

Vacuum Equipment Business ①

Semiconductor Production Equipment



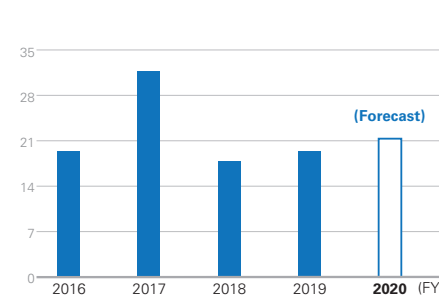
We aim to achieve growth of the semiconductor production equipment business outperforming the market growth rate by continuing to capitalize on investment trends and advanced technological trends in the semiconductor market.

To accomplish this, we will endeavor to seize growth opportunities based on our business strategy emphasizing responsiveness to the needs and trust of customers.

Tomoyasu Kondo

Senior Executive Officer,
General Manager of Semiconductor Equipment Division

Orders received (Billions of yen)



Vacuum Equipment Business ②

Electronic Device Production Equipment



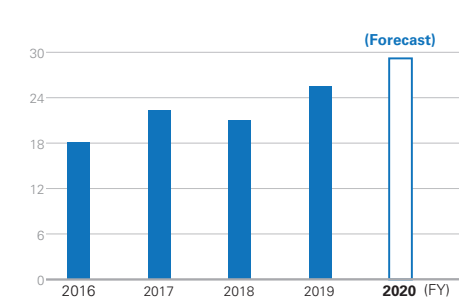
Electronic devices are indispensable in contemporary society. Emergence of the smart society and the spread of remote work are providing a tailwind for the electronic device market. Sensor and communication technologies will continue to develop and evolve. Moreover, the trends toward energy saving and electrification are spurring growth of the power device market.

We aim to further expand business in the electronic device market.

Tetsuya Shimada

Managing Executive Officer,
General Manager of Advanced Electronics Equipment Division

Orders received (Billions of yen)



Review of FY 2019

In the wake of memory manufacturers' vigorous investment that peaked in 2018, the business environment was challenging in 2019 and in the first half of 2020 because of a marked tendency to postpone investment, albeit briefly, due to oversupply and price declines. Investment is expected to resume moderately from the second half of 2020 onward and we expect the recovery trend to give us a tailwind.

Meanwhile, in the logic/foundry market, a growing number of major customers are adopting our sputtering equipment for the process that requires extreme ultraviolet lithography (EUV) and joint development for new processes is becoming vigorous. Thus, further growth in this market is expected.

Regarding the sputtering process of PCRAM nonvolatile memory, which has good prospects for future market growth, our equipment continues to be adopted not only by our existing customers but also for development and pilot lines by all other customers who are planning mass production, although investment in mass production has temporarily halted.

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

Medium- to long-term outlook of the market environment

In line with continuing to rise data traffic in the emerging smart society, semiconductor devices continue to evolve and grow through the expansion of equipment, servers, and edge computing for big data processing. Despite fluctuations from year to year, investment in the memory and logic device segments is on an upward trajectory over the medium to long term.

As we have entered the logic market in addition to the memory market, we now have two pillars sustaining ULVAC's growth. Based on a business growth strategy unique to ULVAC, we will pursue business development and product development different from other major competing equipment manufacturers to fulfill needs associated with leading-edge devices.

Recognized Business Opportunities

- Investment in mass production of leading-edge 5-3nm logic devices
- New processes and change in materials for leading-edge DRAM and 3D-NAND products
- Expansion of wafer level package deposition process
- Mass production of new memory such as PCRAM

Conceivable Risks

- Intensifying of competition
- Change in the semiconductor business structure due to prolonged U.S.-China trade friction
- Delay in new product development and application to mass production
- Delay in expansion of the new memory market such as PCRAM

Measures for Reducing Risks and Maximizing Opportunities

- Develop products by embracing customer requirements through steady marketing and develop differentiation technology
- Promote joint development with customers leading the market
- Strengthen support for development and mass production of leading-edge devices
- Strengthen support for development and mass-production launch by new customers
- Provide thorough support to customers that manufacture new types of memory such as PCRAM and maintain 100% market share

Review of FY 2019

We got off to a strong start with order-receiving in the first half of FY 2019, benefitting from the momentum of the electronic device market. However, in the second half, business opportunities stalled and installation of equipment was suspended owing to travel restrictions because of the COVID-19 pandemic. As a result, both orders received and sales fell short of the annual targets. In these circumstances, we continued our efforts to strengthen manufacturing capabilities and were able to promote transformation to a profitable structure. By the end of FY 2019, there were indications of a recovery in business opportunities. In FY 2020, despite the continuing impact of COVID-19, we will promote new business opportunities and facilitate installation of equipment by local subsidiaries to expand the business.

