Vacuum Equipment Business **(1)**

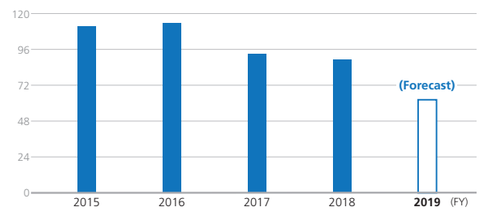
FPD and PV Production Equipment

Creation of growth drivers and profit-oriented cost structure reform to achieve further growth

We have been working to create growth drivers and achieve profit-oriented cost structure reform since the previous year. By further promoting these initiatives, we will not only provide customers with superior products and technologies but also promote development and sales of new products for growth markets, thus expanding ULVAC's share of the market for FPD, PV and high functional films.

Yasuo Shimizu
General Manager of FPD · PV Division

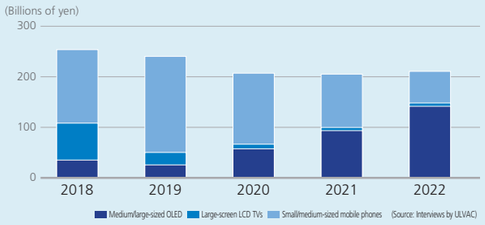
Orders received (Billions of yen)



Maintaining high market share by receiving orders for LCD production equipment for large-screen TVs and OLED production equipment for smartphones in China

Regarding LCDs for large-screen TVs, device manufacturers rapidly expanded capital expenditures for G10.5 that is capable of producing multiple 65- or 75-inch panels from one substrate. Capitalizing on abundant experience in supporting the trend toward large screens in the TV market, ULVAC introduced sputtering equipment offering superior productivity ahead of competitors and engaged in continuous improvement programs, maintaining an overwhelming share of this market segment. Furthermore, regarding equipment for OLED, a key measure of the growth strategy, we won repeated orders for evaporation equipment from smartphone panel manufacturers in China. Regarding vacuum equipment for printed OLED TVs, which are promising next-generation large-screen TVs, the launch of the business proceeded well and we took an important step in the expanding OLED market. With regard to high-capacity lithium-ion batteries, whose market is expected to enjoy strong growth along with the FPD market, we have advanced from the basic development phase for metal lithium evaporation technology to the phase for examination of pre-production technology with a leading manufacturer, and expectations rose regarding the market launch of ULVAC's roll coater for lithium-ion batteries.

FPD capital expenditure trends



New products supporting the smart society

In the FPD market, owing to the trend toward lower prices because panel supply capacity greatly exceeded demand, investment in LCD production equipment is expected to be soft in the near term. However, in view of the demand for flexible OLED with a high degree of design flexibility as the interface of choice in the smart society driven by 5G and IoT, companies are competing in the development of such displays. Compared with LCD, flexible OLED is characterized by light emittance, wide viewing angle, and high contrast. Their application is expected to grow in various fields, such as for automotive displays indispensable in the era of "connected cars."

In line with the strengthening of environmental regulations across the world, electrification of cars will be facilitated and various preferential measures are expected to spur expansion of the lithium-ion battery market. ULVAC is aiming for the No. 1 market share by developing new models of sputtering equipment for OLED, organic evaporation equipment for OLED, and roll coaters for lithium-ion batteries. Moreover, although robust market growth of the production equipment for solar cells, a promising source of renewable energy, is expected to continue centering on China, price competition is fierce. Therefore, we will switch to production in China to enhance competitiveness.

Recognized Business Opportunities

1. Expansion of the medium/large-sized OLED market
2. Expansion of new display applications and of the lithium-ion battery market in the smart society
3. Robust growth of the solar cell production equipment market of China

Conceivable Risks

1. Delay in development of technically challenging technology for new applications and markets
2. Slowdown of the Chinese market
3. Intensifying competition and market entry of Chinese manufacturers of low-priced equipment

Measures for Reducing Risks and Maximizing Opportunities

1. Collaborate with leading manufacturers in development for mass production for new applications and markets
2. Develop highly competitive new products
3. Thoroughly eliminate waste in manufacturing processes and reestablish the supply chain to generate profit
4. Promote overseas production to reduce cost

