

Research and Development

1. R&D Strategy

To continuously create first-class products under the "Leap to Excellence '07" plan, we have designated the cream of our lineups in each business area as "core products" and have launched Groupwide initiatives to further develop them. With a goal of achieving value for our customers, we are making priority investments throughout the product cycle from planning to development and marketing.

We have designated the following as growth areas where we are stepping up technological development and innovating new products: Semiconductor and Liquid Crystal Production Equipment, Information Technology Related Equipment, Medical Equipment, and Actuators.

We have clustered on our leading-edge R&D and business bases in the Yokosuka area southwest of Tokyo, and are accelerating the pace of development. At the R&D Center, development resources are focused on both new products as well as key and basic technologies to help us create the next generation of new products and strengthen our product-innovation capabilities.

Total R&D expenditures during the term came to ¥8.6 billion in fiscal 2006. We intend to increase these expenditures in the future, to further extend our technological lead.

As a yardstick of R&D efficiency, sales of new products accounted for 30% of total sales on a non-consolidated basis. We will continue to launch new products.

2. Main R&D Milestones

(1) Growth Areas

Semiconductor and Liquid Crystal Production Equipment and Information & Technology Related Equipment

In the plastic injection molding machine business, we added light-guiding panel modules to our SE-HP range of ultra high-speed all-electric injection molding machines, to meet market demand for thinner light-guiding panels. The upgraded product was warmly received by the market. To enable formation of 0.3mm-thin light-guiding panels, we added our proprietary injection and temperature control technologies to the high-speed, high-response injection functions, yielding a very high level of filling performance. We also developed and launched our new NANO-PRESS H system capable of meeting the high productivity requirements needed by optical glass element formation. We added the SLR-400T to our range of CO₂ laser drills for printed circuit boards, continuing our drive for higher-quality processing in laser-drilling machines. We impressed the market with our further development - lowering running costs - of our ELA series of laser annealing systems for leading LCD manufacturers.

In semiconductor encapsulating systems, we launched the new SX120 model for frame-widening in the transfer-molding process, and continue to develop this series. In the COMP series of compression molding technologies, we completed the development of molds using substrates divided into several blocks, and continue to develop ways to broaden the transfer area to meet demand for lower running costs.

In encapsulation for organic electroluminescent (EL) devices, we supplied pilot mass-production lines using our Reactive Plasma Deposition method.

In cryogenic equipment and its applications, a newly developed cryopump system "SICERA™" optimized for next-generation semiconductor-manufacturing equipment, has now

been adapted for volume production lines. Development of a series of the cryopumps is underway. 4K pulse-tube cryocoolers are under evaluation for medical and measuring equipment applications and extensive work to further reduce vibration continues.

In precision positioning stages, we focused development efforts on platforms for large stages for LCD use. In motion components, we expanded our product ranges for high-performance drivers and controllers for precision processing for advanced semiconductor and LCD manufacturers. We launched new products in our range of Air Sonic high-speed, high-precision air actuators, which we have developed as an original machine component, and as well as air dancers for them.

Orders were robust for clean transportation equipment for high-performance film for LCD-manufacturing lines. We continued to develop our lineup of Automatic Guided Vehicles (AGVs) and enhance their functionality.

Medical Equipment

We launched the ultra-compact HM-7 cyclotron system for Positron Emission Tomography (PET) for cancer diagnostics. In proton therapy devices for cancer treatment, efforts were focused on increasing output and reducing the number of days of treatment.

Actuators

In our core competence of motion control and drive products, we are developing new high-value-added products as successors to our F4C-D and F2C-C series of Cyclo® speed reducers with enhanced rotation control and output torque to meet high rotational accuracy and low backlash specifications. In electro-motor products, we developed a low-noise motor for stage-setting devices. This product, with an Interior Permanent Magnet motor with built-in high-performance magnets, is designed to meet demand for compact, high-performance, silent models. We also focused efforts on the market for industrial magnetic motors, which we expect to show strong growth going forward. In speed reducers for industrial applications, one of our core products, we launched a low-noise model in our SFC series of orthogonal speed reducers for cooling towers and condenser drives. We were able to achieve significant noise reduction by using three-dimensional gear-tooth modification, enabling this product to be used for meeting noise reduction needs in systems located close to residential areas. We will continue to develop basic technologies to meet the high level of demand for orthogonal gearmotors.

