Cultivating Technologies for 80 Years

Based on the corporate motto of "Contribute to culture and industry through creativity," TDK has been continuously pouring forth a stream of innovative products ever since its founding in 1935, using ferrite as a starting point and harnessing superior magnetics and materials technology.

1935

Innovation 1

Four Great World-Class Innovations by TDK

Materials Technology with Origins in Ferrite

The world's first ferrite cores

A pioneering university-generated venture company

Tokyo Denki Kagaku Kogyo K.K., the forerunner of TDK, was founded in 1935 in order to commercialize ferrite, an epoch-making magnetic material that had been invented in Japan by Dr. Yogoro Kato and Dr. Takeshi Takei of the Tokyo Institute of Technology. So TDK really was a pioneering university-generated venture company.

Dr. Yogoro Kato (left)
Dr. Takeshi Takei (right)

1950

Ferrite cores from TDK used extensively in super heterodyne-type radio receivers

The super heterodyne principle, which enables high performance in radio receivers, came into wide use around the year 1950. This led to a drastic rise in demand for ferrite from TDK, to be used as a core material in intermediate frequency (IF) transformers. After the age of television began, ferrite also found wide application in the deflection yoke cores of CRT tubes.

A super heterodyne-type radio receiver, and ferrite cores for IF transformers (foreground)

1966

Innovation 2

Four Great World-Class Innovations by TDK

Magnetic Tape Technology Revolutionizes Music

From a desire of to easily store music, TDK developed the first cassette tape made in Japan. The combination of superior magnetic materials technology and coating technology later also proved its worth in the manufacture of video tape products.

Equipment for manufacturing cassette tapes and video tapes

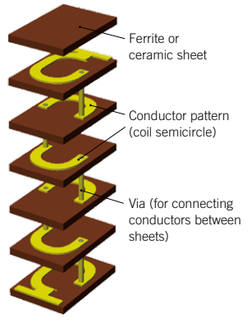
1980

Innovation 3

Four Great World-Class Innovations by TDK

Fine Multilayering Technology Drives Miniaturization and Weight Reduction of Electronic Equipment

TDK developed the first multilayer chip inductor, using original multilayering technology to form three-dimensional spiral coils inside the chip. Further refining of this technology led to the introduction of multilayer ceramic chip capacitors and various other multilayer electronic components which significantly contribute to the reduced size and weight of electronic devices.



1994

Innovation 4

Four Great World-Class Innovations by TDK

Magnetic Head Technology Opens the Way to Amazingly High Recording Density

TDK's magnetic heads business began in 1962 with the development of a ferrite head core piece for storage devices such as magnetic drums. Thanks to the development of magnetic heads utilizing thin-film process technology on the nanometer level, the recording density of hard disk drives (HDDs) took a giant leap forward in the 1990s.

HDD magnetic heads

2009

Recognition as IEEE Milestone: TDK's efforts influenced the world's technological history

The Institute of Electrical and Electronics Engineers (IEEE), an international academic society relating to electricity and electronics, recognized the "Development of Ferrite Materials and Their Applications" by the Tokyo Institute of Technology and TDK as a historical achievement that has contributed to the development of society and industry.

