the Summer Holiday Chemical Experiment Show for Children, sponsored by the "Dream Chemistry 21" committee, for the fourth consecutive year. This was an opportunity for the children who will lead the next generation as well as their parents to experience the excitement and wonder of chemistry.



## Denka Polymer Co., Ltd.

### Sakura Monozukuri Festa 2016

On May 14 and 15, 2016 at Sakura City Gymnasium we participated in a local industrial exhibition aimed at improving the vitality of the local community. With representatives from local manufacturing, agricultural, commerce and service industries gathering at the event, we gained valuable opportunities to introduce our products and operations to people of Sakura City.



## Denka Seiken Co., Ltd.

### Supporting the NIIGATA Albirex BB Rabbits

As a healthcare company, Denka Seiken is proactively supporting local sports events. As part of this initiative, we entered sponsorship contracts with the two members of the NIIGATA Albirex BB Rabbits, a top-tier professional team in the Women's Japan Basketball League.



## CRK Co., Ltd.

### Workplace Meetings

We discuss the status of our 5S activities as well as the causes of near-miss incidents at monthly workplace meetings, thereby soliciting suggestions for improvement.



## Hinode Kagaku Kogyo Kaisha Ltd.

### Safety Education

We hold daily meetings to promote KY (hazard prediction) activities and address worksite risk before work begins, thereby ensuring that measures to prevent operational risk are in place. We marked the third year of an ongoing project aimed at improving issues found onsite involving frontline operators.



## Denka Azumin Co., Ltd.

### A Lecture on Risk Assessment

With lecturers from Head Office and the Environment and Safety Dept. of the Chiba Plant, we held a risk assessment themed training session for all employees as well as subcontractors.

# Overseas

► For a corporate overview as well as data on policies, activities and other items pertaining to overseas business sites, please see Site Reports (PDF format).



## Denka Singapore Pte. Ltd. Merbau Plant

### Safety Assurance Activities

We hold quarterly emergency drills in tandem with Petrochemical Corporation of Singapore. We are also stepping up employee education and make rounds of the entire worksite to call attention to safety before and during operation.



## Denka Singapore Pte. Ltd. Seraya Plant

### Receiving an Inspection on Fire Drills

The Singapore Civil Defense Force conducted an inspection of our fire drill procedures. Having obtained valuable input from this inspection, we renewed our commitment to relentlessly pursuing occupational safety and facility security.



## Denka Advantech Pte. Ltd. Tuas Plant

### Safety Assurance Activities

In addition to workplace patrols, emergency response drills and other regular safety activities, since 2015 we have been periodically providing mandatory safety training to raise employee awareness, with safety specialists serving as lecturers.



## Denka Advantech Pte. Ltd. South Plant

### Promoting Worksite Communication

We hold various regular meetings while hosting dinner events to deepen ties among the plant staff.



## Denka Advanced Materials (Suzhou) Co., Ltd.

### Fire Drills at Branch

Along with fire drills, our manufacturing section managers, frontline operators and administrative department staff conduct 5S patrols.



## Denka Chemicals Development Suzhou Co., Ltd

### A Study Session Focused on China's Intellectual Property Rights Regulations

To deepen employee understanding of IP, which is vital to our research activities, we held three study sessions focused on Chinese patent law, inviting an external lecturer (Mr. Yu Xia, the president of KingTen Shanghai Intellectual Property Agency Co., Ltd.) to participate.



## Denka Electronics Materials Dalian Co., Ltd.

### Worksite Communication

We apply a "bottom up approach," drawing on employee suggestions to improve our workplace environment and hazard prediction systems. To encourage participation, employees who submit suggestions are commended at general meetings. In addition, we host such social events as New Year's celebrations and cherry-blossom viewing parties with the aim of creating a workplace in which all workers feel free to share their opinions.

## Denka Inorganic Materials (Tianjin) Co., Ltd.

### Safety Assurance Activities

As we use alkaline substances as raw materials, we provided hands-on training sessions to learn about dangers associated with mishandling these substances.



## Denka Infrastructure Malaysia Sdn. Bhd.

### Communication Activities

In 2015, we organized a company trip to Ho Chi Minh City and hosted such sporting events as bowling games. Denka employees from business bases in Singapore, Indonesia and Hong Kong also took part in these events.

## Denka Advanced Materials Vietnam Co., Ltd.

### Participating in a Marathon Relay Race

We created marathon uniforms using VINI-TAPE waste products, aiming to enhance the general public's recognition of Denka and foster a sense of unity among employees.



## Icon Genetics GmbH

### Safety Assurance Activities (Education, Training and Compliance)

To ensure compliance with Germany's legal regulations as well as international requirements, we stepped up the development of standard operational procedures related to GMP (good manufacturing practice) while enhancing our quality assurance systems.

## Denka Performance Elastomer LLC

### Near Neighbors Meeting

Once in every two months, we invite local residents to report on the status of plant operations and exchange opinions.