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

Medium- to long-term outlook of the market environment

Since demand for electronic devices will increase with the advent of the smart society and owing to the spread of remote work, the market is expected to continue growing. Although Japanese companies still have a strong presence in the electronic device field, growth of the electronic device market is expected to center on China and elsewhere in Asia. Electronic devices related to the evolution of sensing technology, communication technology, and low-power-consumption equipment represent opportunities for the advanced electronics equipment business. Devices are evolving and we need to continue offering equipment that can keep pace with this evolution. While enhancing existing technology, careful monitoring of technological trends is indispensable since we also need to be capable of swift development in response to innovation.

Recognized Business Opportunities

- Realization of the smart society
- Manufacturing and mass production of electronic devices in Asia
- Exponential evolution and improvement of electronic devices

Conceivable Risks

- Constraints on the China business due to intensifying U.S.-China trade friction
- Sluggish consumption (automobiles etc.) due to the COVID-19 pandemic, which may not abate for some time
- Growth of Chinese competitors

Measures for Reducing Risks and Maximizing Opportunities

- Enhance production efficiency through equipment standardization
- Strengthen installation by local subsidiaries
- Strengthen and increase the speed of equipment development
- Disperse development functions overseas

Vacuum Equipment Business ③

FPD and PV Production Equipment

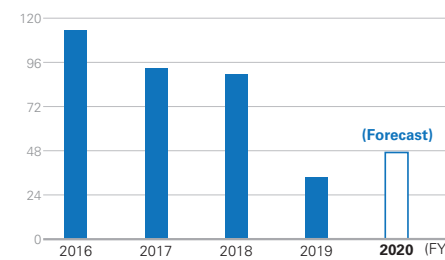


In the promising OLED and lithium-ion battery markets, we offer ever-more advanced products to customers by capitalizing on ULVAC's unique strengths in large-substrate sputtering and substrate transport technologies, thus strengthening profitability.

Yasuo Shimizu

Executive Officer,
General Manager of FPD·PV Division

Orders received (Billions of yen)



Vacuum Equipment Business ④

Components

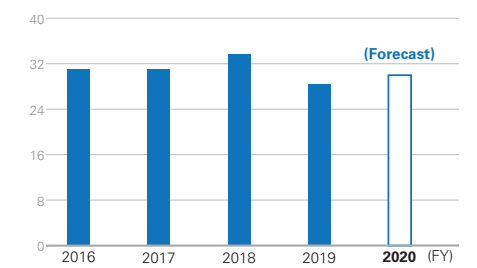


The vacuum components business is becoming increasingly borderless and competition with European and American manufacturers is inevitable. In order to prevail, we are developing a global marketing structure, enhancing efficiency of production systems, strengthening quality management systems, and establishing systems for developing products attuned to market needs.

Ju Hoon Shin

Executive Officer,
General Manager of Components Division

Orders received (Billions of yen)



Review of FY 2019

We engaged in continuous improvement activities for G10.5 sputtering equipment for large LCD TVs and maintained an overwhelming share of this market segment. However, business opportunities on major investment projects related to large LCD TVs had come to a cyclical downturn and investment related to OLED for smartphones entered a temporary adjustment phase. Moreover, extensive constraints on economic activity in line with the COVID-19 pandemic resulted in a great decrease in orders received compared with the previous fiscal year. Although the impact on net sales was limited because of a substantial order backlog at the beginning of the fiscal year, net sales were still far below the target and the level of the previous fiscal year. In order to adapt to such a drastic change in the market environment, we began initiatives in the second half to transform the business structure. There are signs that the situation is improving; for example, we received an order for a large investment project for sputtering equipment for small and medium-sized OLED.

Medium- to long-term outlook of the market environment

Remote work and non-face-to-face communication, such as online meetings, are spreading rapidly owing to the COVID-19 pandemic and a perception that it may not abate for some time. In response to these changes in the social environment, there are increasing needs for OLED displays because they can emulate face-to-face communication with superior color reproduction and responsiveness to achieve a more realistic and immersive experience. In line with this trend, developments targeting higher definition, use of larger substrates and mass-production systems are gaining momentum. The impact of the expansion of non-face-to-face communication is far-reaching and by no means limited to displays. Along with the progress of the smart society, an increase in opportunities to use electronic devices, such as wearable speakers and smartwatches, will expand demand for lithium-ion batteries that are safe and portable.