IEEE Milestone plaque

2012

"Year Zero of the Magnet" —A new TDK challenge

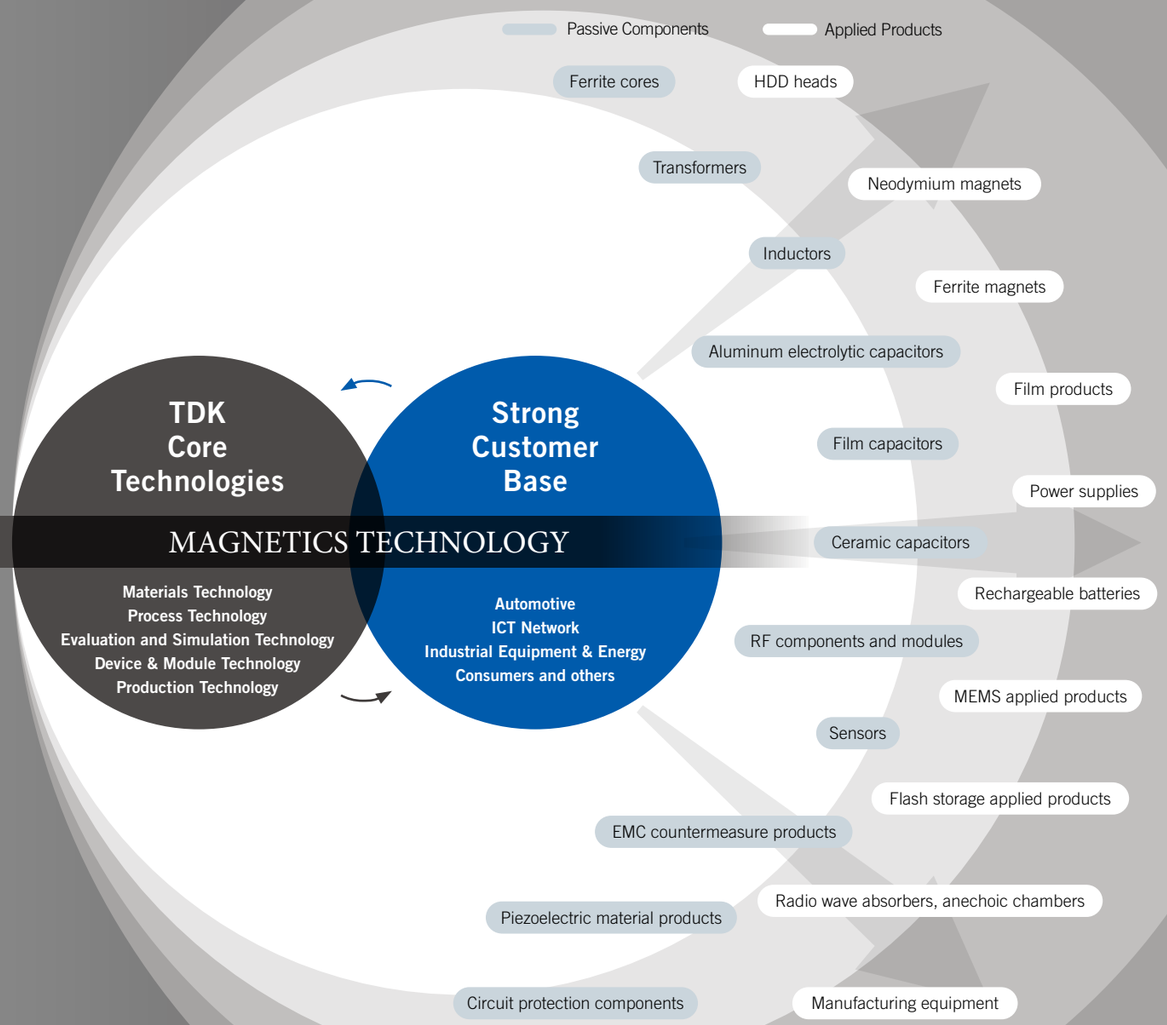
TDK is forging ahead with the development of new magnets that either reduce the use of costly rare earth additions significantly or eliminate them altogether. To mark this new beginning, 2012 was designated as "Year Zero of the Magnet" and TDK is continuing to work towards the realization of various new magnets that do not rely on rare earth materials at all.

Neodymium magnets (NEOREC series) from TDK

Exploiting Strength in 0.00 0000001m

Nanotechnology is the art of handling ultrafine materials to a precision of less than a millionth of a millimeter, to create new functionality and previously unattainable material properties. TDK has gained extensive nanotechnology experience through the development and manufacture of magnetic heads for HDDs and thin-film multilayer products. This enables TDK to offer electronic components and devices that meet highly advanced and sophisticated needs.

Business Model



TDK's business model is based on strong and continuously advancing competence in core technologies and a solid customer base. We handle a wide range of products, from passive components to applied products, and are expanding the scale of our business operations.

Our vast accumulated expertise in magnetics technology serves as a backbone, while we explore the properties of materials down to the molecular level. All of our production processes have been developed and unified in-house, a fact that clearly sets us apart from our competitors, as we continue to develop products that meet the most advanced needs of the age.

We also aim to provide high value added by responding flexibly to various customization requests. This in turn has helped us to grow as a company.

