TAIYO YUDEN Group's Research and Development Activities

The Foundation of Our Research and Development Activities

Hikohachi Sato, the founder of TAIYO YUDEN, was a researcher in ceramic materials. Since its establishment, TAIYO YUDEN has believed that product commercialization should start from the development of materials. This has been one of the strengths of TAIYO YUDEN, and has resulted in us creating many products that have been the "world's first."

The TAIYO YUDEN Group's research and development continues its focus on activities that are driven by one of the Company's main objectives, which is to develop products that are rated highly by our customers, by means of enhancing the Company's many elemental technologies that have been built up since its foundation. In particular, we are focusing on the development of super high-end products.

Research and Development Principles

"Innovative advance"

Technology precedence

Promote leading edge technological development as the precursory to innovative product development and become a global leader in technology

Reproducibility

Logically verify the reproducibility of the technology we develop

Technological applicability

Develop technologies that are feasible and applicable economically to our manufacturing process and that meet critical environmental standards

Environmental consideration

Devise technologies which can be applied not only to specific products but also to other areas useful to the markets we serve

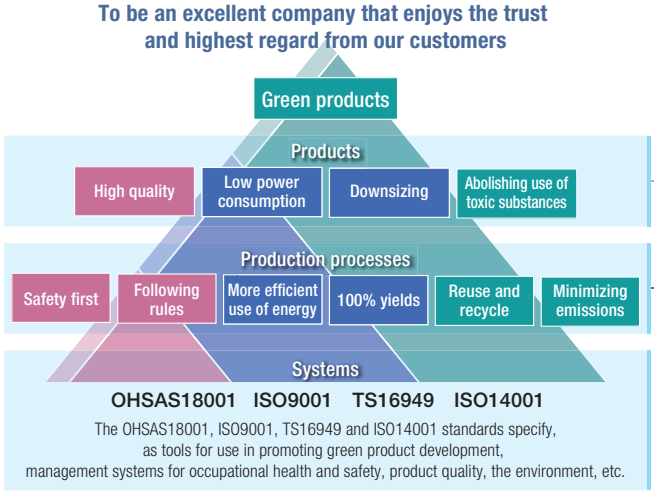
Achievement of our Vision through Development of "Green Products"

The TAIYO YUDEN Group has effective methods available that resolve the dilemma of how to both respond to customer demands for more advanced electronic devices and reduce environmental burdens on society as a whole and the communities we serve. Our core objective using these methods is to make electronic components that are incorporated inside a final product possess higher and higher performance levels and values.

Electronic components with high performance levels manifest improvements such as compactness (leading to reduction in the parts and materials used) and enhanced power efficiency (leading to lower energy consumed). Consequently, the TAIYO YUDEN Group continues to support the implementation of higher performance in all devices, and to achieve reductions in the environmental burden. We also consider our products as being beneficial for society as they are useful for a wide variety of producers that use electric power and, most importantly, our products enhance the quality of life of our customers.

TAIYO YUDEN Group strives to make a positive contribution to reducing the Company's burden on the environment by pursuing "green products" and working to provide a stable supply of these items. The green products that the Group has on its development horizon reflect the environmental considerations applied throughout the product life cycle, not only at the products' end use, but also at all stages from design through production, sales, and incorporation into the final product right up to final disposal. We eliminate what in Japanese are called the three M's—*muda* (wastefulness), *mura* (inconsistency), and *muri* (overburden)—over the entire life cycle of products to add value for customers and local communities we serve as well as our employees.

We are confident that our R&D activities aimed at creating a higher standard of green products will enable us to realize our vision to "become an excellent company that enjoys the trust and highest regard from our customers."



High quality
Products satisfying customer requests with high reliability

Low power consumption
Products delivering superior performance without consuming vast amounts of electricity

Downsizing
Products delivering high performance with few materials and thus contributing to end products fitting high functionality into a compact package

Abolishing use of toxic substances
Products not containing toxic substances

Safety first
Production processes designed with safety in mind allow operators to work free from *muri* (overburden).

Following rules
Operating in accordance with standardized procedures holds the key to minimizing irregularities between items.

More efficient use of energy
We minimize the energy used in manufacturing products.

100% yields
Stable production of high-quality products requires not allowing rejects and other forms of *muda* (wastefulness) to arise.

Reuse and recycle
Wherever possible, we use reused and recycled goods as materials for production.

Minimizing emissions
Wherever possible, our production processes strive for zero levels for emissions and other forms of *muda* (wastefulness).