We will respond to these expanding new needs, in addition to existing sputtering technologies, and achieving technological differentiation through collaboration with leading companies with the aim of enhancing profitability.

Recognized Business Opportunities

1. Large equipment suitable for mass production of high-definition, large OLED
2. Sputtering equipment for small and medium-sized OLED
3. Evaporation roll coaters for production of electrode parts that enhance safety of lithium-ion batteries

Conceivable Risks

1. Decline in investment because the COVID-19 pandemic may not abate for a considerable time and delay in orders received and sales due to restrictions on movement
2. Constraints on the China business due to intensifying U.S.-China trade friction
3. Delay in the shift and adaption to complex next-generation technology
4. Declines in sales prices and profit due to price competition

Measures for Reducing Risks and Maximizing Opportunities

1. Jointly develop advanced technology with leading companies
2. Strengthen marketing (particularly in FPD and lithium-ion battery markets)
3. Strengthen manufacturing capabilities and develop differentiated technology
4. Strengthen the system enabling swift response to customers despite travel restrictions

Review of FY 2019

During the first half of FY 2019, order-receiving was sluggish owing to slowing investment in FPD and automotive markets as well as a worldwide decline in demand caused by U.S.-China trade friction and other factors. As soon as signs of recovery became evident in the second half, COVID-19 emerged and a challenging business environment persisted throughout FY 2019. In these circumstances, investment by customers in certain markets, such as the OLED and semiconductor markets, supported our financial performance.

By enhancing the efficiency of production and sales through integrated management of the Group, we promoted establishment of a system that will enable us to aim for further growth.

Medium- to long-term outlook of the market environment

In the OLED and optical device fields, we will develop business centering on cryopumps. In growth fields, such as semiconductors and electronic devices, we intend to expand the lineup by launching new products with the aim of increasing our market share and cultivating new customers. In particular, we will strengthen cooperation with equipment divisions to maximize the competitive advantage of ULVAC's components business with a view to accelerating growth centering on the China market.

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
3. Increase of investment in social infrastructure improvement and in fields such as medicine, food, and air conditioning

Conceivable Risks

1. Stronger competitors expanding business through M&A
2. Intensifying price competition, market entry by low-cost manufacturers
3. Prolonged sluggishness of the market environment

Measures for Reducing Risks and Maximizing Opportunities

1. Expand business fields by strengthening alliances
2. Enhance efficiency of production and sales to reduce cost
3. Develop business focusing on growth fields

Components

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

Applications for OLED production equipment

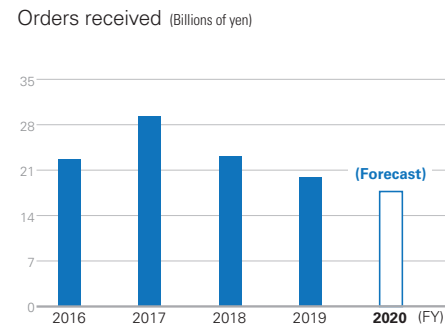
Vacuum measurement

Advanced research, medical, etc.

Vacuum Equipment Business 5

Industrial Equipment

The industrial equipment business offers vacuum technology solutions involving thermal application. Our products include equipment for freeze drying foods and pharmaceuticals combining vacuum and heating/cooling technology, equipment for high-purity refining using vacuum distillation, and heat-treatment furnaces for various industrial parts. From the current fiscal year, we will promote consolidation of products in cooperation with Group companies and enhancement of equipment quality while strengthening the earnings structure by commencing structural reform of the industrial equipment business.



Review of FY 2019

Whereas we have a competitive advantage in the market for freeze-drying equipment due to the technology that we have cultivated, the market for heat-treatment equipment was affected by continuing fierce cost competition in China, the main market for such equipment. In the second half of FY 2019, we overhauled the industrial equipment business, starting from the manufacturing processes, including consolidation of large-scale production bases through organizational integration with the advanced electronics equipment business. Positioning vacuum brazing, freeze drying, and vacuum distillation equipment as the fundamental elements of the business, we strengthened business development in China in order to expand sales in the market for vacuum melting furnaces and heat-treatment equipment.