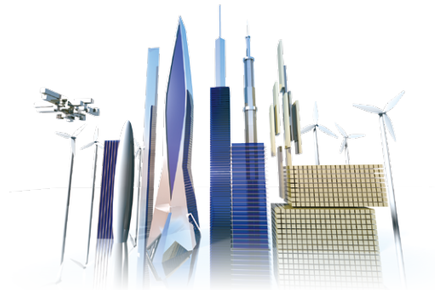
The world of electronics is in constant flux, marching rapidly towards the future. As a global leader in the field of electronic components, we operate at the leading edge of development, creating and marketing numerous innovative products of high value for our customers.

TDK's Challenges for the Future

Wireless Power Transfer Technology

Development of wireless power transfer systems harnessing magnetic materials technology and magnetic circuit technology

This system is designed to allow wireless charging of the battery in a vehicle, thereby eliminating the need for cumbersome cable connections. Coils utilizing high-performance ferrite, together with a proprietary automatic tuning technique, ensure optimized charging. We are also working on experimental systems for power transfer to moving vehicles.



Spintronics

Application of TMR element technology allows realization of ultra-sensitive magnetic sensor

The science of controlling the charge of an electron and spin through nanotechnology is called spintronics. Application of TMR elements developed for HDD heads allows the realization of an ultra-sensitive magnetic sensor. The technology is expected to lead to applications in the health care and medical fields.

Infinite Challenges toward the Future

A major mission of TDK is contributing to the future of electronics.
On the strength of our materials technology,
we always take up new challenges and continue to innovate.

Renewable Energy

Development of next-generation magnets and high-efficiency power supplies

Renewable energy is becoming an ever more important topic as we move closer to the realization of a sustainable society. TDK is engaged in developing capacitors and reactors specially designed for use in power conditioners of wind power and solar power installations, and also building extremely powerful and large magnets as well as other parts for wind power generators.

Wearable & Health Care

Pursuing next-generation electronic components and modules through advanced substrate embedding techniques

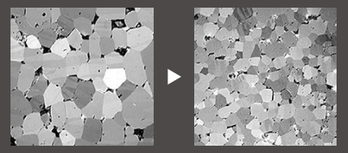
With a view toward wearable devices and health care products, TDK has developed a technology called SESUB for embedding chips directly in the substrate, and is advancing state the art RF module technology and other sophisticated methods for incorporating electronic components into modules. We have also developed an ultra-low-profile thin-film capacitor (TFCP) that is flexible and allows embedding in the substrate.

TDK's Core Technologies

1 Materials Technology

Shaping the characteristics of the material at the molecular level enables the creation of innovative electronic components and devices that meet even the most advanced market needs.

Materials Design Technology
Control of main raw material composition as well as micro-additives is an effective approach for achieving specific targeted properties.

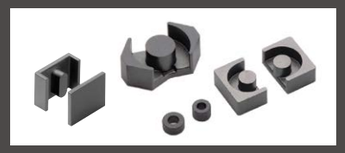


Powder Control Technology
Finer crystal grain and greater uniformity result in improved materials characteristics.

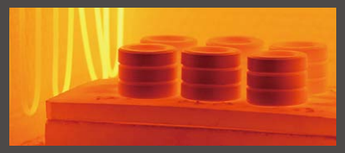
Microstructure Control Technology
By controlling the internal composition of the crystal grain as well as the boundary between particles and other properties, various characteristics can be realized.

2 Process Technology

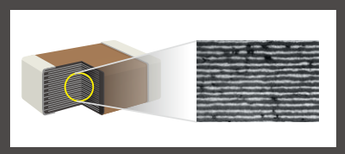
Super-advanced control techniques operating with nanometer level precision result in products with outstanding performance and functionality.



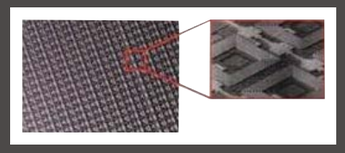
Forming Technology
Achieving compact, low-profile, and complex shapes by adding a binder to the base powder.



Sintering Technology
A firing process for solidification and hardening. Requires highly precise control of temperature and atmospheric conditions (gas composition in sintering furnace).