# Our CSR Initiatives Overseas

## Singapore—Promoting Interaction with Local Communities

Denka Chemicals Holdings Asia Pacific Pte. Ltd.

We expanded into Singapore in 1980 and established Denka Chemicals Holdings Asia Pacific Pte. Ltd. (DCHA) in 2009. DCHA is a holding company that oversees other Group companies based in Singapore as well as a number of other subsidiaries in other ASEAN nations, including Malaysia, Vietnam and Indonesia.

In 2015, we celebrated our 35th anniversary in Singapore in conjunction with Denka's centennial. Coincidentally, 2015 was also a landmark year for Singapore, which celebrated the 50th anniversary of its founding. We have embarked on several initiatives to give back to the local communities in an effort to express our gratitude for the support given to our operations. The following are examples of our initiatives in this regard.

### (1) Support for the Department of Japanese Studies of the National University of Singapore (NUS)

NUS's Department of Japanese Studies is the preeminent research organization in this field in Southeast Asia. We have sent several Japanese and Singaporean staff from DCHA to conduct guest lectures and share with students from NUS the operations of Japanese companies in this region. In addition, our staff from DCHA participated in various seminars that involved active discussions with other researchers and students on global issues Japanese corporations face. In 2015, DCHA donated SGD\$10,000 worth of Japanese Studies related books and DVDs to NUS's library.

In 2016, Japan and Singapore marked the 50th anniversary of diplomatic relations. We sincerely hope that our initiatives will continue to strengthen the foundation of a close relationship between the two countries over the next generation.

### (2) Football Clinics Featuring Athletes from ALBIREX NIIGATA Singapore

In recent years, the ALBIREX NIIGATA Singapore, a professional football team affiliated with the ALBIREX NIIGATA in Japan, has gained prominence as a member of S League, the country's top football league.

As a CSR sponsor for this team, we have been assisting them in providing football clinics at public elementary and secondary schools since 2015. By providing the students with the opportunity to have fun learning football directly from professional athletes, we believe it can help them build confidence in their sporting abilities.

As we consider Singapore as our "second home country," we will continue to work hand in hand with the local communities to ensure mutual support and continued development of our operations in the region.



Mr. Muneatsu Miida (second from left), Deputy Managing Director of DCHA, answering a question from the audience



(Left) Dr. Thang Leng Leng, Associate Professor at NUS, posing for a picture with her staff and DCHA representatives in NUS's library  
(Right) Some of the books donated by DCHA



The happy young participants at the football clinic



Mr. Masaharu Suzuki, Chairman (Left) of DCHA, and Mr. Daisuke Korenaga, Chairman of ALBIREX NIIGATA football club Singapore, shaking hands at the signing ceremony of the CSR sponsorship contract

# Third-Party Opinion Close Attention Paid to Social Trends and Stakeholder Concerns



**Tamio Yamaguchi**  
Director of Junkan Workers Club\*

Each time I've prepared my "third party opinion" for the annual *Denka Group CSR Report*, I've not based it on a cursory examination of that document's final draft; rather, I've taken the time to read the first draft and then submitted questions, asking for certain points to be clarified and pointing out items I appreciate or expect to be developed further. For its part, Denka sincerely considers my questions and the points I raise, making some changes in the report being prepared while earmarking other recommendations to be addressed in subsequent or later editions. Moreover, Denka has invited me to participate in dialogues where I may converse with as many as 25 people from the Company, including a senior managing executive officer and managing executive officers, to discuss how the Company intends to address my concerns. It is evident from this that Denka has focused significant resources on the preparation of these reports, and I believe that this is the reason why the Company has been able to significantly improve its reporting year after year.

As for information disclosure aimed at communicating how the corporation is working to fulfill its social responsibilities, ISO 26000 stipulates that such information be "complete," "easy to understand," "sensitive to trends," "well-balanced," "timely" and "readily available." Given the recent enactment of a number of relevant domestic and international regulations, ranging from "hard" to "soft," I think that being sensitive to trends has become particularly important for those in charge of CSR reporting.

The year 2015 was a landmark year for businesses that proactively take on CSR initiatives. Among other things, the United Nations adopted the "2030 Agenda for Sustainable Development" (2030 Agenda) in September while in December the signatories to the Paris Agreement at COP21 agreed to contribute to the collective effort to reduce GHG emissions. On the domestic front, Japan's Corporate Governance Code came into force in June. In my estimation, Denka is to be commended for its sensitivity to trends in CSR and the quality of disclosing countermeasures it has put in place, including changes in its management systems. In particular, the following three points communicate Denka's sensitivity very well.