Vacuum Equipment Business **(2)**

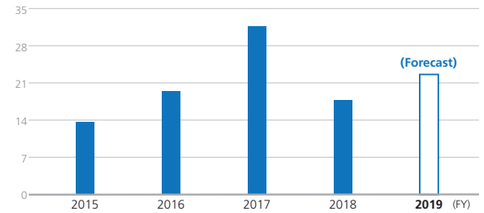
Semiconductor Production Equipment

Continued growth through creation of new products and cultivation of customers

Our objective is to grow the semiconductor production equipment operation as one of ULVAC's primary pillars of revenue, and advance global business development by continuing to capitalize on investment trends in the semiconductor market. To accomplish this, we will endeavor to seize business opportunities based on our growth strategy emphasizing responsiveness to the needs and trust of customers.

Tomoyasu Kondo
Executive Officer, General Manager of Semiconductor Equipment Division

Orders received (Billions of yen)



Preparation is underway and aligned with the business strategy despite temporary postponement of investment by memory manufacturers

Whereas memory manufacturers made vigorous investments in 2017 and 2018, many of them are temporarily postponing investment due to oversupply and price declines of memory products since the end of 2018. However, investment is expected to resume moderately from 2020 onward and we are steadily preparing for that.

In the logic/foundry market several major customers recently adopted our sputtering equipment for the process step that requires extreme ultraviolet lithography (EUV) and we were able to establish a foundation for future growth.

Regarding the sputtering process of PCRAM nonvolatile memory, which has good prospects for future market growth, our equipment is being adopted not only by existing customers for their new lines but also for development and pilot lines by all other customers who are planning mass production.

To build on these gratifying accomplishments and progress, we are promoting initiatives to further reinforce the foundation for growth by strengthening sales & marketing, production, and customer support systems.

Increase market share in the semiconductor production equipment market that is continuing to grow in the smart society

The requirements of semiconductor devices and related components are evolving to support the emergence of IoT's big data demand and servers for edge computing. Growth opportunities are increasing not only for traditional DRAM and NAND but also for storage-class memory consisting of non-volatile memory. Miniaturization is fueling innovation in processor technology.

Amid these technical innovations in semiconductors, in addition to NAND and DRAM memory, ULVAC positions PCRAM and the logic/foundry business as the axles of growth.

We will focus on growth engine keywords: "Miniaturization process requirements," "Nonvolatile memory deposition," "Wafer level package deposition," and "Logic/foundry miniaturization mass production support." Based on a business growth strategy unique to ULVAC, we will pursue business development different from other major competing equipment manufacturers.

As for mid-term strategic products, we are promoting the development of leading-edge technologies that leverage our strengths in the native oxide removing system and sputtering system.

Recognized Business Opportunities

1. Full-scale mass production of leading-edge 7-5nm logic devices
2. New processes for leading-edge DRAM and 3D-NAND products and change in materials
3. Expansion of wafer level package deposition process
4. Mass production of PCRAM

Conceivable Risks

1. Intensifying of competition
2. Slowing growth of the leading-edge device market
3. Delay in expansion of the PCRAM market

Measures for Reducing Risks and Maximizing Opportunities

1. Develop products by embracing customer requirements through meticulous marketing and achieve differentiation
2. Strengthen support for development and mass production launch by new customers
3. Strengthen support for development and mass production of leading edge devices
4. Provide thorough support to PCRAM customers and maintain 100% market share

Vacuum Equipment Business **(3)**

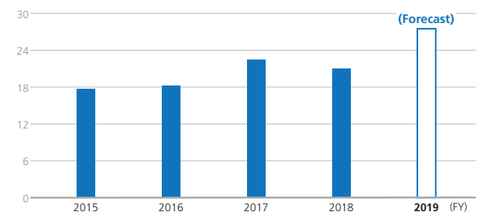
Electronic Device Production Equipment

Advent of the smart society—Further expand global business development of equipment for electronic devices

In addition to various devices indispensable for the realization of IoT and the smart society, such as communication devices, sensing devices, optical devices, and power devices, the development of compact miniaturized packaging technology for such devices is bound to accelerate. We aim to further expand this business in the electronic device market.