Thick-Film Process Technology
Printing of electrodes and similar in a multilayer laminated configuration, to produce multilayer electronic components such as chip capacitors and chip inductors.

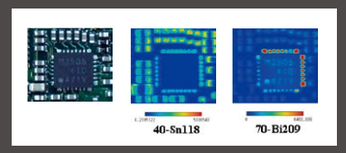


Thin-Film Process Technology
Film formation of electrodes, coils, head elements, etc., to produce magnetic heads for HDDs and other thin-film electronic components.

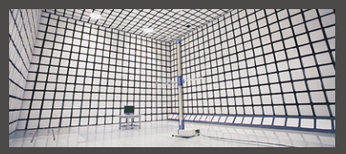
3 Evaluation and Simulation Technology

Activities range from material analysis and examination, simulation of product structure, thermal conditions, and electromagnetic field to noise measurements and design of noise solutions.

Evaluation and Analysis Technology
Used for observation of microstructures and visualization of molecular distribution, etc.



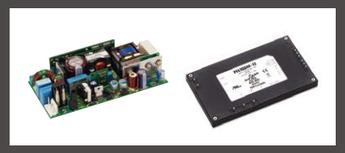
Simulation Technology
Used to visualize the distribution of thermal energy emitted by circuits, or the electromagnetic field distribution of noise sources.



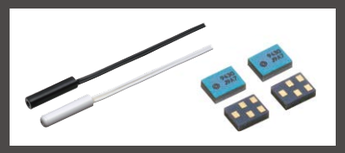
EMC Countermeasure Technology
EMC measures are aimed at ensuring that a device is not susceptible to interference from other devices and also does not become the cause of interference in other devices.

4 Device & Module Technology

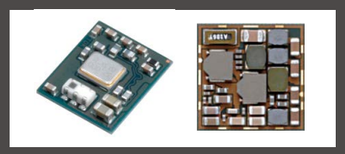
This technology involves combining various electronic components into high-performance, multi functional electronic devices and optimized modules.



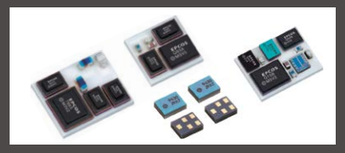
Circuit Design Technology
This comprises selecting optimum components and designing the circuitry including the wiring and thermal dissipation arrangement using advanced simulation techniques.



Packaging Technology
Parts assembly, matching, sealing, as well as structural design and shape design are optimized to achieve compact dimensions and high performance.



Semiconductor Embedded Substrate (SESUB) Technology
This technology involves embedding ICs and other components as well as the wiring into the substrate itself, to achieve a modular product.



LTCC Technology
Low temperature co-fired ceramic (LTCC) technology allows the integration of a high number of components such as capacitors and inductors on a dielectric sheet to create a printed multilayer module.

5 Production Technology

The TDK policy of QCD (Quality, Cost, Delivery) is being further strengthened, to enable swift and effective adaptation to changes in the marketplace.

Production Technology
Outstanding products come from outstanding manufacturing facilities. TDK not only develops innovative manufacturing techniques but realizes these by building much of the required equipment in-house. This comprehensive approach is the key to superior craftsmanship.

Globally Cultivating Leading Edge Technology

TDK is making full use of its worldwide network linking Japan, China, other Asian countries, Europe, and the U.S. Specific priority operation fields has been defined for each region. This enables us to pursue R&D at the cutting edge of technology, utilizing our accumulated expertise in five core technologies, in order to anticipate and meet highly sophisticated demands.

We are actively engaged in further deepening and nurturing these core technologies, establishing unified and consistently outstanding production processes that ensure superior reliability through next-generation technologies. By continuing to innovate, we create products that contribute to the realization of a sustainable society, while also resulting in a sustained increase in corporate value.