(1) Response to the 2030 Agenda: In the section entitled "To Our Stakeholders (pages 4 to 5)," the president communicates his strong commitment to tackling the challenges suggested by the UN Sustainable Development Goals, which comprise 17 targets, that society is and will soon come to face. In statements outlining the Company's CSR goals he declares, "...we will tackle these challenges by identifying areas where Denka can maximize its strengths. In this way, we will expand the possibilities of chemistry and create new value." Moreover, under "Value Creation Process (page 11), presented as part of "The Denka Group's CSR," the Company clearly explains the relationships between the UN's Sustainable Development Goals (SDGs) and the next-generation products being developed by its individual business divisions. In



Denka representatives attending a dialogue with Mr. Tamio Yamaguchi (September 8, 2016)

### Editorial Afterword

First of all, we would like to express our gratitude to the readers of the *Denka Group CSR Report 2016*. In this edition, we highlighted our operations related to the healthcare field, a priority area on which we are focusing Groupwide resources. At the same time, we featured our global warming countermeasures and a dialogue between our outside directors as well as interviews with stakeholders involved in initiatives to revitalize communities through sports activities.

We would also like to thank Mr. Yamaguchi, who has provided us with a number of suggestions and insights. His valuable input brought home the relevance of SDGs and the Paris Agreement in terms of the corporation's sustainability initiatives, the need for identifying and quantifying materiality and disclosing the process employed when discussing it—a key factor he expects us to address in the future edition—and the importance of facilitating

addition, it is stated in the 2030 Agenda that "All countries and all stakeholders, acting in collaborative partnership, will implement this plan," emphasizing the importance of collaboration. Denka's response to this statement is notable and described in "Denka's R&D Activities (pages 44 to 45)." This section describes Denka's focus on encouraging dialogue among engineers, promoting open innovation and engaging in collaborative research with academia overseas. I'm truly looking forward to seeing Denka's joint research yield concrete results embodying the spirit of the 2030 Agenda—"leaving no one behind."

(2) Response to the Paris Agreement: Denka has committed itself to medium-term total CO<sub>2</sub> emission targets it has set for 2020 in addition to continuing initiatives to reduce emissions intensity. Comprising separate targets for domestic and overseas operations, the Company's newly established targets incorporate reduction targets that will be met in part through the utilization of a carbon offset scheme. I highly commend this move. However, the Paris Agreement mandates that reduction targets must be reviewed every five years. This means that Japan's target for CO<sub>2</sub> emissions for 2030 can be altered, maybe upwardly. To keep the projected change in global temperature to two degrees or less, however, achieving an even greater reduction is essential. Therefore, I hope that Denka sets a more ambitious reduction target for itself for 2030.

(3) Response to the recent trend in corporate reporting: Over the past several years, I have seen an increasing number of corporations stepping up their emphasis on presenting their strategic focus and forward-looking initiatives in their reporting. This content is often supplemented by conventional articles featuring historical data on the reporting company's initiatives to ensure corporate and social sustainability. Quick to incorporate this trend, Denka discloses such information in its "Special Feature" and "Our Business Strategies" sections, thereby meeting the expectations of its stakeholders.

All in all, I found the *Denka Group CSR Report 2016* to be a highly credible report. That said, today's stakeholders are calling on businesses to deliver on a growing portfolio of issues. Among their demands, I would like to point out two matters that I hope Denka will address in future editions of its CSR report.

First, materiality should be identified and quantified. The G4 Sustainable Reporting Guidelines stress that placing a focus on materiality will "enhance the conformance, reliability and usability of reporting while helping improve information provided to market and society with regard to sustainability issues." With regard to Denka, it was concluded in the aforementioned dialogue that I participated in that the Company will feature the process and content of its discussions on materiality in the next edition of its CSR report. When it comes to descriptions of specific processes, I recommend the Company to put great emphasis on transparency and objectivity.

Second, connections between financial and non-financial data should be mapped out. These days, a corporation's environmental, social and corporate governance (ESG) initiatives are considered to be a determining factor regarding its future management performance and financial results. However, I've seen only a few reports that disclose such connections. This is, I believe, is because "integrated thinking," an approach that acknowledges the intertwined nature of key financial and non-financial elements, has yet to be embraced by the majority of domestic corporations. Nevertheless, such ways of thinking will become ever more vital when businesspeople discuss the creation of corporate value.

\* An NPO dedicated to fostering the harmonious coexistence of society and natural ecosystems through research conducted from a global perspective. It studies and spearheads local community efforts for creating a recycling-oriented society joining citizens, businesses and governments, presenting recommendations through CSR workshops and other means.  
URL: <http://junkanken.com/> (Japanese only)

"integrated thinking" that takes into account the intertwined nature of financial and non-financial elements. In addition, after submitting the first draft, we invited him to attend a dialogue in which Denka officers and managers in charge of relevant activities were given the opportunity to exchange ideas with him and benefit from the meaningful insights he afforded with regard to improving our CSR activities.

We would like to ask our readers to furnish us with their frank opinions and comments as we aspire to live up to the expectations of and trust placed in us by all our stakeholders. Looking ahead, we sincerely ask for your guidance and encouragement.

Noriyuki Shimizu  
General Manager, CSR & Corporate Communications Dept.