Tetsuya Shimada
Executive Officer, General Manager of Advanced Electronics Equipment Division

Orders received (Billions of yen)



Ongoing establishment of systems to seize opportunities without fail in a buoyant market

Orders received in fiscal 2018 were lower than the result for the previous fiscal year, reflecting the temporary stagnation of the market. In fiscal 2019, amid robust growth in capital expenditures eyeing the smart society, we will work to win more orders by further strengthening and fostering sales engineers.

In the electronics device-related business, delivery lead times are very short for manufacture and shipment of equipment. We are establishing a front-loading system from the order-forecasting phase onward.

How to meet customers' delivery requirements is an issue. We will continue to establish a system for seizing opportunities without fail through flexible responses, such as by reviewing the procurement method.

Priority fields

Priority fields	Final products
Communication devices	● Smartphones ● Smart devices
Optical devices	● 3D sensors ● In-vehicle displays
Electronic devices (MEMS)	● 5G-ready equipment
Power devices	● Devices for EV application ● Industrial robots ● Energy-saving equipment
Electronic packaging	● Smartphones ● High-speed data servers ● IoT devices

Expand equipment sales worldwide to become a truly global enterprise

With the advent of the smart society, needs for electronic devices that support IoT will further increase. Development of these devices is progressing concurrently around the world. The ongoing evolution of production equipment for them is predicated on the development of innovative new technologies and improvement of existing technologies.

In Europe and North America, where many new devices are developed, we are cultivating collaborative relationships with customers through collaboration among Group companies. To play the role of a trailblazer, we aim to vigorously cultivate new customers.

In Asia where many of our customers have production bases, we will vigorously implement activities to expand sales while strengthening innovative proposal capabilities in addition to building on our delivery track record so far. Through these initiatives, we aim to expand business globally.

Recognized Business Opportunities

1. Realization of the smart society by IoT and 5G
2. Technological innovation by leading companies in Europe and North America
3. Manufacturing and mass production of electronic devices in Asia

Conceivable Risks

1. Slowdown of the Japanese electronic device production equipment market
2. Intensifying competition due to customers' shift of production locations
3. Longer equipment production lead times because parts production and supply cannot keep up with the short delivery lead time

Measures for Reducing Risks and Maximizing Opportunities

1. Cultivate a range of applications
2. Establish relationships with leading European and North American companies and grasp market trends
3. Continue development of cutting-edge technologies eyeing the smart society

Vacuum Equipment Business **(4)**

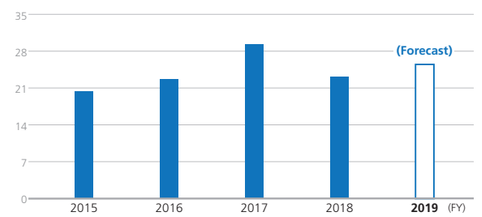
Industrial Equipment

Contributing to industries and society with vacuum technology involving thermal application

The Industrial Equipment Division offers vacuum technology solutions involving thermal application. We are developing the equipment customers require in order to create higher-value-added products of superior quality. Our solutions contribute to the full spectrum of industries and cover such processes as vacuum heat treatment and brazing of internal combustion engine parts, vacuum melting of magnetic materials, vacuum freeze drying of pharmaceuticals, high-purity refining of vitamin E, eicosapentaenoic acid (EPA), and docosahexaenoic acid (DHA) using vacuum distillation, and special vacuum drying of food without spoiling the taste.

Hisanao Kusaba
General Manager of Industrial Equipment Division

Orders received (Billions of yen)



Offering solutions for higher-value-added products of superior quality based on a sure grasp of customer needs across the full spectrum of industries

Industrial Equipment constitutes the infrastructure for high-tech industry. ULVAC supports customers' innovation by combining vacuum technology with fundamental technologies, such as heat treatment of parts to increase hardness and luster, melting for development and production of high-performance materials, brazing for bonding different kinds of materials, and drying and distillation to increase purity and preservability.

In order to respond to customers' global business development, we enhanced activities targeting customers in the Chinese market in fiscal 2018. Going forward, we will strengthen approaches to the Southeast Asian market and the Indian market.

Contributing to the full spectrum of industries

The industrial equipment business is contributing to the full spectrum of industries.

Cultivating growth markets and pioneering new markets

Regarding systems employed in the manufacture of the rare-earth magnets widely used in wind turbines, electric vehicles, and mobile phones, we will meet customer needs by optimizing hydrogen furnaces, pulverizers, and SC melting furnaces. China is the principal market. We will provide high-quality equipment manufactured in China at reasonable prices.