(2) Other Businesses

Environmental Equipment, Ships, and Logistics

In our water-treatment plant business, we continue to develop new units and component systems for water processing facilities. We are also developing energy recovery and solutions based on our core competence of fermentation technologies, and have launched and commercialized a camera for visually monitoring the behavior of microorganisms inside reactor tanks.

In energy plant, we are developing application technologies for our circulating fluidized-bed boilers for new fuels based on woodchip biomass, waste tires and waste plastics. We have found a new way of smoothly extracting and recycling steel wire from waste tires due to the adoption of specially-designed furnace bases. We also have developed resource recovery technologies for rare metals derived from waste materials using rotary kilns.

In ship and marine operations, we have continued to develop energy-saving hull forms, and new environment-friendly tankers that meet tougher safety rules. We are studying ways of improving construction methods to improve productivity and reduced lead times, by making more efficient use of a wide range of information processing technologies.

Turning to logistics and parking systems, we are developing products for mail-order customers through TV and online channels. We are also developing rapid and flexible picking systems that can promptly deal with changes in product lineups.

In car-parking facilities, we have completed trial operations of an above-ground version of our "Sumipark® Ground" "puzzle-type" parking facility, in which space-saving is achieved by more efficient use of available spaces, and plan to commercialize this new system.

Other Industrial Equipment

In forging presses, we are expanding marketing of the 1,600 ton press using the "i-CL@B®" large wet-type clutch break system, which was well received by our customers. We have launched a compact model of the "i-Tr@nsfer®", front-and-back, feed-bars separated-type transfer system, developed with the goal of substantially broadening the range of products handled, and improving productivity and maintenance, and it and established models are operating satisfactorily. We have also developed the "i-H@nd®" charge device for use with this system, and plan further function upgrades. At the same time we have completed a series of new more simple and compact presses jointly with a customer, and have completed their serialization as items of production equipment. Repeat orders have already been placed for all models.

In the field of industrial power-generation turbines, we have received an order for the C11-type 67MW turbine incorporating a 22-inch long-blade system that we have developed, and have already begun design and manufacturing. In the process pumps, we are upgrading the functions of our high-pressure multistage cylindrical case pumps to expand their range in line with progress in light petrochemical applications.

R&D activities in construction machinery have focused on products that offer IT compatibility, ease of operation, energy-saving and environment-friendly qualities. In hydraulic excavators, we launched models in the SH200-5 and SH240-5 mainstay medium-sized ranges with engines that meet the (latest) Tier 3 emission regulations. These are next-generation vehicles with high levels of operability, economic viability and environment-friendliness under the motto "real performance." We have also built this environment-friendly engine into our large hydraulic excavators for large-scale general civil engineering, road construction and aggregate crushing, and launched models in the Japanese and overseas markets.

In road-paving equipment, we continued development of our new HA90C large asphalt-finisher, mainly targeting overseas markets, are developed the HA45C-6 (JP2045) asphalt-finisher using the crawler method for mountainous areas and soft-soil environments. We also further upgraded the "J-paver®" series of 3-stage extendable screeds.

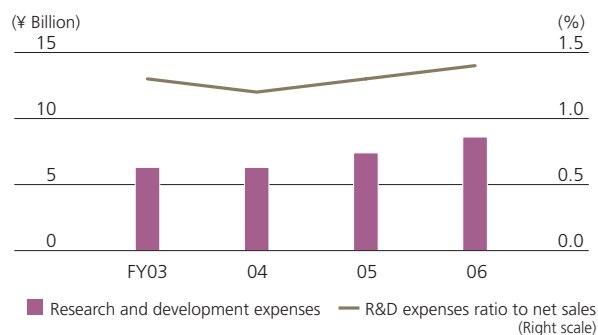


COMP-3



NANO-PRESS H

Research and Development Expenses



Proportion of New Products in Total Sales