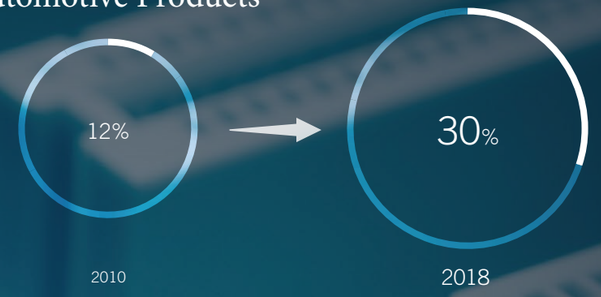
Competitive Strength of 5 Core Technologies

Continue to Change Ourselves to Realize Sustainable Growth towards 2035 100th Anniversary

In our quest to contribute to society and create value, we have pursued a range of different strategies and scenarios, to give concrete shape to abstract ideas. This year, 2015, marks the 80th anniversary of the company's founding, and we are taking this as a starting point for a new trajectory of growth.

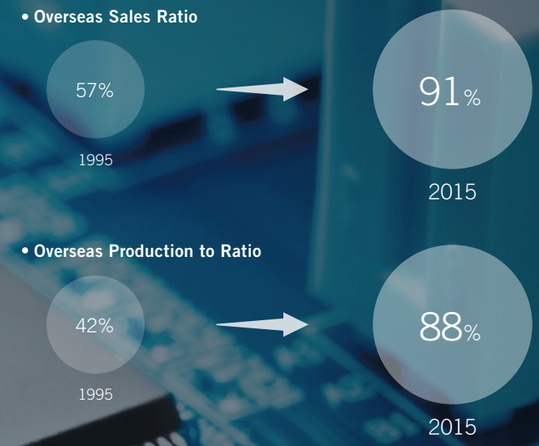
Increased Sales Ratio of Automotive Products

Ever since TDK turned its attention to the increasing "electrification" of the automobile more than 40 years ago, we have been providing magnets, inductors, capacitors, and other parts to car manufacturers on a global basis. As the ratio of electric equipment in cars gets ever higher, and with the continuing advance of hybrid electric and electric vehicles, we have set a medium-term goal of increasing our automotive sales to about 30 percent of our total net sales.



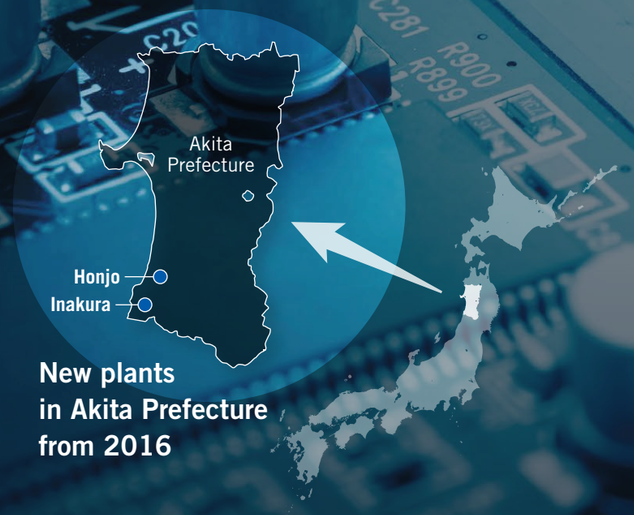
Going Global from Early On

One of the strengths of TDK is the speed by which we globalized our operations. By strengthening and expanding our framework of overseas production and technical support, we expanded our customer base from the subsidiaries of Japanese companies to deal with overseas manufacturers as well. Currently, about 90 % of TDK's entire output is being manufactured and marketed overseas.



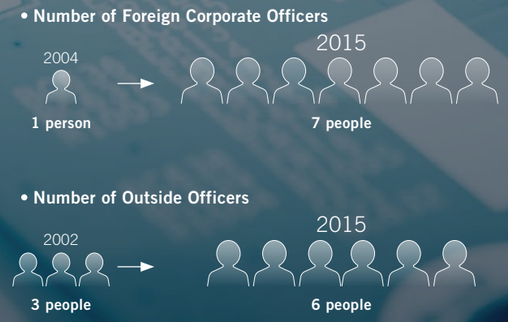
Promoting Consolidation of Manufacturing Sites and In-House Production

Responding to major changes in the business environment for electronic products, TDK is in the process of consolidating its manufacturing sites. To further bolster our *Monozukuri* power of creating products with a strong craftsmanship ethos, we are establishing two new plants in Akita Prefecture, which will also reflect many advances in next-generation technology. The new plant in Honjo will be handling high-frequency components, piezoelectric material components, ferrite cores, and other passive components, while the new plant at Inakura will be dedicated to ferrite materials. Both are expected to start production from the end of 2016.



