The “100 million dollar Export Tower Award” is an award aimed at companies the accumulate export value of which exceeds 100 million US dollars. South Korea holds a ceremony to recognize the outstanding export performance of companies on December 7 each year, which is celebrated as “Annual Trade Day” in the country. The ceremony was conducted on a grand scale again this year, with the attendance of President Park Geun-hye and those representing the companies to be honored.

This was the third time UK has been awarded an Export Tower Award, following the “10 million dollar Export Tower Award” in 2005 and “70 million dollar Export Tower Award” in 2012, showing that the company has made steady progress.

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Paik Choong Ryul, President of ULVAC KOREA, Ltd., with the “tower” in his hands

New Products

* Please visit our website for further information.

ULVAC, Inc.
World’s first*, Low Temperature PZT Sputtering Technology in Mass Production Scale Developed for Piezoelectric MEMS Device Integrated on CMOS.

Sputtering system model SME-200

ULVAC, Inc. announced industry’s first low temperature PZT sputtering technology in mass production scale enabling future advanced MEMS device integrated on CMOS which will be the mainstream of next generation MEMS devices.

Today many sensors such as accelerometers, gyroscopes, and pressure sensors are widely used inside high performance smart phones, tablet PCs, and automobiles enabling the “Smart society” representing the IoT world.

The increasing demand and the key element to enable this functionality, is the piezoelectric MEMS (Micro Electro Mechanical Systems) device, using a piezoelectric thin film material called PZT (lead zirconate titanate, Pb(Zr,Ti)O3).

The future holds that, higher performance, multi-functional and smaller piezoelectric MEMS devices for the next generation of advanced sensor technology is rapidly expanding its applications by the integration with CMOS (Complementary Metal Oxide Semiconductor) devices.

PZT, Piezoelectric MEMS is one of the most practical MEMS devices available today, however, the process temperature was an obstacle, to integrate the MEMS device directly onto a CMOS device. A CMOS device due to its nature, can only withstand a process temperature of 500 degreesC or lower. A typical crystallization temperature for a PZT thin film is 600 degreesC for sputtering and 700 degreesC for Sol-Gel.

ULVAC has developed world’s first unique innovative technology allowing integration of the piezoelectric MEMS device onto a CMOS device, thus achieving highest level piezoelectric performance, withstand voltage reliability, and cycle performance. This is accomplished by utilizing unique sputtering technology with process temperature below 500 degreesC.

The piezoelectric device, using thin film PZT, is formed by five (5) layers which are: an adhesion layer, a lower electrode layer, a buffer layer, a piezoelectric (PZT) layer, and upper electrode layer. All the accumulated layers are formed sequentially, through one single sputtering system developed by ULVAC. This multi-chamber type sputtering system (model SME-200) allows for consistent process flow, optimizing each individual layer inside each process chamber respectively, achieving highly stable repeatability of the stacked layer performance, and also improving throughput, to that which is that is very suitable for mass production purposes.

ULVAC, Inc.
Launched High-purity Niobium Material for Superconducting Accelerators

ULVAC, Inc. has developed niobium material of high purity for superconducting accelerators and started selling the material.

Superconducting accelerators are expected to be used in a wide variety of areas, including researching the origin of the universe by International Linear Colliders (ILC) in particle physics, analyzing the structure of proteins in medicine, and partitioning and transmuting of
high-level radioactive waste using nuclear transmutation (ADS: Accelerator Driven System) in environmental and energy sciences.

Superconducting accelerators are used to accelerate charged particles (such as electrons, positrons, protons and ionized atoms). Niobium (Nb), which becomes superconductive at the highest temperature (9.25 K) among pure metals, is used as material for accelerating cavities. Niobium material for accelerating cavities must have a Residual Resistance Ratio (RRR) that exceeds 250.

To increase the purity of niobium, ULVAC optimized multiple conditions, including the selection of raw materials, the degree of vacuum, and melting speed by using a 600 kW EB melting furnace that was newly constructed at our group company ULVAC TOHOKU, Inc. (Hachinohe, Aomori), thereby successfully producing niobium ingots with an RRR exceeding 250.

We requested the High Energy Accelerator Research Organization (KEK) —an inter-university research institution with which we conduct joint research—to manufacture a single-cell accelerating cavity by using plates produced from these ingots and to conduct an electric field performance test. Consequently, we achieved a maximum accelerating electric field gradient of 41 MV/m (performance required for ILCs: at least 35 MV/m).

ULVAC, Inc. has developed Precise Microplate Paddle Mixer “MICROPADDLE” and started selling the product. Precise Microplate Paddle Mixer “MICROPADDLE” is the mixer for 96 well microplate that enables mixing with high precision, accuracy, and efficiency.