In the automotive components field, we will meet demand for heat exchangers for exhaust gas recirculation (EGR) coolers used in internal combustion engines and heat exchangers for electronic parts cooling in EVs by offering vacuum brazing furnaces, which are ULVAC's forte.

In the pharmaceuticals field, investment in generic drugs and in high potency active pharmaceutical ingredients, such as for anticancer drugs, is booming. This is creating opportunities for ULVAC to display its strengths in vacuum freeze-drying equipment.

New applications of ULVAC's unique Micro Powder Dry technology for producing porous powder include blood plasma preparation, ceramic capacitors, and new materials. We will meet customers' expectations by realizing mass-production technology and sterilization technology at an early stage.

In the food field, distinctive drying technologies, such as superheated steam drying and puffed freeze drying, have made it possible to preserve and commercialize foodstuffs that were previously disposed of as waste. We aim to offer solutions to alleviate food shortages and food losses worldwide.

Recognized Business Opportunities

1. Expansion of demand for magnets, automotive parts, and pharmaceutical formulation
2. Rising awareness about food safety and security and reduction of food waste and food losses

Conceivable Risks

1. Progress of commoditization and intensifying price competition
2. Customer retention by first-movers

Measures for Reducing Risks and Maximizing Opportunities

1. Enhance production efficiency through integration of production bases
2. Cultivate new application fields for porous powder production
3. Develop competitive new products
4. Expand the domain for creation of added value by using the vacuum process in the food products field

Vacuum Equipment Business **(5)**

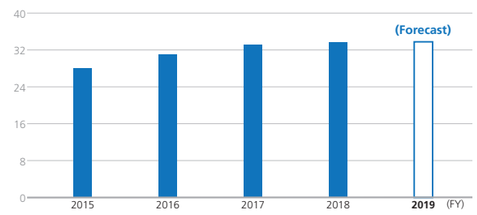
Components

Become a driving force of ULVAC's global business with an extensive product lineup

Vacuum technology is essential for diverse industries. As a comprehensive manufacturer of vacuum components supporting industrial infrastructure, we offer an extensive lineup of vacuum components. Bringing our comprehensive capabilities into full play, we will develop business from both aspects of regions and industrial fields in an aim to become a driving force of ULVAC's global business.

Ju Hoon Shin
General Manager of Components Division

Orders received (Billions of yen)



Achieve further growth through Group synergy

In fiscal 2018, despite a slowdown of investment by FPD and semiconductor manufacturers following several years of buoyant investment, OLED-related investment supported ULVAC's business results.

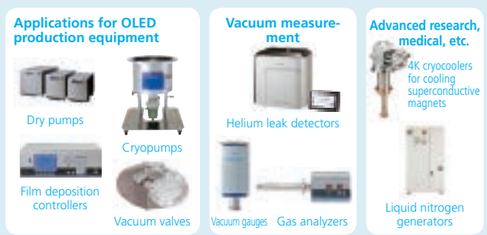
The vacuum pump business is conducted by ULVAC CRYOGENICS, which is a manufacturer specializing in cryopumps and cryocoolers, and ULVAC KIKO, which handles compact vacuum pumps, as well as ULVAC, Inc. By enhancing the efficiency of production and sales through integrated management of the Group, we are establishing a system that will enable us to aim for further growth.

Regarding product development, we released low-noise, compact high-vacuum pumping equipment targeting R&D applications. We will step up development of products offering higher productivity and environmental friendliness.

Components business

Components essential for vacuum equipment.
ULVAC supplies vacuum pumps, vacuum gauges, vacuum valves, vacuum leak testers, gas analyzers, power generators for deposition processes, etc. to vacuum equipment manufacturers, machinery manufacturers, etc.

Application example



Reaching out from Japan to China, Europe and North America in pursuit of global business development

Despite uncertain prospects in the near term, it is evident that manufacturers will make major investments with a view to the big data era and the smart society over the medium to long term.

The vacuum components business is becoming increasingly borderless. Tackling this market inevitably involves competing against powerful European and American manufacturers. In order to prevail, we are strengthening our global marketing structure, enhancing efficiency of production systems, and establishing systems for developing products attuned to market needs.