Ongoing Governance Reform

TDK has implemented a broad array of measures to strengthen its corporate governance backbone. In June 2002, we started a system of having outside directors and corporate officers, which since June 2004 also includes non-Japanese corporate officers. This is part of our effort to ensure continued soundness, compliance, and transparency of management.



How the Public Sees Us

TDK has always been creating innovative products to contribute to society through original technology. This stance, in turn has been rewarded outside recognition, earning us a place among the "Top 100 global innovators" named by Thomson Reuters for three years running. The award honors corporations and research organizations with notable inventions on a global scale.

In addition, we are actively engaged in activities to support sustainability, such as environmental protection and compliance, and we are registered for key indicators of socially responsible investment.

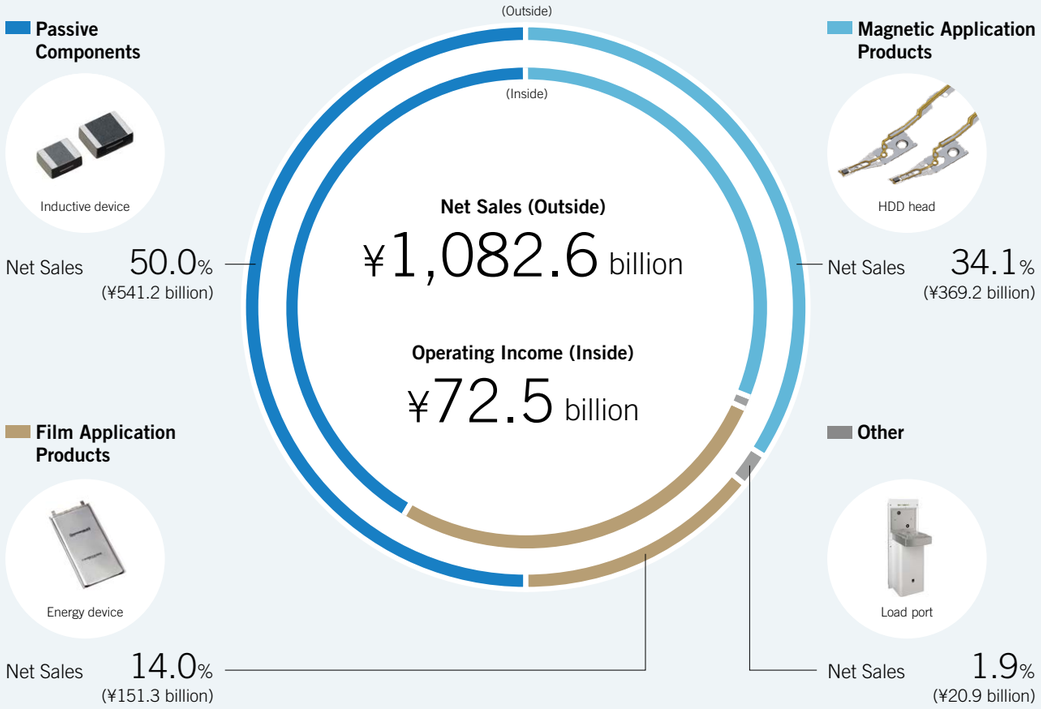
Member Ethibel EXCELLENCE

Thomson Reuters Top 100 Global Innovators

MONODUKURI, Nippon. Conference Nippon Brand Prize

Sales by Segment

TDK is harnessing its proprietary core technologies and *Monozukuri* power, creating innovative products in areas such as passive components, magnetic application products, film application products, and other.



Passive Components

The passive components business is TDK's mainstay, generating about half of its total net sales. The segment includes the capacitor business, comprising ceramic capacitors, aluminum electrolytic capacitors, and film capacitors, the inductive devices business with coils, etc., and other passive components including high-frequency components, piezoelectric material components, circuit protection devices, and sensors. As mobile devices become more powerful and incorporate a variety of functions, and as automobiles rely ever more heavily on electrical and electronic equipment, the demand for passive components continues to expand, a trend that is expected to remain strong.