[Feature]

- **Low volume mixing:** Reduce sample consumption by mixing with 96 well microplate (50 - 300 μL).
- **High efficiency mixing:** Direct paddle mixing and high rotation speed enable high efficiency mixing.
- **Highly accuracy and precision mixing:** Rotation speed from 1 to 3000 min⁻¹ (1min⁻¹ increment) with ± 1% precision.
- **Low rotation speed mixing:** Available highly precise gentle mixing below 300 min⁻¹.
- **Multiple rotation speed setting simultaneously:** 12 Independent rotation speed setting in 1 microplate facilitates your optimum rotation setting search.

The use of the “MICROPADDLE” in wide range of market of Mixer with microplate, is highly expected, such as Basic research at Universities, Government Research laboratory of Medical, Pharmaceutics, and Agricultural Science, and Evaluation of products and prototypes at pharmaceutical manufacturer and diagnostic pharmaceutical manufacturer.

**Contact Information**

ULVAC, Inc.

ULVAC, Inc. has recently developed and started selling the ECO-SHOCK ES4A, a power saving accessory for dry vacuum pumps that can reduce power consumption substantially by attaching to the dry vacuum pump exhaust line.

Dry vacuum pumps consume particularly large amounts of electricity in production lines. Therefore, it is of crucial importance to reduce their power consumption. ULVAC has already released the ECO-SHOCK ES10, which reduces power consumption when attached to a dry vacuum pump exhaust line. However, it has been difficult to reduce power consumption of dry vacuum pumps that are used for frequent pumping down of loading/unloading chambers of vacuum systems and use large amounts of sealing gas.

This new product, “ECO-SHOCK ES4A”, enables a reduction in power consumption of dry vacuum pumps that are used for frequent pumping down of loading/unloading chambers of large vacuum system and use large amounts of sealing gas.

[Features]

— The ECO-SHOCK ES4A makes possible a substantial reduction in power consumption of dry vacuum pumps used for the following purposes:

(1) Dry vacuum pumps that are used for frequent pumping down of loading/unloading chambers

(2) Dry vacuum pumps that use large amounts of sealed gas

— There is no degradation of pumping speed because any control such as rotation speed
Innovation Award 2015 (AOMORI) — ULVAC TOHOKU, Inc.

Takeo Kato, President of ULVAC TOHOKU, Inc., giving a speech at the awards ceremony

Mobile power cable checker

wires and a protective earth—at the same time, and can even measure the low-value resistance of the protective earth stipulated by JIS.

In recent years, increasing numbers of highly-functional electric medical instruments have been used in operating rooms, intensive care units (ICUs) and other medical environments. However, patients are at risk of suffering electrical discharges known as “micro-shocks” that can be caused by electricity leaking from these instruments even if it is so minute that conventional measuring equipment cannot detect it.

To prevent risks from these micro-shocks, the JIS standards for medical electrical equipment set a standard for the resistance of protective earth conductors of medical instruments (0.1 to 0.2 Ω). As this resistance range stipulated by JIS is too low to be measured with general-purpose measuring equipment, the resistance value is normally measured by electricians using a special measuring system.

In response to Aomori Prefecture’s policy for promoting collaboration between medicine and engineering, ULVAC TOHOKU set about a few years ago to tackle this issue to meet the demand of the local Hachinohe City Hospital and other stakeholders. After about two years of efforts and hard work, the company has finally succeeded in developing an easy-to-measure mobile power cable checker.

This mobile power cable checker does not require any specialist knowledge or special equipment and allows the user to quickly measure the “JIS safety standards” level of resistance simply by inserting the 3P plug of the power code of the target medical equipment. ULVAC TOHOKU sees this award as a good trigger for making further progress into new areas of business.

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Stylus Profiler/ Optical Surface Profiler

ULVAC, Inc. started selling KLA-Tencor’s Stylus Profiler and Optical Surface Profiler

by KLA-Tencor Corporation (Headquarter: California, USA).

Those profilers have the capability to measure the fine shape and the roughness of various sample surface with high precision, and measure a various applications from R&D to production, in many area like Semiconductors, Displays, Electronics, Optical Components, MEMS etc.

[Product Range]
1. Stylus Profiler (4 models)
   • Alpha-Step D-500:
   • Ø150mm manual stage
   • Ø200mm auto stage
   • P-7, Ø150mm auto stage
   • P-17, P-17 OF:
   • Ø200mm (P-17 OF: 300mm) auto stage
2. Optical Surface Profiler (2 models)
   • MicroXAM-100:
   • 100 × 100mm manual stage
   • MicroXAM-800:
   • Ø150mm auto stage

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