Contributing to the full spectrum of industries

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

- Heat exchangers**
Radiators, EGR coolers, electronic parts cooling, etc.
→ Vacuum brazing furnaces, vacuum leak testing
- Resin fuel tanks**
→ Vacuum leak testing
- Pharmaceuticals and food**
Generic drug manufacturing
Extraction of high-purity substances
→ Vacuum freeze-drying equipment, vacuum distillation equipment
- Rare-earth magnets for electric motors**
HV, EVs, wind turbines, home appliances
→ Vacuum sintering furnaces and melting furnaces

Medium- to long-term outlook of the market environment

In the rare-earth magnet field, we will address the needs for high-efficiency, high-output, compact motors indispensable for power assist suits in the aging society, drones whose use is expanding in the service field, and human friendly robots

by offering vacuum heat treatment furnaces and vacuum melting furnaces in China, the main market. In the automotive components field, we will help meet the demand for heat exchangers for exhaust gas recirculation (EGR) coolers necessary for improving fuel efficiency by developing and offering vacuum brazing furnaces with minimal environmental impacts. In the pharmaceuticals field, new drug development is being promoted in the Japanese market, the market for generic drugs is expected to expand early, and sophisticated production technology is required for mass production of biopharmaceuticals. To meet demand in this field, we will introduce vacuum freeze-drying equipment and apply freeze time control and process monitoring, which are technologies that create added value. In the health food and electronic device fields, we will offer vacuum distillation equipment with high concentration technology for anti-aging products and high-performance resin materials, which are in demand overseas.

Recognized Business Opportunities

1. Growing demand for magnets, automotive parts, and pharmaceutical formulation in China
2. New market for services geared to population aging
3. Country-wide countermeasures for infectious diseases

Conceivable Risks

1. Rapid change in the pharmaceuticals industry due to large-scale M&A
2. Decline of existing automotive manufacturers due to the progress of autonomous driving technology, the spread of car sharing, and electrification
3. Rapid change in product value in line with the rapid change in the social environment

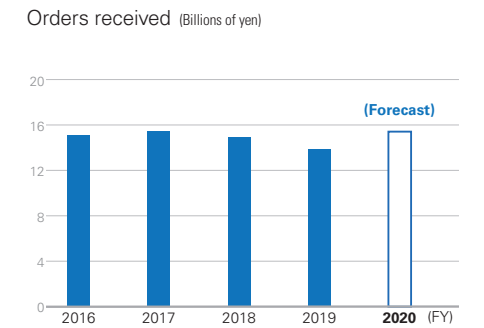
Measures for Reducing Risks and Maximizing Opportunities

1. Strengthen response to the pharmaceuticals industry overseas
2. Cultivate opportunities for winning new orders created by accelerated electrification of automotive vehicles
3. Respond to expansion in demand for products in the healthcare industry

Vacuum Application Business

Materials

ULVAC offers high-quality, high-performance advanced materials related to vacuum technology to the worldwide market. In view of needs in the emerging smart society and for low power consumption, we develop thin-film materials (mainly sputtering targets) used in the deposition process for semiconductors, electronic devices and FPDs as well as corrosion-resistant, superconductive high-performance materials, manufacture them at our plants and supply them to customers.



Review of FY 2019

Although the business environment was challenging owing to the impact of the COVID-19 pandemic, we managed to secure sales virtually the same level as the previous fiscal year. Among thin-film materials, those for cutting-edge semiconductors saw a steady increase in sales. Sales of IGZO target materials for FPD were virtually unchanged from the previous fiscal year as market expansion fell short of expectations. In China, the largest FPD market, sales of materials for cutting-edge displays such as LTPS and OLED grew but sales of materials for LCD (a-Si) were sluggish because of the rise of Chinese competitors. For high-performance materials, we executed capital investment with an eye to the future and made preparations to respond to the need for higher-performance materials and for increased production.

Medium- to long-term outlook of the market environment

One consequence of the trend toward realization of the smart society is that new high-performance materials are coming into their own in the semiconductor, electronic device, and the display

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.

- Sputtering target
- Sputtering equipment for large-screen TV manufacturing
- Acceleration cavity for high-performance accelerators (use of high-purity Nb materials)

Semiconductor mask blanks business

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).

fields. They are destined to eventually supersede traditional materials. With a view to facilitating the emergence of the smart society, we are actively 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 performance of semiconductors and electronic devices improves
3. Switching to new materials in line with the trend toward larger, higher-definition, and flexible display panels
4. Expansion of the business for superconductive materials and accelerators that use high-performance materials

Conceivable Risks

1. Decrease in the market share for FPD materials due to the rise of Chinese competitors
2. Intensifying price competition for FPD materials due to price erosion of large-screen TVs
3. Restrictions on export and supply chain interruption due to U.S.-China trade friction

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. Promote alliances with partner companies
4. Further promote recycling of materials

Surface analyzer business

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.