Interview with the Head of the R&D Department

We are committed to constantly aiming our R&D at cutting edge domains to meet customer needs.

Shoichi Tosaka
Director, Executive Operating Officer in charge of quality assurance and R&D/engineering

Research and development is where TAIYO YUDEN creates new sources for the Company's future successes.

We are focusing our R&D activities in each business field on creating unique products in all phases of the product development. For example, TAIYO YUDEN is a world leader in materials technology. In material development for multilayer ceramic capacitors, we are downsizing dielectric particles, capacitors' material, while storing more power inside. This combination is a desired but challenging technology. We unceasingly seek to develop the "World's Best and World's First" products meeting the evolving needs of the market.

Technical breakthroughs in research do not always translate to business profits. To avoid such misunderstandings, our R&D department is working in collaboration with our sales and marketing departments and directly with our business divisions. This gives us valuable insight to what our customers' needs are and enables us to deliver new products at the right timing for our customers. Our medium-term development activities are organized to respond to customers' product development schedules. Our fundamental research gears toward long-term technology trends. These resources are allotted to each in line with the golden ratio*.

In addition, TAIYO YUDEN is taking steps to eliminate what in Japanese are called the three Ms—*muda* (wastefulness), *mura* (inconsistency), and *muri* (overburden)—at every stage of a product's lifecycle from design to disposal over our all products. This results in the production and deliverly of "green products" to the market, which have a greater value in aspects of safety, environmental, quality, cost, and delivery timing. We believe that pursuing these objectives will lead us into a new growth stage and create a virtuous cycle that is mutually beneficial for the Company and the society and environment around us.

*The golden ratio ($\frac{1+\sqrt{5}}{2}$:1) has been said from the ancient Greek era to be the harmonious proportions that provide the greatest amount of perceived beauty. Common modern applications of the ratio are in the measurements of postcards and business cards.

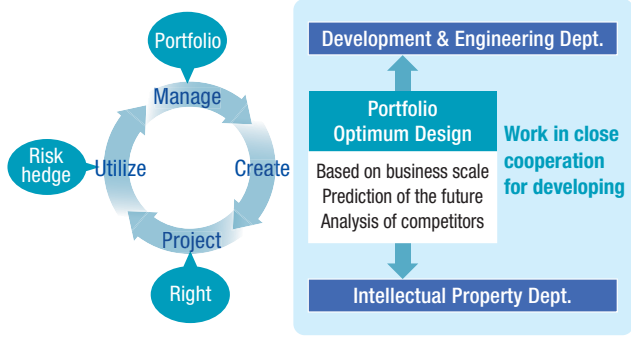
Activities on Intellectual Property Rights

Basic Policy

We, the TAIYO YUDEN Group, endeavor to obtain, maintain and protect intellectual property rights for proper use, and also to respect the intellectual property rights of third parties, in accordance with our CSR Code of Conduct.

Protection of Intellectual Property Rights

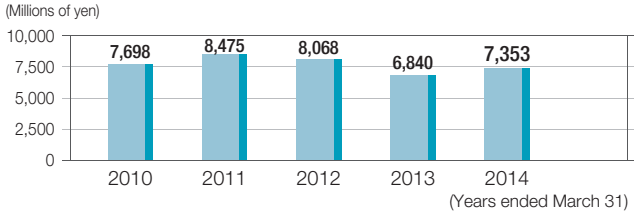
At TAIYO YUDEN, the Intellectual Property Department and the Developing and Engineering Department work in close cooperation with each other from the early stages of developing new technologies and obtaining intellectual property rights. We have our own management system to create, protect and utilize the intellectual property rights that are suitable for each of our businesses.



R&D Expenses

We recognize that continuing innovations and advancement in our technologies through R&D is the foundation for the Group to create the future. With this belief, we will continue to invest in R&D activities and the future development of our products.

R&D expenses



R&D Center, TAIYO YUDEN's Research Facility (Takasaki City, Gunma Prefecture)

As we were committed to continuing to create the world's best products and uphold our claim to be "the TAIYO YUDEN of technology and the TAIYO YUDEN of development," we opened the R&D Center in 1998. In 2003, we established an Anechoic Chamber Test Facility in the same complex, and accelerated our proactive R&D activities in the field of radio communication. Currently, the R&D Center of the TAIYO YUDEN Group drives development and technological progress and takes a role of a foundation of creativity focusing on the future.