Magnetic Application Products

TDK's magnetic application products segment is mainly comprised of HDD heads, a field where we hold about 25% of the worldwide market share. The segment is divided into the recording devices business comprising HDD heads and HDD suspensions, and the other magnetic application products business including power supplies and magnets. Heads for HDDs handle the task of writing information to the magnetic media and reading the recorded information. Our mastery of thin-film process technology on the nanometer level has brought about an amazing increase in storage capacity. High-efficiency power supplies incorporating outstanding ferrite and transformer technology, and high-performance magnets also contribute significantly to the conservation of power and resources.

Film Application Products

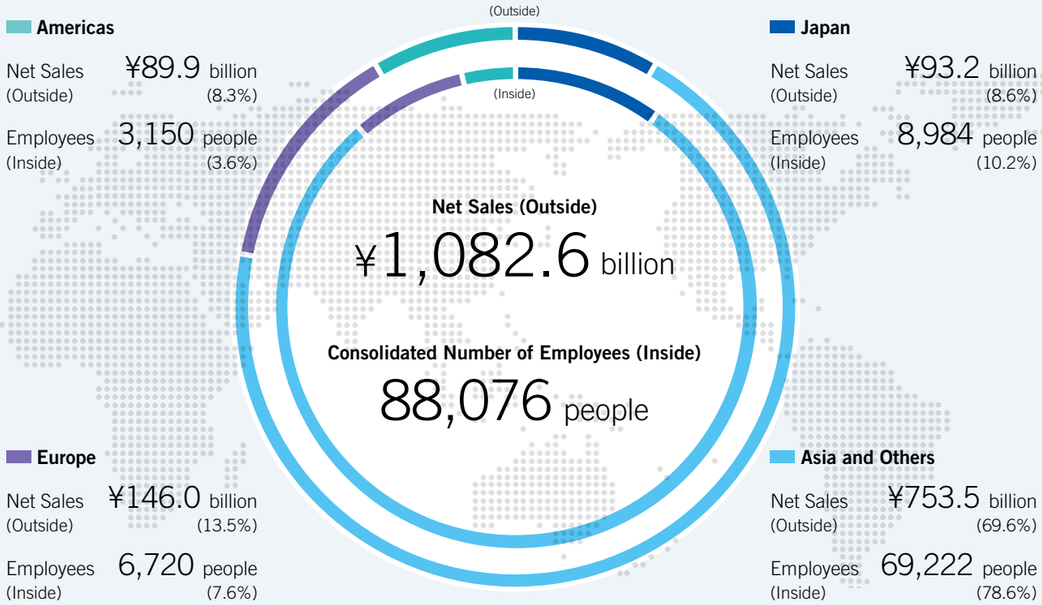
The film application products segment covers energy devices such as rechargeable batteries primarily for tablets, smartphones, and other Information and Communication Technologies (ICT) devices, as well as applied film products used for the touch panels of smartphones and similar applications.

Other

Products that are not part of the three major segments, such as mechatronics (production equipment), anechoic chambers, and flash memory applied devices, are grouped into this category.

High Level of Globalization

The TDK Group is active in over 30 countries and regions all over the globe, selecting suitable bases for plants, research facilities, and sales offices under the viewpoints of marketability, product range, distribution etc. TDK has 117 consolidated subsidiaries overseas and employs a total work force of approximately 88,000 people.



Explanation of Key Terms

What are passive components?

Sustaining the manifold functions of electronic equipment

Electronic components can be divided into two major groups: active components such as chips and transistors that use the electrical power supplied to them to perform amplification, transmission, conversion, and many other tasks, and passive components such as capacitors that consume, store, or release the supplied power. The passive components generally serve for driving the active components, and their efficiency in this task, along with the ability to supply current without generating unwanted noise*, has a major influence on enhancing the performance of the end product. The market for passive components is further expanding, driven by developments such as the move towards higher performance of ICT equipment and the increasing "electrification" of automobiles. Further improved performance and higher productivity will be crucial demands in the area of passive components as well.

* Noise is mainly defined as the unintended emission of electromagnetic radiation, which can impede the correct propagation of desired signals, or cause malfunction and other problems in equipment.