By offering the optimum products for various fields, including analysis, medicine, and food, we are cultivating vacuum applications and promoting expansion of the cryocooler business so as to contribute to the enhancement of the comprehensive value of the ULVAC brand.

Recognized Business Opportunities

1. Large-scale investment in view of big data and the smart society
2. Expansion of market in emerging countries

Conceivable Risks

1. Stronger competitors expanding business through M&A
2. Intensifying price competition, market entry by low-cost manufacturers

Measures for Reducing Risks and Maximizing Opportunities

1. Expand business fields by strengthening alliances
2. Enhance efficiency of production and sales to reduce cost

Vacuum Application Business

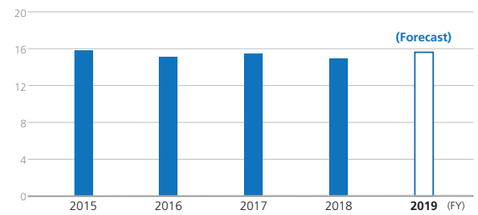
Materials

Be a pioneer in offering excellent materials to the market

Sputtering equipment, ULVAC's mainstay product, requires target materials as a source for deposition substances. We are endeavoring to develop products such as target materials endowed with functions required in the emerging smart society, power-generation markets, and corrosion-resistant, superconductive high-performance materials, in cooperation with the equipment divisions and research institutes. Moreover, we aim to be first-to-market so that our customers can be the first to enjoy their benefits.

Seigou Kinugawa
Executive Officer, General Manager of Materials Division

Orders received (Billions of yen)

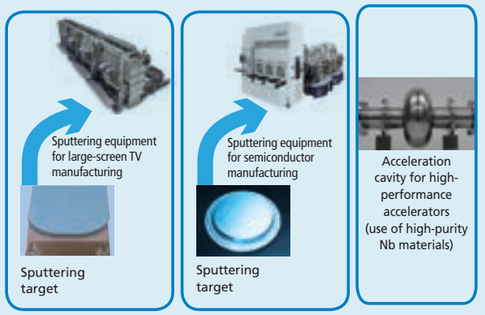


Steady growth in the markets that are expected to expand in the future

In fiscal 2018, sales grew steadily in the markets that are expected to expand in the future, namely, target materials for cutting-edge semiconductors, Cu and IGZO target materials for FPD, and high-performance materials. On the other hand, sales of materials mainly for OLED for smartphones were sluggish.

Materials business

The materials business centers on target materials used in sputtering, which is the mainstream method of vacuum deposition, and also includes development and manufacturing of functional materials.



Such a great opportunity comes only once in decades

With IoT, 5G communication, and AI to the fore, technological innovation geared to the needs of the emerging smart society is underway. One consequence of this trend is that new high-performance materials are coming into their own in the semiconductor, cutting-edge electronic device, and the display field. They are destined to eventually supersede traditional materials. With a view to facilitating the emergence of the smart society, we are developing new materials required in this expanding application field in cooperation with ULVAC's equipment divisions and research institutes and together with our customers.

Recognized Business Opportunities

1. Increases of sputtering thin-film processes due to increases in semiconductors and electronic devices in the smart society
2. Switching to new materials as device performance improves
3. Switching to new materials in line with the trend toward larger, higher-definition, and flexible display panels
4. Expansion of the superconductive material business

Conceivable Risks

1. Difficulty of securing stable supply of raw materials in view of increasing demand
2. Intensifying price competition

Measures for Reducing Risks and Maximizing Opportunities

1. Promote joint development with leading manufacturers and influential private or public institutions
2. Invest and manufacture in growing markets (regions and products)
3. Further promote recycling of materials
4. Promote alliances

Others

Semiconductor mask blanks market

We will respond effectively to increasing needs for miniaturization and higher definition in line with the expansion of the application field and the proliferation of types, reflecting the improved performance of smartphones, development of self-driving vehicles, and the ramp-up of demand related to IoT and artificial intelligence (AI).

Surface analyzer market

Whereas university and company laboratories were previously the principal users of surface analyzers, this equipment is increasingly used nowadays for routine purposes such as product inspection. Surface analyzers are being applied to more materials in more regions and markets throughout the world. ULVAC will continue offering surface analyzers with functions attuned to customer needs.